Saltmarsh Monitoring Project 2007-2008

Volume 3

Contract reference D/C/227

Final Report (2009)

Mark McCorry & Tim Ryle

A Report for Research Branch, National Parks and Wildlife Service

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

Table of Contents
Site Reports Volumes 2-5

Volume number	County	Coastal Sitename	Coastal Sitecode
2	Clare	Bunratty	564
2	Clare	Inishdea, Owenshere	566
2	Clare	Killadysart, Inishcorker	567
2	Clare	Knock	568
2	Clare	Lahinch	085
2	Clare	Querin	569
2	Clare	Rinevilla Bay	570
2	Clare	Scanlan's Island	571
2	Clare	Shepperton, Fergus Estuary	565
2	Cork	Ballybrack	552
2	Cork	Ballymacoda	054
2	Cork	Ballyrisode House	553
2	Cork	Barley Cove	064
2	Cork	Bawnard	548
2	Cork	Carrigatoohil	549
2	Cork	Harbour View	057
2	Cork	Jamesbrook Hall	547
2	Cork	Rock Castle, Bandon Estuary	550
2	Cork	Seafort	551
2	Donegal	Creeslough	600
2	Donegal	Dooey	160
2	Donegal	Fahan	531
2	Donegal	Glen Bay	146
2	Donegal	Green Hill	529
2	Donegal	Keadew	153
2	Donegal	Laghy	598
2	Donegal	Lower Lough Swilly	530
2	Donegal	Maghera	147
2	Donegal	Mullansole	142
2	Donegal	Rathmelton	528
2	Donegal	Ray	527
2	Donegal	Rosapenna	166
2	Donegal	Roshin Point	150
2	Donegal	Rossmore	599
2	Donegal	Sheskinmore	148
2	Donegal	Tawny	601
2	Dublin	Baldoyle Estuary	503
2	Dublin	Booterstown	533
2	Dublin	Bull Island	504
2	Dublin	Malahide Estuary	502
2	Dublin	Rogerstown Estuary	501
3	Galway	Barna (Whitestrand)	093
3	Galway	Bealandangain	583
3	Galway	Cleggan	586
3	Galway	Furbo	579
3	Galway	Kilcaimin	575
3	Galway	Kileenaran	573
3	Galway	Kinavarra	584
3	Galway	Kinvarra-West	572
3	Galway	Lettermore South	582
3	Galway	Lettermullan West	581

Volume number	County	Coastal Sitename	Coastal Sitecode
3	Galway	Mannin Bay	102

Volume number	County	Coastal Sitename	Coastal Sitecode
3	Galway	Oranmore North	576
3	Galway	Roscom West and South	577
3	Galway	Seaweed Point	578
3	Galway	Tawin Island	509
3	Galway	Teeranea	580
3	Galway	Turloughbeg	585
3	Galway	Tyrone House - Dunbulcaun Bay	574
3	Kerry	Ballyheige	078
3	Kerry	Carrigafoyle	561
3	Kerry	Cromane	558
3	Kerry	Dereen House	554
3	Kerry	Dinish	555
3	Kerry	Emlagh East	560
3	Kerry	Inch	070
3	Kerry	Rossbehy	068
3	Kerry	Tahilla	556
3	Kerry	West Cove	557
3	Kerry	Whitegate, Fybagh	559
3	Kilkenny	Ringville	544
3	Kilkenny	Rochestown	543
3	Limerick	Barrigone, Aughinish	562
3	Limerick	Beagh	563
3	Louth	Baltray	002
3	Louth	Dundalk	532
4	Mayo	Aasleagh Falls	587
4	Mayo	Annagh Island	519
4	Mayo	Aughness	591
4	Mayo	Bartragh Island	523
4	Mayo	Bartraw	520
4	Mayo	Bellacragher Bay	521
4	Mayo	Bunnahowen	593
4	Mayo	Caraholly South	517
4	Mayo	Dooaghtry	510
4	Mayo	Kiladangan	518
4	Mayo	Lackan	522
4	Mayo	Leam Lough	125
4	Mayo	Mallaranny	511
4	Mayo	North Achill Sound	588
4	Mayo	Owenduff, Corraun	590
4	Mayo	Rockfleet Castle	515
4	Mayo	Rosharnagh East	516
4	Mayo	Rosmurrevagh	513
4	Mayo	Ross	524
4	Mayo	Rusheens	525
4	Mayo	Saleen Harbour	594
4	Mayo	Salia West	589
4	Mayo	Srah South	121
4	Mayo	Tierna	514
4	Mayo	Tooreen	512
4	Mayo	Trawboy	117
4	Mayo	Tullaghan Bay	592
4	Meath	Mornington	003
4	Sligo	Ballysadare Bay	595
4	Sligo	Castleconor	526
4	Sligo	Cummeen Strand	596
4	Sligo	Drumcliff Bay	597

Volume number	County	Coastal Sitename	Coastal Sitecode
4	Sligo	Strandhill	133
4	Sligo	Streedagh Point	137
5	Waterford	Cunnigar Point	050
5	Waterford	Kinsalebeg	546
5	Waterford	Little Island	545
5	Waterford	Tramore	046
5	Wexford	Ballyteige Burrow	041
5	Wexford	Bannow Island	042
5	Wexford	Castlebridge	534
5	Wexford	Clonmines	536
5	Wexford	Dunbrody Abbey	541
5	Wexford	Duncormick	506
5	Wexford	Ferrycarrig	535
5	Wexford	Fethard	540
5	Wexford	Gorteens	539
5	Wexford	Grange	043
5	Wexford	Killowen	542
5	Wexford	Rosslare	036
5	Wexford	Saltmills	538
5	Wexford	Taulaght	537
5	Wicklow	Kilcoole	013

Barna House

1 SITE DETAILS

SMP site name: **Barna House**	SMP site code: **SMP0096**
Dates of site visit 2**9**/**10**/**2007**	CMP site code: **N**/**A**
SM inventory site name: **Barna House**	SM inventory site code: **113**
NPWS Site Name: **Galway Bay Complex**	
NPWS designation cSAC: **000208**	MPSU Plan: **old format plan available**
pNHA: **000208**	SPA: **004031**
County: **Galway**	Discovery Map: **45** Grid Ref: **125000, 223000**
Aerial photos (2000 series): **O 3407-C,D; O 3469-A**	6 inch Map No: **Ga093**

Annex I habitats currently listed as qualifying interests for Galway Bay Complex cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **Scanlan's Island, Kinavarra West, Kileenaran, Tyrone House-Dunbeacon Bay, Kilcaimin, Oranmore North, Roscom West and North, Seaweed Point**

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

2 SITE DESCRIPTION

This site is located along the north side of Galway Bay and is situated between Salthill and Barna Village. A relatively large area of intertidal flats is present in a sheltered bay called White Strand (or Rusheen Estuary) and is protected from Galway Bay by a narrow low-lying peninsula in Derryloney Townland that connects a taller hill (Knockagoneen) with a smaller vegetated shingle/gravel/cobble bank further east. The tall hill is eroding and a cliff face has developed along the seaward side. A mixed sandy sediment and storm beach known as Silver Strand is situated along the seaward side of this peninsula. Several streams flow into the White Strand. The east side of White Hill is protected by Blakes Hill. There is only a small opening into the White Strand at the south-east corner.

Saltmarsh is distributed around the shoreline of White Strand, with some larger patches developing in more sheltered flatter areas. The immediate terrestrial zone around the Silver Strand is relatively un-developed, but there is significant urban development in the area. The Silver Strand beach on the peninsula has been developed by Galway Council into an important local amenity area. A minor road located along the west side of the bay/estuary accesses the Silver Strand beach and amenity area. The grassland on the Silver Strand (Derryloney) peninsula is grazed, as is the adjacent hill. Most of the saltmarsh around the shoreline of the Silver Strand was surveyed apart from the section within Rusheen Townland at the north-east corner of the bay.

The site is located within the Galway Bay Complex candidate Special Area of Conservation (cSAC 208). Three Annex I habitats are present at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All these habitats are listed as

qualifying interests for the Galway Bay Complex cSAC. Most of the saltmarsh habitats mapped at this site is located within the cSAC boundary. There are several fragments of Annex I habitats located outside the boundary around the site. Some are unintentional exclusions, as the 6 inch map was used to draw the cSAC site boundary and there are some errors between this map and the actual ground as indicated from the aerial photos. Some of these habitat fragments are found in adjacent fields excluded from the cSAC.

Sea Purslane (*Atriplex portulacoides*) is one species of local distinctiveness that is present at this site and is associated with the vegetated shingle/gravel/cobble bank located at the east of the site. This species is mainly distributed along the eastern coast of Ireland and is only found in six 10 km^2 squares along the west coast (Preston *et al.* 2002).

Part of the western side of this site (Lenarevagh Townland) is included within the Bearna Local Area Plan Strategic Environmental Assessment (CAAS Environmental Services 2007). This report notes the presence of saltmarsh habitat in the Rusheen Estuary where the Lenarevagh Stream reaches the tidal zone. This area was also surveyed as part of the Galway City Habitat Inventory (Natura 2006).

The southern part of the site was accessed from the car park along the beach. The area to the east is fenced off and marked private land. The north-western part of the site was accessed from a new park developed by Galway County Council.

3 SALTMARSH HABITATS

3.1 General description

There are several patches of saltmarsh surveyed at this site. Atlantic salt meadow is the most dominant Annex I saltmarsh habitat (Table 3.1). This site, due to the diverse landscape around the bay/estuary also increases the diversity of the saltmarsh topography and its transitions to terrestrial habitats. The largest area of ASM is found along the landward side of the stony bank at the south-western section of the site. There are narrow bands of this habitat around much of the shoreline of the southern section of White Strand. Some of these bands could be classified as ASM/rocky mosaic, as there are frequent loose rocks and exposed rock scattered over the saltmarsh strip. These bands have developed on thin bands of sediment that are eroding in places and rocks and cobbles are frequently exposed.

The ASM transitions at its upper boundary to upper saltmarsh dominated by Twitch (*Elytrigia repens*) and then to dry coastal grassland (GS1) on the vegetated gravel/cobble bar to the south-east. The vegetation dominated by Twitch has been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. A fence, stone wall or hedge occurs along the landward edge of the narrow bands of ASM around the tall hill. The north-western section of ASM transitions to small amounts of dry coastal grassland or CM2 dominated by Twitch, although much of the terrestrial area has been modified to create a new park. Atlantic salt meadow transitions to dry and wet grassland along the south-west grazed section of the site. The ASM generally transitions at its lower boundary to mixed gravely sediment and onto the intertidal mud and sand flats.

Mediterranean salt meadow habitat is found along the western side of the site where the Lenarevagh Stream reaches the tidal zone. A bridge has been built over the stream to access the Silver Strand beach and this divides the saltmarsh habitats. There is a narrow

band of MSM saltmarsh habitat extending west along the edges of the stream and also along several drainage channels before this vegetation transitions into wet grassland. The area east of the road bridge contains MSM and brackish habitat 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 classification. This area is cut off from the rest of the estuary by a small seawall and culvert that may have been used as an old footbridge in the past. A narrow band of MSM occurs along the shoreline in the north-west corner of the estuary and there is a small of Common Reed in this area.

Small patches of *Salicornia* flats are found along the southern side of the White Strand adjacent to ASM habitat in sheltered areas. One small patch is located at the tip of the vegetated cobble bar in a sheltered pan or hollow within the ASM.

Table 3.1. Area of saltmarsh habitats mapped at Barna House.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand	0.067
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	2.240
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.418
	Total	**2.725**

*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 southern part of the site. This habitat only occurs in very small patches. It mainly occurs on muddy sediment or mixed sediment along the seaward side of the ASM. The patches of 1310 *Salicornia* flat habitat are dominated by Glasswort (*Salicornia europaea*) and occur on mud or occasionally on mixed sediment. The largest area is located at the south-west corner of Knockagoneen Hill and is only 5 m wide at its widest point.

This habitat also occurs in several small pans or hollows containing mud (< 5m^2) at the tip of the shingle/cobble bank. The patches contain a sward of Glasswort with no other species present. There is a definite boundary between the 1310 vegetation and the ASM around the edge of the pans.

3.3 Atlantic salt meadows (H1330)

This is the most dominant Annex I saltmarsh habitat on the site. It is also quite variable, which is to be expected on a site where the saltmarsh habitat is quite spread out over a relatively large distance, occurring in different situations. Several typical ASM vegetation communities are present and there are also mosaics with MSM habitat. The largest portions of habitat occur along the gravel/cobble bank and along the inner part of the southern peninsula.

The inner sheltered part of the gravel/cobble bank has a narrow band of ASM that widens out towards the tip. The narrow band is on a relatively steep slopes and displays typical zonation with Common Saltmarsh-grass dominated at the seaward edge and Red Fescue (*Festuca rubra*) dominating towards the upper landward edge. Other species present in the lower community includes Lax-flowered Sea Lavender (*Limonium humile*), Glasswort, Annual Sea-blite (*Suaeda maritima*), Sea Aster (*Aster tripolium*) and Greater Sea-spurrey (*Spergularia*

media). The upper saltmarsh community contains Sea Plantain (*Plantago maritima*), Common Scurvygrass (*Cochlearia officinalis*). Creeping Bentgrass (*Agrostis stolonifera*) also occurs close to the upper saltmarsh boundary.

Sea Purslane, while rare on the site, is relatively abundant on the gravel/cobble bar to the south-east. This bar is fenced off from the adjacent hill and is not grazed, which may be influencing the abundance of this species.

There is an accretion ridge along part of this seaward boundary, indicating some very minor saltmarsh growth, although towards the tip a low saltmarsh cliff (0.4 m high) develops along the seaward boundary and there are signs of erosion. The saltmarsh topography in this section is poorly developed. The saltmarsh vegetation is more complex at the tip of the shingle/cobble bank and a typical mid-marsh zone *Armeria-Plantago* sward has developed. This area contains some saltmarsh pans. The saltmarsh in this area has been grazed lightly.

A narrow (2-3 m wide) fragmented strip of rocky ASM occurs around the large hill (Knocknagoneen). There are frequent signs of erosion with patches of vegetation on sediment overlaying rocks and cobbles.

The ASM located at the south-west corner of Knocknagoneen Hill also has an accretion ridge on a shallow slope where pioneer ASM transitions to 1310 *Salicornia* flats. The pioneer ASM contains scattered patches of Common Saltmarsh-grass and rare Lax-flowered Sea Lavender. The ASM continues west along the shoreline around a low-lying area of wet grassland, dry grassland and scrub. An old dry stone wall is situated along the lower saltmarsh boundary. The upper boundary of the ASM communities is sometimes difficult to distinguish as this area was heavily grazed. There is an interior network of low-lying channels and mounds in the inner section, creating a variety of habitats. There are also several drains in this area. The inner part of this section was not examined in detail due to livestock on the site. There may be some saltmarsh influence along some of these drains.

Atlantic salt meadow habitat is also located along the north side of the estuary, with a low saltmarsh cliff along the seaward boundary. This area also has developed a typical short *Armenia-Plantago* sward in a relatively flat section and is possibly grazed by wildfowl. This relatively flat area has also developed some typical mid marsh saltpans and small creeks. An additional ASM community with Saltmarsh Rush, Sea Plantain and Red Fescue has developed along the landward transition of this area of saltmarsh. The upper saltmarsh boundary is marked by an old wall and grassy bank in places.

3.4 Mediterranean salt meadows (H1410)

This habitat is mainly located at the west side of the site on either side of the small road that accesses Silver Strand beach and car park. This area contains very soft mud and is cut off from the main part of Rusheen Estuary bay an old seawall with a culvert. The tides influence this low-lying area containing a small section of bare mud and adjacent saltmarsh.

The MSM habitat on the east of the road contains dense sward of Sea Rush with few other species on soft mud. There are occasional open patches in the MSM with Common Saltmarsh-grass with Sea Aster. The Sea Rush appears to be spreading into the bare mud section near the channels. Other species such as Common Scurvygrass, Saltmarsh Rush, Creeping Bent, Sea Milkwort, Red Fescue and Silverweed (*Potentilla* anserina) appear closer to the roadside and the edges of the MSM. This section has been badly poached in the past

with significant bare mud present with the MSM, although the vegetation has now recovered somewhat.

The habitat is brackish in places and patches of Sea Club-rush (*Bolboschoenus maritimus*) develop along some of the open bare mud area on the northern side of the channel. A diverse transitional vegetation community influenced by freshwater seepage and containing Sea Rush, Sea Club-rush, Autumn Hawkbit (*Leontodon autumnalis*), Curled Dock (*Rumex crispus*), Brookweed (*Samolus valerandi*), White Clover (*Trifolium repens*), with patches dominated by Creeping Bent and Red Fescue has developed to the north of the central channel. This habitat transitions to wet grassland with a greater freshwater influence higher up the shoreline slope.

Mediterranean salt meadow habitat also occurs along the north-western shoreline. This habitat is relatively narrow and diverse in places with fragments of ASM interspersed with patches dominated by Sea Rush and creating a mosaic. The MSM vegetation is therefore more diverse and also contains species such as Sea Plantain and Common Scurvygrass. Some zonation within the MSM is evident and is seen in the other ASM species. The MSM habitat encroaches behind on old dry stone wall marking an old field boundary. This habitat is rocky in places. Further north the habitat transitions to a band of Common Reed.

The tidal influence extends further west of the road by a culvert under the road and Sea Rush and Sea Club-rush is distributed along the sides of a small drain/stream. The habitat on the west side of the road is not grazed or is only grazed lightly.

4 IMPACTS AND ACTIVITIES

Several impacts and activities affect this site with a range of intensities (Table 4.1). Some parts of the site are grazed lightly (140), while other sections have been damaged by poaching and overgrazing (143). A path used by walkers and grazing animals accessing the tip of the shingle/cobble bank crosses some of the saltmarsh (501).

Erosion (900) at the site is not significant. Some of the lower saltmarsh boundaries have low saltmarsh cliffs, but this is typical of this sort of sheltered site. The impact of erosion is assessed as neutral. There are also signs of accretion (910) along the lower ASM boundary at several locations around the site. A comparison of the OSI 2nd 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. The position of the shingle/cobble bank has changed somewhat at its tip in the past 100 years, with some minor losses and gains to the saltmarsh. Accretion is still continuing but there has been no measurable growth of saltmarsh in the current monitoring period.

Impacts and activities adjacent to the site include urbanization (401), amenity use of the Silver Strand beach (629) and grazing of livestock (140). These activities have little or no measurable impact on the saltmarsh habitats. Toilet facilities are situated adjacent to the Silver Strand car park and beach amenity area and there is some runoff of sewage from these buildings into the estuary that affects the saltmarsh at this location (701). There is a quarry situated on Knocknagoneen Hill and some work related to the quarry has disturbed part of the narrow strip of ASM around the hill (301).

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	140	C	0	0.067	Inside
1330	140	B	0	1.477	Inside
1330	143	B	-1	0.763	Inside
1330	501	C	0	0.010	Inside
1330	622	C	0	0.010	Inside
1330	900	C	0	0.05	Inside
1330	910	C	+1	0.12	Inside
1410	143	B	-1	0.418	Inside
1410	900	C	0	0.01	Inside
1330	701	C	-1	0.100	Outside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

The overall conservation status of this site is *unfavourable-bad* (Table 5.1). The main activity affecting the site is poaching and over-grazing and this activity affects part of the site. Barna House saltmarsh is a relatively small site but with several features of interest such as, the presence of typical saltmarsh vegetation and topography, natural transitions to other coastal habitats including a shingle/cobble bar and natural transitions to diverse brackish vegetation. A species of local distinctiveness (Sea Purslane) is present on the site. Three monitoring stops failed out of ten total stops. The saltmarsh is protected from significant erosion by the shelter of the estuary (White Strand). The area is an important amenity site, although the saltmarsh habitats are not affected by this use directly (apart from runoff from the toilet facilities on the site).

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are poor-moderate. There is some scope for landward transition of saltmarsh vegetation up slope into wet grassland vegetation in the western part of the site. The rest of the saltmarsh has steeper slopes along the upper boundaries (on the shingle/cobble bank) or has hard upper boundaries. However, these are very general predictions.

This site is located within the Galway Bay Complex cSAC. An old format NPWS management plan is available for the saltmarsh habitats at this cSAC but it is now out of date.

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

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

The extent of this habitat is assessed as *favourable*. This habitat is distributed at several locations along the edge of the ASM and is also found in several small patches in pans within the ASM. There are no indications of any loss of habitat due to erosion or to land-use changes. There are no indications that this habitat was more extensively distributed over the intertidal mud and sand flats of the White Strand/Rusheen Estuary.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. No monitoring stops were carried out in this habitat due to the small extent in total. However, a visual assessment of the habitat indicated that it would probably pass for all attributes. Two ecotypes were present with Glasswort filling some of the small muddy pans on the saltmarsh and several patches also occurring adjacent to the seaward boundary of the ASM. There are natural transitions along a shallow slope from adjacent ASM to 1310 *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 few impacts or activities affecting this habitat at this site, although a small extent is present. 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 loss of habitat due to erosion or to land-use changes within the current monitoring period.

Small positional changes at the tip of the shingle/cobble bar have led to some gains and losses of saltmarsh habitat in the past 100 years. However, these largely compensate each other and 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-bad*. Seven 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 saltmarsh vegetation is present at this site. The saltmarsh topography is moderately well-developed. There are natural transitions to other coastal habitats 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 two 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^2 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 is the main activity affecting part of the ASM at this site. There are few other impacts or activities significantly affecting this site. There are few prospects for the loss of habitat due to erosion in the future. The site is within a cSAC so the habitat should not be affected by land-use changes such as development.

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 erosion or to land-use changes within the current monitoring period. Only a small area of this habitat was recorded at this site, although it is more frequent at other saltmarshes around Galway Bay.

5.4.2 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 one failed. Most of the attributes required for the structure and functions of this habitat reached their targets. The main reason for the failed stop was overgrazing and poaching damage. The species composition of this was typical of this habitat. Some zonation was noted in the habitat and this was noted from other saltmarsh species. There are also mosaics present with ASM and diverse transitional communities with brackish habitats. The topography was poorly developed, but this is typical of a small patch of habitat.

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 such as grazing continue in the near future. Overgrazing and poaching is the man activity affecting part of the MSM at this site. There are few other impacts or activities significantly affecting this site. There are few prospects for the loss of habitat due to erosion in the future. The site is within a cSAC so the habitat should not be affected by land-use changes such as development.

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for the Annex I saltmarsh habitats present at this site. The area of saltmarsh affected by overgrazing and poaching is relatively small.

7 REFERENCES

CAAS Environmental Services (2007). *Environmental report of the Bearna local area plan 2007 - strategic environmental assessment.* A report for Galway County Council.

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

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.

Long, M. (2001) *A study of the Rusheen Bay, Barna Woods and Silver Strand area (Galway) and proposals for its management*. MSc thesis. Ecosystem Conservation and Landscape Management, NUI Galway.

Natura (2006). *Galway City habitat inventory*. A report for Galway City Development Board. Galway County Council.

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

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats	0.067	0.067				
2	Spartina swards						
3	1330 Atlantic salt meadow	2.073		2.073			
4	1410 Mediterranean salt meadow	0.350			0.350		
5	ASM/MSM mosaic (50/50)	0.136		0.068	0.068		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	0.443					
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)	0.396					
19	1330/rocky shore mosaic	0.198		0.099			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
Total		**3.663**	**0.067**	**2.240**	**0.418**		

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

Saltmarsh Monitoring Project 2007-2008

Barna

Galway Bay Complex SAC (000268)

SMP code: SMP0096

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

0 50 100 150 200 250 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:3500

N

Bealadangan

1 SITE DETAILS

SMP site name: **Bealadangan**		SMP site code: **0101**
Dates of site visit: **31/10/2007**		CMP site code: **N/A**
SM inventory site name: **Bealadangan**		SM inventory site code: **101**
NPWS Site Name: **Kilkieran Bay and Islands**		
NPWS designation	cSAC: **2111**	MPSU Plan: **Old format plan**
	pNHA: **N/A**	SPA: **N/A**
County: **Galway**		Discovery Map: **45** Grid Ref: **92500, 229850**
Aerial photos (2000 series): **O 3334-D; O 3397-B**		6 inch Map No: **Ga 078**

Annex I habitats currently listed as qualifying interests for Kilkieran Bay and Islands cSAC:

H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

H1410 Mediterranean salt meadows (Juncetalia maritimi)

Other SMP sites within this SAC/NHA: **Teeranea, Lettermullan West, Lettermore South, Kinavarra, Turloughbeg**

Saltmarsh type: **Fringe** Substrate type: **Peat**

2 SITE DESCRIPTION

Bealadangan saltmarsh is located in west Co. Galway in the south-eastern corner of Kilkieran Bay. This part of the bay is called Greatman's Bay. This area is 5 km north of Carraroe Village and is located east of the road embankment over to Lettermore Island. One feature of this site is an old RTE mast that was built on blanket bog in the middle of the site. This part of the bay is moderately sheltered and there is extensive bed rock with Wrack cover lining the shore of this part of the bay in the more exposed areas. The landscape of this area is quite low-lying and dominated by patches of blanket bog, heath and outcropping rock with associated scrub, small pools and lakes and transitional habitats such as wet grassland.

The saltmarsh is a typical 'fringe' type site. Most of the saltmarsh is found in a basin between the main regional road to Letterrmore Island (R374) and a connecting minor road to the south on higher ground. Blanket bog has been inundated by the tide and a complicated mosaic of saltmarsh habitat, cutover blanket bog, pools, scrub and exposed rock has developed that is related to the local topography. The structure of the site has been further complicated by peat-cutting in the past, which has created old channels now containing saltmarsh vegetation along side old remnant face-banks with blanket bog vegetation. The distribution of mounds and hollows over a relatively uniform area influences the distribution of saltmarsh in hollows with blanket bog vegetation still remaining in some of the low mounds and face-banks. There is an extensive band of rocky shoreline with abundant Wrack cover to the seaward side of this

saltmarsh. Saltmarsh extends along some low-lying channels into the blanket bog for some distance. Tidal inundation seems to extend along a main channel into a small pool and continues westwards along connecting channels. The survey site was limited to the saltmarsh south of the regional road, although the channel containing ASM continues further north into Lough Fhada.

These channels connect to Lough Aughnagaddy (Loch na Ghadai) and the Lough Fhada complex. Both these Loughs have been identified as lagoons and have been surveyed for NPWS in the past (Roden 1998, NPWS 2007). The two small pools connected to channels through the Bealadangan saltmarsh are also part of the Lough Fhada complex. These pools are also listed on the Lagoon inventory (NPWS 2007). Lough Fhada and Loch na Ghadai are influenced by a tidal connection to the north of this site, through Loch na Aibhnin and connected to Camus Bay in the north-east part of Kilkieran Bay. However Roden (1998) does mention that Loch na Ghadai is also flooded from the Bealadangan side during spring tides.

Both Loch na Ghadai and Lough Fhada are classified as rock/peat lagoons, which are saline loughs with a tidal connection, sometimes through blanket bog. The two Lough Fhada upper pools have been classified as 'Saltmarsh' lagoons, which are more like large deep pools in saltmarsh (NPWS 2007). The two Lough Fhada upper pools are both in the mid range salinity while Lough Fhada itself has a somewhat higher salinity with a Zostera/Ruppia community. Loch na Ghadai is calssified as a low salinity, *Potamogeton/Ruppia* lagoon (Oliver 2005).

The saltmarsh influence is limited by the minor road embankment, although some brackish influence can be seen on the vegetation east of this minor road in low-lying land adjacent to Lough Aughagaddy. The small pool west of Lough Aughagaddy could be classed as a lagoon.

This site is part of Kilkieran Bay and Islands candidate Special Area of Conservation (cSAC 2111). This large coastal cSAC contains a wide range of habitats of notable conservation interest, including open marine water, sub-tidal habitats, coastal habitats such as machair and lagoons. Two Annex I saltmarsh habitats are present at this site, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Both these habitats are listed as qualifying interests for this cSAC in addition to *Salicornia* flats, which was not found at this site. Saltmarsh has also developed at several other locations around this bay in this SAC. Several of these sites are listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and were also surveyed during the Saltmarsh Monitoring Project (see the site details table above).

Most of the saltmarsh habitat mapped at this site is located inside the cSAC boundary. This is mainly due to the fact that the upper shoreline on the OSI 6 inch map was used to draw the cSAC boundaries and this enclosed most of the land covered by spring tides. There are some patches of saltmarsh habitat extending beyond this boundary in places, particularly

where there has been peat-cutting. There are also some notable differences between shoreline boundary on the OSI 6 inch map and the current shoreline.

Turf fucoids are the only species of local distinctiveness recorded at this site and these are typical of saltmarsh found on peat along the western coast of Ireland.

Access onto the main portion of the site, whose land is held in commonage, is via a local road which is adjacent to a television transmission tower.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh habitats at this site have developed in a complicated mosaic with patches of relic blanket bog vegetation and exposed rock. This site is unusual in that the saltmarsh vegetation, which has developed on peat, is dominated by Atlantic salt meadows (ASM) (Table 3.1). There are only several minor patches of MSM in the main section of saltmarsh with the largest section of MSM found along the banks of the deep pool towards the south-east corner of the site. The structure of the main section has been significantly modified by peat cutting in the past. Saltmarsh vegetation extends along low-lying channels and hollows, many of which are not natural but have been created by the peat cutting. These channels extend into more typical modified blanket bog vegetation with species such as Purple-Moor-grass (*Molinia caerulea*), Common Reed (*Phragmites australis*), Sea Club-rush (*Bolboschoenus maritimus*), Grey Sea-rush (*Schoenoplectus lacustris* spp. *tabernaemontani*) appearing in these channels. There are also terrestrial grassy banks (old face-banks) within the saltmarsh that are dominated by Creeping bent-grass and Red Fescue and also contain terrestrial species such as Silverweed (*Potentilla anserina*), Carnation Sedge, Birdsfoot (*Lotus corniculatus*) and Tormentil (*Potentilla erecta*). Bog species such as Purple Moor-grass, Bog-cottons and Black Bog-rush also appear on some of the higher peat banks. Further east towards the landward side of the main section there is some transition to more brackish habitats and pockets of Sea Club-rush, Grey club-rush and Common Reed appear in some small pools and channels.

The development of the minor road around the southern side of the site has also partially enclosed or isolated several small pools and pockets of ASM vegetation from the main area. Several of these pools are likely to be brackish and contain stands of Common Reed and some Sea Club-rush and are connected via drainage pipes under the road. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. There are some signs of old lazy-beds in the ASM located on the south side of the minor road.

Table 3.1. Area of saltmarsh habitats mapped at Bealadangan.

EU Code	Habitat	Area (ha)
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	3.634
H1410	Mediterranean salt meadows (Juncetalia maritimi)	0.285
	Total*	**3.919**

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

3.2 Atlantic salt meadows (H1330)

Several typical ASM vegetation communities were recorded at this site. Much of the vegetation is dominated by mid marsh and mid-upper marsh communities. The mid marsh community is dominated by Sea Pink (*Armeria maritima*) and Sea Plantain (*Plantago maritima*) with a small amount of Common Saltmarsh-grass (*Puccinellia martima*), Common Scurvy-grass (*Cochlearia officinalis*), Sea Milkwort (*Glaux maritima*), Sea Arrowgrass (*Triglochin maritimum*) and Glasswort (*Salicornia* sp.). There is some zonation along the edges of some of the low-lying channels and low mounds to mid-upper marsh with increased cover of Red Fescue (*Festuca rubra*) and Saltmarsh Rush (*Juncus gerardii*) in places. Some of this saltmarsh contains a very high cover of bare peat cover. Species like Common Saltmarsh-grass disappear and species like Creeping Bent (*Agrostis stolonifera*) and Long-bracted Sedge (*Carex extensa*) appear in the vegetation. Clumps of Sea Rush (*Juncus maritimus*) are also scattered through the ASM in places but at low densities. Turf fucoids are also present on some of the bare peat exposed within the mid marsh community.

The upper saltmarsh community appears along the edge of some of the terrestrial banks within the saltmarsh. This vegetation is grassy and is dominated by Red Fescue with frequent Creeping Bent and Long-bracted Sedge. Other species appearing within this vegetation include White Clover (*Trifolium repens*) and Buck's-horn Plantain (*Plantago coronopus*). Further east there is some development of brackish communities along the edge of drainage channels and pools dominated by Spike-Rush (*Eleocharis* sp.) and also containing Sea Plantain and Saltmarsh Rush.

The lower zone community is poorly represented at this site. However it is present along the edges of some of the channels through the saltmarsh and on some of the peat platforms along the seaward side of the saltmarsh that are positioned at a lower height compared to the rest of the blanket bog. This community is dominated by Common Saltmarsh-grass and contains small amounts of Sea Pink, Sea Aster, Sea Plantain, Glasswort and Sea Arrowgrass. This zone is quite narrow along the main drainage channel through the saltmarsh and along some of the smaller connecting channels.

The structure of the ASM has been considerably modified. However, some of the newer features created by peat cutting and drainage are now similar to natural salt pans and drainage channels. Some of the main natural drainage channels out to the seaward side of the marsh are quite deep where the channel has cut through the peat.

Narrow bands of grassy saltmarsh vegetation extend along the low-lying channels towards the eastern side of the site where the minor road links to the regional road. These channels connect the Lough Fhada upper pools to Lough Fhada and the vegetation is dominated by Red Fescue with frequent Saltmarsh Rush and Creeping Bent and also contains small amounts of Common Scurvy-grass, Sea Aster, Sea Plantain, Sea Pink, Sea Rush and Sea Arrowgrass.

3.3 Mediterranean salt meadows (H1410)

The MSM at this site is typically dominated by a dense sward of Sea Rush that has colonised peat. The largest section is located around the margin of one of the Lough Fhada upper pools. Other species present within this vegetation type include Sea Pink, Sea Aster, Creeping Bent, Sea Milkwort, Red Fescue, Autumn Hawkbit, Sea Plantain and Sea Arrowgrass. The largest section was badly damaged by overgrazing and was quite species poor in places where sheep had stripped away the other vegetation leaving the tussocks of Sea Rush surrounded by bare peat. The saltmarsh topography is poorly developed in this habitat, but there is mainly due to the relatively small extent of the MSM.

MSM is also found in some transitional situations where Sea Rush dominated sward extends along channels and old face-banks into the blanket bog. Purple Moor-grass appears in this vegetation type. This is the main example of zonation within this habitat.

4 IMPACTS AND ACTIVITIES

This site is not affected by many impacts and activities (Table 4.1). Grazing of sheep is probably the main activity currently affecting the site (140). The site is grazed as commonage and some of the sward is extremely low with negative indicators such as eroding patches of bare peat substrate and area of heavy poaching evident (143). There are some old tracks accessing the saltmarsh that were used to access peat cutting face-banks (501).

There are some indications of erosion (900) at this site. There are common indicators of erosion such as the presence of a saltmarsh cliff along the seaward edge and some slumps of this cliff in places to leave exposed and isolated peat hags. A comparison of the OSI 2nd edition 6 inch map to the current 2005 aerial photos shows that there has been some retreat of the blanket bog and saltmarsh due to erosion of peat along the seaward edge during this period. However, there has been no measurable erosion within the current monitoring period.

There is also some poaching-induced erosion of the saltmarsh surface in places. The impact of erosion is assessed a having a low negative influence.

Peat has been cut from the site in the past (311). There are old face-banks scattered over the site and this activity is likely to have significantly increased the overall extent of saltmarsh with ASM vegetation colonising channels and low-lying areas where peat has been cutaway. This activity has significantly modified the natural structure of the saltmarsh at this site. There are no signs of any recent peat-cutting activity at this site. Therefore this activity was not assessed even though it has had a considerable residual impact.

The site has also been modified by the construction of the radio mast (803). Part of the saltmarsh and blanket bog has been infilled to create a foundation and access causeway to the mast across a channel. The construction of the minor road, which crosses a low embankment across some low-lying areas, has also modified the structure of the original saltmarsh, including drainage and tidal inundation into several of the small pools around the site. These impacts are not assessed as they occurring outside the current monitoring period.

Impacts and activities adjacent to the site include grazing (140) (of bog and wet grassland), peat-cutting (312), dispersed habitation (403) and minor roads (502). These activities have little or no measurable impact on the saltmarsh habitats.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	B	0	1.0	Inside
H1330	143	B	-1	2.6	Inside
H1330	501	C	-2	0.001	Inside
H1330	900	C	-1	0.05	Inside
H1410	143	B	-1	0.285	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the NHA survey, the 1995, 2000 and 2005 OSI aerial photo series. The baseline information from the NHA survey

is generally limited to some descriptions of saltmarsh habitat and does not record the specific condition of the saltmarsh during the survey at this site. The limited descriptions of this site in the NHA files indicate that the vegetation of this site has not significantly changed since this survey.

Bealadangan saltmarsh is site with several features of conservation interest, particularly the transitions to brackish vegetation types towards the landward side that have developed in a series of old peat-cutting channels and also around the margins of a series of lagoons that are part of the Lough Fhada complex. The saltmarsh also forms a mosaic with modified blanket bog vegetation on low mounds. The structure of the saltmarsh has been considerably modified by peat cutting in the past and this activity is likely to have significantly increased the extent of the saltmarsh habitat. The overall conservation status is unfavourable-bad due to severe overgrazing by sheep in places.

This site is located within the Kilkieran Bay and Islands cSAC. An old format NPWS Conservation management plan is available for this cSAC but it is now out of date.

The conservation status of the lagoons adjacent to this site has already been assessed (NPWS 2007). Loch na Ghadai had a *favourable* conservation status while to two smaller pools had an *unfavourable-inadequate* conservation status. No major impacts were affecting Lough na Ghadai while the two smaller pools (L. Fhada upper pools) were negatively affected by decaying algae and also affected by dumping, silting up and urbanisation.

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

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

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. There are indications of an erosional trend along the seaward side of this site but nay erosion is likely to be at a very slow rate.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-bad*. Six monitoring stops were carried out in this habitat and three stops failed. This site is badly damaged due to severe over-grazing from sheep and the appearance of several negative indicators such as bare peat substrate and heavy poaching was the main reason for the failed stops. Heavy poaching may also be inducing localised erosion of the saltmarsh surface in places. The sward height of some sections was also quite uniform in places. The grazing intensity was variable and some sections are still in good condition with a more typical sward height.

The species diversity in this habitat is typical of ASM and several different vegetation communities were recorded at this site. ASM zonation is also well-developed due to the variable topography and there is complex zonation with several different transitional communities towards more brackish communities. The connection of the saltmarsh with a series of lagoons also increases the complexity and diversity of this site and some of the saltmarsh vegetation mapped at this site is actually marginal vegetation around the lagoon pools are along tidal channels. The ASM structure has been significantly affected by the old peat cutting.

5.2.3 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 such as grazing continue in the near future. Overgrazing is the man activity affecting the ASM at this site and this activity is likely to continue into the future.

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 *unfavourable-bad*. One monitoring stop was carried out in this habitat and it failed due to heavy poaching by sheep.

This monitoring stop was located adjacent to one of the Lough Fhada upper pools (lagoon) and was typical of most of the MSM around the site. Negative indicators such as a low diversity and bare peat cover are present within this area. However, some smaller patches of MSM habitat are in somewhat better condition with higher species diversity. The connection of the saltmarsh with a series of lagoons also increases the complexity and diversity of this site and some of the saltmarsh vegetation mapped at this site is actually marginal vegetation around the lagoon pools are along tidal channels.

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 such as grazing continue in the near future. Overgrazing is the main activity affecting the ASM at this site and this activity is likely to continue into the future.

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.

NPWS (2007). Conservation Assessment of Coastal lagoons in Ireland. NPWS. www.npws.ie.

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

Roden, C. M. (1998). Survey of Irish Lagoons Volume 1 Part 3 – Flora. A Survey of the Flora and Vegetation of Sixteen Irish Coastal Lagoons. Unpublished Report for National Parks and Wildlife Service.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	*Spartina* swards
1	1310 *Salicornia* flats						
2	*Spartina* swards						
3	1330 Atlantic salt meadow	3.634		3.634			
4	1410 Mediterranean salt meadow	0.285			0.285		
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)	12.793					
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)	0.082					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**16.794**		**3.634**	**0.285**		

Legend

- SAC Boundary
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stops
- 1410 monitoring stops

Department of Environment, Heritage and Local Government
National Parks and Wildlife Service

Saltmarsh Monitoring Project 2007-2008

Bealadangan

Kilkieran Bay SAC (002111)

SMP code: SMP0101

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

0 40 80 120 160 200 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:3000

N

Cleggan

1 SITE DETAILS

SMP site name: **Cleggan**		SMP site code: **SMP0105**	
Date of site visit : **22/04/2008**		CMP site code: **N/A**	
SM inventory site name: **Cleggan**		SM inventory site code: **85**	
NPWS Site Name: **no designations**			
NPWS designation	cSAC: **N/A**	MPSU Plan: **N/A**	
	pNHA: **N/A**	SPA: **N/A**	
County: **Galway**		Discovery Map: **37**	Grid Ref: **061425, 258315**
Aerial photos (2000 series): **O 2656-A**		6 inch Map No: **Ga 022**	
Saltmarsh type: **Lagoon**		Substrate type: **Peat/sand**	

2 SITE DESCRIPTION

This site is located in north-west Galway in Cleggan Bay, near Cleggan Village and 9 km north-west of Clifden Town. The site is located at the head of Cleggan Bay where a cobble bar has created a brackish lagoon called Lough Anilliun. The landscape of this area is dominated by hills with typical upland habitats including wet grassland, Wet and Dry Heath, scrub Bracken and some exposed rock on the steeper slopes. Some lower lying land along the lower slopes of the bay contains grazed fields with agricultural grassland. There is scattered habitation in this area.

The saltmarsh is located on the landward side of a vegetated stable cobble bar that separates Lough Anilliun from Cleggan Bay. A minor road crosses the cobble bar. There is some confusion with this site on the SM Inventory as it is listed as a Sandflats type marsh with associated sand-hills (Curtis and Sheehy-Skeffington 1998). However, there is no sign of any saltmarsh on the seaward side of this cobble bar and there is no indication that this site is being confused with an adjacent site in the locality that does have associated sand hills. The main habitats on the seaward side of the cobble bar are sandy beach, exposed rock and stony banks. The grid reference for this site pin-points it on the centre of this cobble bar. An alternative explanation is that there had been some saltmarsh on the seaward side of the cobble bar, which has now been eroded away. However, there was no indication of any saltmarsh habitat on the 6 inch map. It is assumed that the site has been labelled wrongly on the SM inventory and it should have been labelled as a 'lagoon type' saltmarsh.

Lough Anilliun is known as a coastal sedimentary brackish lagoon and has been included is some national surveys of Irish lagoons for NPWS (Oliver 2005, NPWS 2007). Oliver (2005) described sedimentary lagoons as having some percolation of seawater moving through the shingle/cobble barrier into the lagoon. The vegetation of this lagoon was classified a '*Potamogeton*/*Ruppia*' type lagoon by Oliver (2005), which generally have a low salinity. There is a small outflow at the north-western corner of the lagoon. A stream flows through this outflow normally. However, high spring tides are likely to flow up this outflow and into the lagoon.

This site is not located in any nature conservation designations. The western side of the site was easily accessed via the adjacent minor road. The northern side of the site is part of an adjacent farm and was grazed.

3 SALTMARSH HABITATS

3.1 General description

The only example of Atlantic salt meadows (ASM) habitat at this site is situated along the west side of Lough Anillaun or the landward side of the cobble bar with the best developed section located close to the small outflow at the north-eastern corner of the lough. The minor road crosses the top of the cobble bar with some scrub and wet grassland along the landward side.

Emergent brackish (CM2) vegetation dominated by Sea Club-Rush (*Bolboschoenus maritimus*) is much more prevalent around the shoreline of Lough Anillaun. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. Brackish vegetation is more prevalent on the western side of the lough with transitions to more typical freshwater shoreline vegetation towards the north-eastern and eastern sides of the lough, such as stands of Common Reed (*Phragmites australis*) and occasional Willow (*Salix* sp.). The ASM transitions to wet grassland at the upper saltmarsh boundary dominated by Creeping Bent and other grasses. Other species present includes Curled Dock (*Rumex crispus*), Yarrow (*Achillea millefolium*), Autumn Hawkbit (*Leontodon autumnalis*), Long-leaved Plantain (*Plantago lanceolata*), Soft Rush (*Juncus effusus*), Red Fescue (*Festuca rubra*), Creeping Buttercup (*Ranunculus repens*), Sow-thistle sp. (*Sonchus* sp.), Dandelion (*Taraxacum officinale*), Meadow Buttercup (*Ranunculus acris*), Birdsfoot (*Lotus corniculatus*), Sedge sp. (*Carex* sp.), Tufted Hair-grass (*Deschampsia caespitosa*), Yellow Flag (*Iris pseudacorus*) and Parsley-leaved Water Dropwort (*Oenanthe lachenalii*).

Table 3.1. Area of saltmarsh habitats mapped at Cleggan.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.312
	Total	**0.312**

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

3.2 Atlantic salt meadows (H1330)

Typical ASM habitat at this site was poorly developed, which is typical of a coastal lagoon of relatively low salinity. There is a very narrow band of ASM-like vegetation (>1m -2 m wide) along the western shoreline of the lough with frequent Saltmarsh Rush (*Juncus gerardii*), Creeping Bent (*Agrostis stolonifera*) and White Clover (*Trifolium repens*). Other species present include rare Brookweed (*Samolus valerandi*) and Sea Plantain (*Plantago maritima*). Adjacent to this band of vegetation there is a wider band of emergent Sea Club Rush in shallow water along the shoreline. Other aquatic species include Shoreweed (*Littorella uniflora*) indicating the freshwater influence. However, there is also some Brown algae (*Fucus* sp.) cover particularly in the small outflow at the north-west corner.

A somewhat larger patch of ASM like vegetation has developed in a low-lying hollow close to the outflow. This vegetation has typical of upper saltmarsh and is dominated by Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush (*Juncus gerardii*) and Sea Plantain (*Plantago maritima*). Other saltmarsh species include Sea Milkwort (*Glaux maritima*), Autumn Hawkbit (*Leontodon autumnalis*), Brookweed, Curled Dock, Red Fescue (*Festuca rubra*) and Sea Arrowgrass (*Triglochin maritimum*). However, there is also evidence of brackish and freshwater influences in the vegetation with the appearance of Silverweed (*Potentilla anserina*), Jointed Rush (*Juncus articulatus*), Long-leaved Plantain, Marsh Arrowgrass (*Triglochin palustris*) and some Bog Cotton (*Eriophorum sp.*).

This ASM vegetation transitions to wet grassland towards the upper saltmarsh boundary dominated by Creeping Bent and other grasses. There is a also a band of more typical freshwater or terrestrial vegetation along the lower boundary on a low ridge creating a complex zonation, probably due to the topography. There is also some development of a mixed brackish community of Sea Club-rush and Creeping Bent around the outflow. There are also some elements of saltmarsh vegetation along the outflow channel connecting the lough to Cleggan Bay.

4 IMPACTS AND ACTIVITIES

There are few impacts and activities affecting the saltmarsh habitat at this site (Table 4.1). This is to be expected as the area of habitat classified as ASM is quite small. The main ASM saltmarsh is found along the western side of Lough Anillaun and adjacent to the road. This area is not grazed or managed intensively although cattle may cross the channel and graze this area at times. There are no other significant impacts affecting the saltmarsh habitat.

Impacts and activities adjacent to the site include grazing (140), poaching by cattle in adjacent fields north of the channel (which contain brackish CM2 vegetation) (142), dispersed habitation (403) and a minor road (502). These activities have little or no measurable impact on the ASM habitats.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	B	0	0.132	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the 1995, 2000 and 2005, OSI aerial photo series. There is no baseline information available in the NHA survey files as this site was never designated. Lough Anillaun has been included in some surveys of coastal lagoons (Oliver 2005), which is also an Annex I habitat. It was also assessed during a national conservation assessment of coastal lagoons for NPWS (NPWS 2007). The assessment for Lough Anillaun was '*favourable'* with some minor damage from cattle poaching.

This site only contains a very small patch of vegetation that could be classified as ASM. The vegetation present is of notable conservation interest as it is an unusual 'lagoon' type. However the site is of relatively low conservation value due to the insignificant size of the Annex I saltmarsh habitat. Most of the vegetation surrounding the lough is a brackish or freshwater fringe.

An NPWS management plan is not available for this site as it remains undesignated.

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

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

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 erosion or to land-use changes within the current monitoring period. However, the habitat extent is quite small and this is related to the habitat type as Lough Anillaun is a lagoon.

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 it passes. All of the attributes required for the structure and functions of this habitat reached their targets. The species assemblage in this habitat is somewhat untypical of ASM and this is related to the brackish influence of the lagoon. This is a notable conservation feature. However the area is quite small.

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 grazing continue in the near future. There are no significant impacts negatively affecting this habitat.

This site does not have any nature conservation designations. However, this does appear to have any significant influence on the quality and conservation status of the habitats present including the surrounding brackish and freshwater habitats.

Oliver (2005) noted that this type of lagoon is more likely to develop into a freshwater system with time. This may mean that the long term prospects for ASM habitat are poor due to natural habitat change 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.

NPWS (2007). *Conservation Assessment of Coastal lagoons in Ireland*. NPWS. www.npws.ie.

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)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	0.132		0.132			
4	1410 Mediterranean salt meadow						
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)	0.473					
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)	7.219					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**7.824**		**0.312**			

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

Saltmarsh Monitoring Project 2007-2008

Cleggan

Not Designated

SMP code: **SMP0105**

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

0 40 80 120 160 200 Meters

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

Original Drawing Size: **297 x 420 (A3)**
Scale **1:3000**

N

Erriseask

1 SITE DETAILS

SMP site name: **Erriseask**		SMP site code: **SMP0104**
Dates of site visit 22/04/2008		CMP site code: **102**
SM inventory site name: **Erriseask**		SM inventory site code: **92**
NPWS Site Name: **Slyne Head Peninsula**		
NPWS designation	cSAC: **2074**	MPSU Plan: **N/A**
	pNHA: **2074**	SPA: **N/A**
County: **Galway**		Discovery Map: **44** Grid Ref: **061625, 245210**
Aerial photos (2000 series): **O 2930-A,B,C,D**		6 inch Map No: **Ga 049**

Annex I habitats currently listed as qualifying interests for Slyne Head Peninsula cSAC:

H1330 Atlantic salt meadow (Glauco-Puccinellietalia maritimae)

H1410 Mediterranean salt meadow (Juncetalia maritimi)

Other SMP sites within this SAC/NHA: **None**

Saltmarsh type: **Fringe** Substrate type: **Peat**

2 SITE DESCRIPTION

This site is located in west Galway, 8 km south-west of Clifden Town and close to Ballyconneely. The site is located in the south-east corner of Mannin Bay in a small inlet called Salt Lough. This area has a strong oceanic influence and a large area of machair and other coastal habitats has developed along the peninsula to the west of the site along the southern side of Mannin Bay. This area was surveyed by the CMP in 2006 (Ryle *et al*. 2009). There are also some small patches of saltmarsh along this area but these were not examined during this survey. The main habitats adjacent to the coast include a mosaic of wet and dry heath, wet grassland, exposed rock, scrub, small lakes, pools and associated wetland habitats and some dry grassland. These habitats overlay a mainly low-lying undulating landscape with a complex topography of small hills, mounds and hollows. Many of the enclosures have been abandoned now but some are still grazed.

The saltmarsh habitat is mainly found on the east side of Salt Lough in a low-lying area. A small peninsula extending from the east side protects Salt Lough from Mannin Bay. This inlet contains inter-tidal mudflats, mixed sediment and exposed rocky shore. The peninsula is quite sandy and is dominated by dry coastal grassland with some machair. There is also some wet grassland along the landward side. The rest of the shore around Salt Lough is a complex mosaic of patches of saltmarsh, exposed rocky shore, exposed rock, heath and wet grassland depending on the topography. The saltmarsh is generally fragmentary and its development depends on suitable intertidal topography. The western side of Salt lough was not surveyed as there was little saltmarsh habitat present along this side and there were access difficulties.

The site is located within the Slyne Head Peninsula candidate Special Area of Conservation (cSAC 2074). Two Annex I saltmarsh habitats are present at this site, Atlantic salt meadows

(ASM) and Mediterranean salt meadows (MSM). Both of these habitats are listed as qualifying interests for Slyne Head Peninsula cSAC (0002074). The entire saltmarsh habitat mapped at this site is located within the SAC boundary. Lough Athola and Ballinaboy are two other SM inventory sites located in this SAC (Curtis and Sheehy-Skeffington 1998) along the northern side of Mannin Bay but these sites were not surveyed during the SMP.

Turf fucoids are the only species of local distinctiveness recorded at this site and these are typical of saltmarsh found along the western coast of Ireland.

The site was accessed via land at the south-eastern corner. A hotel has recently been constructed on land adjacent to the site and permission was sought here to enter this land.

3 SALTMARSH HABITATS

3.1 General description

Both Atlantic salt meadow (ASM) and Mediterranean salt meadow (MSM) are present at this site with MSM being the most dominant habitat (Table 3.1). The main area of saltmarsh is centred on the east side of Salt Lough. Here MSM has developed on peat on a small low-lying area between the mainland and the peninsula extending from the east side that protects Salt lough. It is drained by one main channel containing intertidal mud. This is a typical 'fringe type' saltmarsh and is dominated by MSM with some ASM appearing along the edges of the main creeks. There are tall SM cliffs along the edge of these main creeks where the peat face is exposed.

The MSM transitions to wet grassland around the landward edge of the saltmarsh, with a relatively broad transition on the northern side of the main MSM section. There is a band of transitional vegetation around the upper boundary of the MSM with a mixture of typical terrestrial species such as Purple Moor-grass (*Molinia caerulea*), Black Bog-rush (*Schoenus nigricans*), Bird's-foot (*Lotus corniculatus*) Bog Cotton (*Eriophorum* sp.), Sedge sp. (*Carex* sp.) and tussocks containing terrestrial mosses mixed with typical saltmarsh species such as Sea Rush (*Juncus maritimus*), Creeping Bent (*Agrostis stolonifera*), Autumn Hawkbit (*Leontodon autumnalis*) and Sea Milkwort (*Glaux maritima*). The dominance of Purple Moor-grass was used to map the upper MSM boundary, where it became more dominant than Sea Rush. The distribution of Sea Rush extends higher than the upper SM boundary. The transition from MSM to adjacent wet grassland is more obvious around other parts of the site due to steeper topography.

There are several other patches of saltmarsh along the peninsula that are separated from the main area by undulations in the topography, with wet grassland, heath and exposed rock appearing in the terrestrial sections. These patches of saltmarsh are more heterogeneous in structure and composition and form a mosaic of MSM and ASM in places. There is also some typical saltmarsh zonation with ASM appearing at the seaward side of the MSM in places.

Atlantic saltmarsh is generally found towards the northern side of the site and along the narrower fringe of habitat along the southern side. The ASM is much more heterogeneous in structure and forms mosaics with MSM and rocky shore in places. ASM is also found within the MSM along the main saltmarsh channels. This ASM has developed on relic peat deposits. This is in contrast to some of the SM that has developed on thin bands of substrate

of marine origin in places. This sediment is eroding in places (related to cattle poaching) and the ASM is forming mosaics with exposed rocky shore. ASM is also found on some of the sand-blown sediment that is found sandy peninsula. Some of this ASM transitions on the landward side to dry coastal grassland with affinities to machair.

There is also some development of more brackish saltmarsh in places with stands of Sea Club-rush (*Bolboschoenus maritimus*) and Common Reed (*Phragmites australis*) developing in the drainage channel flowing from the adjacent hotel. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification.

Table 3.1. Area of saltmarsh habitats mapped at Erriseask.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadow (Glauco-Puccinellietalia maritimae)	1.418
1410	Mediterranean salt meadow (Juncetalia maritimi)	4.517
	Total*	**5.935**

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

3.2 Atlantic salt meadow (H1330)

This habitat type is less prominent at this site compared to MSM. The ASM is also quite heterogeneous and this is dependant on the type of development, land-use and intensity of gracing. ASM is found along the edges of the main drainage channel and deeper peat. The ASM is also generally heavily grazed with a low sward height. This ASM contains a typical mid-marsh community dominated by Sea Plantain (*Plantago maritima*) and also containing frequent Sea Pink (*Armeria maritima*). Other species present include Red Fescue (*Festuca rubra*), Sea Aster (*Aster tripolium*), Lax-flowered Sea Lavender (*Limonium humile*), Sea Milkwort (*Glaux maritima*) and Common Scurvy-grass (*Cochlearia officinalis*). The saltmarsh plants are dwarfed due to the heavy grazing. While some of the habitat is in relatively good condition, some has suffered from heavy poaching.

This habitat has also developed on more typical substrate of a marine origin further north along the peninsula. Most of this ASM is dominated by mid marsh vegetation. Some of this habitat is very badly poached and a lower marsh community develops in places with frequent Common Saltmarsh-grass (*Puccinellia martima*) appearing. The substrate is quite marshy and this may be related to freshwater seepage. Glasswort (*Salicornia* spp.) is also present in the vegetation but at low densities. The more heavily poached tightly grazed low-mid sward contains turf fucoids.

ASM is also present on thin bands of eroding peaty substrate and form mosaics with exposed rock and mixed substrate pebbles, shingle and mud. This ASM vegetation is generally dominated by low-mid marsh communities. There is very little development of upper ASM vegetation at this site.

The ASM topography in general is poorly developed although this is related to the relatively small size of the ASM fragments around Salt Lough. There are some pans and creeks present. The seaward boundary of some of these ASM fragments is marked by small tussocks of ASM vegetation on mud where the ASM transitions into exposed rock or mixed muddy substrate. There is no distinctive ASM cliff due to heavy poaching and there is no sign of any accretion ridges.

3.3 Mediterranean salt meadow (H1410)

This habitat type dominated the survey area with the largest black found east of Salt Lough and several other smaller patches appearing elsewhere on the site. The MSM contained a typical vegetation assemblage being dominated by Sea Rush with cover values between 20-75%. The largest section did display some typical zonation of saltmarsh species. The lower section nearest the main drainage channel is characterised by Sea Rush with a significant portion of Sea Plantain. Other species present include Saltmarsh Rush (*Juncus gerardii*), Sea Pink, Common Scurvy-grass, Sea Aster and Sea Milkwort. The upper section closer to the landward boundary is characterised by the dominance of grasses including Creeping Bent and Red Fescue. Other species present include Autumn Hawkbit, White Clover (*Trifolium repens*), Sea Milkwort, Sea Plantain and Common Scurvy-grass. The vegetation along the landward boundary is tussocky and characterised by the presence of Purple Moor-grass. Other more typical terrestrial species may appear on the hummocks. Purple Moor-grass may extend into the MSM habitat over some distance (< 20 m) due to the relatively flat topography in places.

The saltmarsh topography within the MSM is somewhat typical with one large main channel draining the main section. This largest area of saltmarsh has the gentlest slopes and some sections are relatively flat. Within the MSM there are some low mounds and hollows. Salt pans are quite rare. The topography of a large area in the main section is characterised by old, evenly-spaced former drainage channels that are now vegetated and resulting in a heterogeneous surface. This has also introduced some zonation of saltmarsh species within this habitat.

The small patches of MSM that appear along the narrower coastal fringe around the other sides of Salt Lough are similar in characteristics to the main section, although the topography is less well-developed.

4 IMPACTS AND ACTIVITIES

Several impacts and activities affect this site with a range of intensities (Table 4.1). The main impact and activity affecting this site is cattle grazing (140, 143). Most of the salt-marsh is grazed by cattle. The more-vulnerable, easily accessible patches along the peninsula to the north of the site are quite badly poached at some locations. The ASM is generally more badly damaged. However, the majority of the large area of MSM is less intensively grazed and exhibits low levels of poaching or poaching is absent. Some of the MSM located in the narrow fringe of habitat along southern side of Salt Lough and the minor road accessing this area is badly poached in places due to heavy grazing and winter feeding of cattle. There are several different management units. Several tracks created by grazing animals cross the saltmarsh habitat (501) but have minor impact. The main drainage creek is used for mooring boats but this has very little impact on the saltmarsh.

Erosion (900) is not a significant impact at this site and would not be expected as Salt lough is relatively sheltered. There is some poaching-induced erosion of some ASM at vulnerable locations were ASM has vegetated thin layers of substrate over rock and mixed substrates (about a third of total area). Some of the larger SM cliffs within the MSM also show some signs of erosion that are probably related to grazing, but this is very minor. A comparison of the OSI 2nd edition 6 inch map to the OSI 2005 series aerial photos shows that there have been no significant changes along the edge of the saltmarsh during this period.

There has recently been some construction at the Erriseask House Hotel adjacent to site (402). The coastal habitats have not been affected by land-take for the hotel and grounds. However the saltmarsh has been affected by drainage works from the hotel and some drainage channels have been cut through the saltmarsh recently (810). There may be some grey water discharge into the site from the hotel area (420). There are also some patches of recently dumped spoil along the edge of the saltmarsh that is probably related to the recent construction. These activities are likely to have a minor impact.

An examination of the aerial photos shows that some of the main area of saltmarsh was possibly drained or cultivated in the past. A series of linear drainage channels are present that connect to the main drainage creek and are largely re-vegetated. These drainage channels were noted in the field and could relate to previous land-use in the 18th-19th centuries. However, it is not known if these ridges are man-made or are naturally occurring.

Impacts and activities adjacent to the site include discontinuous urbanisation (402), dispersed habitation (403), grazing (140), recreational use of the Mannin-More machair (622, 623). These activities have little or no measurable impact on the saltmarsh habitats.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	143	A	-1	1.418	Inside
1330	501	C	0	0.001	Inside
1330	900	B	-1	0.500	Inside
1410	140	C	0	4.467	Inside
1410	143	B	-1	0.050	Inside
1410	501	C	0	0.005	Inside
1410	900	C	0	4.517	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

The overall conservation status of this site is assessed as *unfavourable-bad* (Table 5.1). This site is a typical western saltmarsh that shows some signs of damage from grazing and

poaching by cattle. However the majority of the site is in good condition relative to its overall area.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are moderate. The main area of saltmarsh is located in a small basin with some transitional vegetation present around the landward boundaries of the SM.

This site is located within the Slyne Head Peninsula cSAC. A NPWS Conservation management plan is not available for this cSAC.

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

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

5.2 Atlantic salt meadow (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 erosion or to land-use changes within the current monitoring period. The habitat does display signs of poaching-induced erosion at some locations but there is no evidence that a significant area of habitat has been lost during the current monitoring period.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-bad*. Three monitoring stops were carried out in this habitat and all failed. The main reason for the failed stops was overgrazing and severe poaching damage of most of the habitat. Other attributes required for the structure and functions of this habitat reached their targets. Several typical ASM communities were recorded on this site and zonation was evident with lower and mid marsh communities present. The ASM was also quite heterogeneous, developing on different substrates in different locations.

There are also natural successional communities to terrestrial vegetation present but these are generally poorly developed due to the shoreline topography. The saltmarsh topography is relatively poorly developed but this is typical of these relatively small fragments of ASM. Turf fucoids were recorded in this habitat but these are fairly typical of fringe type saltmarshes along the west coast of Ireland.

5.2.3 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 such as grazing continue in the near future. Overgrazing and poaching is the main activity affecting the ASM at this site. There are few other impacts or activities significantly affecting this habitat. There are few prospects for significant loss of habitat due to erosion in the future. The site is within a SAC so the habitat should not be affected by land-use changes such as development. A NPWS Conservation Plan is not available for this cSAC.

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 erosion or to land-use changes within the current monitoring period. There are indications of different land-use, possibly cultivation at some stage in the 18^{th}-19^{th} century but the area has reverted by to MSM.

5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Five monitoring stops were carried out in this habitat and all passed. All of the attributes required for the structure and functions of this habitat reached their targets. The main MSM area is not significantly affected by grazing and poaching which affects the ASM. However other smaller patches along the southern side of the Salt Lough were damaged by poaching and supplementary winter-feeding of cattle. No monitoring stops were carried out in the damaged areas due to the presence of livestock, but the area of the damaged sections is significant enough (> 1%) to assess the overall structure and functions as *unfavourable-inadequate* even though the overall MSM area is in good condition. There are no other impacts that are having a significant impact on this habitat although a minor section of the habitat was modified by drainage works.

The species composition was typical of this habitat. Some zonation was noted in the habitat and this was noted from other saltmarsh species. There are also some mosaics present with ASM. The topography was moderately well-developed with some creeks and pans present within the main area, which also has some sections with low mounds and hollows. There is also some development of a transitional community along the upper MSM boundary with wet grassland where the topography allows. This site is a good example of MSM habitat that has developed on a fringe type marsh.

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 is the main activity affecting a minor part of the MSM at this site and the majority of the habitat is in good condition. There are few other impacts or activities significantly affecting this habitat.

6 MANAGEMENT RECOMMENDATIONS

Some lowering of overall grazing intensity is required to enhance the conservation status of the ASM at the site. However this habitat is quite vulnerable to cattle poaching relative to the other habitats so while adjacent terrestrial grassland may be in good condition, the ASM may show signs of damage. Some poaching of ASM is typical of saltmarshes that have even low level cattle-grazing. It is likely to be difficult to adapt a suitable grazing level that is beneficial for both the coastal saltmarsh habitats and the adjacent species rich coastal grassland.

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)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	1.363		1.363			
4	1410 Mediterranean salt meadow	4.517			4.517		
5	ASM/MSM mosaic (50/50)						
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic	0.080		0.04			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	2.084					
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)	0.173					
19	1330/rocky shore mosaic	0.029		0.015			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**8.246**		**1.418**	**4.517**		

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

Saltmarsh Monitoring Project 2007-2008

Errisask

Slyne Head Peninsula SAC (002074)

SMP code: SMP0104

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

0 60 120 180 240 300 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:5000

N

Furbo

1 SITE DETAILS

SMP site name: **Furbo**		SMP site code: **SMP0097**
Dates of site visit **09/10/2007**		CMP site code: **N/A**
SM inventory site name: **Furbo**		SM inventory site code: **112**
NPWS Site Name: **N/A**		
NPWS designation	cSAC: **N/A**	MPSU Plan: **N/A**
	pNHA: **N/A**	SPA: **N/A**
County: **Galway**		Discovery Map: **45** Grid Ref: **119000, 222300**
Aerial photos (2000 series): **O 3467-B**		6 inch Map No: **Ga093**

Annex I habitats that occur at this site:

H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

H1410 Mediterranean salt meadows (Juncetalia maritimi)

Other SMP sites within this SAC/NHA: **N/A**

Saltmarsh type: **Fringe** Substrate type: **Sand**

2 SITE DESCRIPTION

This site is located along the northern shoreline of Galway Bay, about 4.5 km east of Barna Village. It is one of 19 Saltmarsh Inventory sites listed in Galway Bay (Curtis & Sheehy-Skeffington 1998). It is the most westerly saltmarsh site along the northern side of Galway Bay. This part of Galway Bay shoreline is dominated by exposed rock (LR1-2) with banks of cobble and shingle. The shoreline habitats transition mainly to wet grassland or dry coastal grassland and scrub in small fields on higher land. A small sandy beach is located to the west of the site adjacent to the Galway-Spiddal Road (R335). Saltmarsh has developed along some of the more sheltered shoreline to the east of the beach, although it is quite fragmented in places. The area surveyed was located between the sandy beach and the Conamara Coast Hotel. Small fragments of saltmarsh occur further east along the coastline towards Barna.

There has been some recent development along this shoreline. Several fields are being drained and have been partially infilled at the west end of the site, adjacent to the beach. A new seawall constructed with large boulders is present along the lower field boundary. There was vegetation with a brackish appearance along the drains in these two fields but they were not inspected due to construction works in this area.

The site is located outside the Galway Bay Complex candidate Special Area of Conservation (cSAC 208) and is not part of any nature conservation designation. Two Annex I habitats are present at this site, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Both these sites are listed as qualifying interests for the adjacent Galway Bay Complex cSAC. Sea Wormwood (*Seriphidium maritimum*) is one species of local distinctiveness that is present at this site. The shoreline was easily accessed by parking at the beach to the west of the site and accessing the shoreline to the east.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh vegetation generally consists of fragments or bands of saltmarsh that extend along the shoreline. Further east the saltmarsh becomes more fragmentary. There were frequent signs of the exposed nature of this coastline on the saltmarsh, with signs of erosion evident. The average width of the saltmarsh is about 20-25 m but some sections are wider and extend to 50 m wide. The total area of saltmarsh is relatively small. The fragments are frequently separated by areas of cobble (LS1) and in some cases by large boulders that extend from adjacent field boundaries down onto the shoreline. Some of the saltmarsh has frequent loose rock scattered over the saltmarsh. The saltmarsh habitats are dominated by Atlantic salt meadows. There was one small patch of Mediterranean salt meadows occurring within the survey area that transitions to ASM at its lower boundary and transitions to CM2 at its upper boundary.

The saltmarsh habitats generally transitioned to wet grassland or dry coastal grassland and scrub on higher ground with transition also to a large boulder sea wall in one section. Some of the upper saltmarsh and the terrestrial transition has been modified in the past by drains. Sea Club-rush (*Bolboschoenus maritimus*) occurs in some of these drains. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. There is some development of CM2 type vegetation along the upper saltmarsh with Twitch, Creeping Bent (*Agrostis stolonifera*), White Clover (*Trifolium repens*), Sow-thistle (*Sonchus* sp.) Spear-leaved Orache (*Atriplex prostrata*), Sea Beet (*Beta maritima*), Sea Mayweed (*Tripleurospermum maritimum*) and Autumn Hawkbit (*Leontodon autumnalis*) in areas where there is a shallow gradient. The upper saltmarsh boundary is indistinct in these places.

At one location (Info Point 7) there was some transition to brackish habitat with Red Fescue, Creeping Bent, Silverweed (*Potentilla anserina*), White Clover (*Trifolium repens*), Trefoil sp. (*Lotus* sp.), Soft Rush (*Juncus effusus*), Yellow Flag (*Iris pseudacorus*) and some Sea Rush with a further transition to a small stand of Common Reed (*Phragmites australis*) in an area where there was freshwater seepage (Near to holiday homes). There is abundant Water-cress (*Nasturtium officinale*) in the adjacent drain. The landward transition is complicated in places where there is a low shingle/cobble ridge with CM2 or stony bank vegetation along the upper saltmarsh boundary. Upper saltmarsh vegetation occurs in places behind these low ridges. There are also better-drained areas where dry coastal grassland dominated by Red Fescue has also developed. There are several locations where there is freshwater influence on the saltmarsh from small streams or seepage from the adjacent terrestrial land.

Saltmarsh generally transitioned to mixed sediment amongst exposed rock at the lower boundaries. Fragments of saltmarsh are also frequently isolated from terrestrial habitats and surrounded by loose cobbles. These fragments occur on eroded ‘islands’ of firm muddy or sandy sediment that are perched over glacial deposits.

Table 3.1. Area of saltmarsh habitats mapped at Furbo.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	2.716
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.136
	Total*	**2.852**

*note that saltmarsh habitat continue outside the mapped area along the shoreline to east.

3.2 Atlantic salt meadows (H1330)

This habitat dominated the site. There are several communities present. The relatively narrow nature of the saltmarsh means that the development of saltmarsh zones is poor, although zonation of species is clearly evident. The main communities were a mid-upper marsh community dominated by Red Fescue (*Festuca rubra*) with Sea Milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Common Scurvy-grass (*Cochlearia officinalis*) and Sea Pink (*Armeria maritima*). Sea Beet (*Beta maritima*), Sea Mayweed and Spear-leaved Orache (*Atriplex prostrata*) frequently occurred along the upper saltmarsh boundary. The larger sections of saltmarsh or areas where there is transition to wet grassland contain bands of Twitch (*Elytrigia repens*)-dominated vegetation. The upper saltmarsh boundary is indistinct in these places. Creeping Bent occurs in these areas. Wrack (*Fucus* spp.) is frequently found along the strandline. A second mid-upper marsh community dominated by Saltmarsh Rush (*Juncus gerardii*) develops in small patches. Buck's-horn Plantain (*Plantago coronopus*) is also present in the upper communities. Sea Wormwood, a species of local distinctiveness, occurs at several locations along the shoreline, mainly near to the upper saltmarsh boundary.

The lower saltmarsh contained a community with Common Saltmarsh-grass (*Puccinellia martima*) with Sea Arrowgrass (*Triglochin maritimum*), Sea Pink, Lax-flowered Sea Lavender (*Limonium humile*) and Sea Aster (*Aster tripolium*). However, this community was quite minor and a typical low-cropped *Armenia-Plantago* sward dominates the lower zone. The sward height is about 2 cm high. This zone contains frequent scattered rocks over the marsh in places, or the vegetation is growing on a thin band of sediment that is eroded and exposing the cobbles and stones beneath the saltmarsh (Photo 7). Some of the zone could be classified as ASM/rocky mosaic.

The saltmarsh topography was poorly developed. The lower saltmarsh frequently had small eroded hollows that had the appearance of pan-like structures. The lower saltmarsh boundary was a low cliff in places (0.4-0.5 m high) and frequently there were small hags of saltmarsh along the lower boundary, isolated from the main saltmarsh (Photo 3). Some of the eroded sections expose a peaty substrate in places.

3.3 Mediterranean salt meadows (H1410)

A small patch of this habitat occurs on this site. This habitat of vegetation containing Sea Rush (*Juncus maritimus*) is situated in the mid-upper saltmarsh zone. The Sea Rush occurs at low frequencies in places (10-30%) and the vegetation is dominated by Red Fescue with Creeping Bent, Autumn Hawkbit, Silverweed, Sea Milkwort, Sea Mayweed, Sea Beet and Common Sow-thistle occurring in the upper part of this habitat.

There is some zonation within this habitat that can be seen in the other species. The lower parts of this habitat contain more frequent Saltmarsh Rush, Sea Arrowgrass, Sea Pink and Sea Plantain. There are some eroded rocky pools present.

4 IMPACTS AND ACTIVITIES

There are few activities that affect this site. No grazing was noted (143) but livestock in adjacent fields may occasionally come down onto the saltmarsh as some poaching was noted. Some wheel ruts (501) were noted at one location, probably related to adjacent land-users accessing the shoreline. The upper saltmarsh boundary has been modified in places in the past 10 years, as a new sea wall (871) has been constructed along terrestrial land to the west of the site, adjacent to the beach. Vegetated mounds of earth left from recent adjacent development are also located along the shoreline.

The main impact on the saltmarsh is erosion (900). There are frequent signs of erosion due to the exposed nature of the shoreline. This is evident especially in areas where the saltmarsh is developed on a thin band of muddy/sandy sediment that may only be 0.2-0.4 m deep. The lower saltmarsh boundary also shows signs of erosion with relic small hags or isolated tussocks of saltmarsh on muddy sediment separated from the main saltmarsh (Photo 3). However, a comparison of the OSI 2nd edition 6 inch map to the OSI 2000 series aerial photos shows that there have been no significant changes in the shoreline and no measurable erosion. The signs of erosion that are noted on the site are quite natural. The impact of erosion is assessed as having a neutral impact on a small portion of the saltmarsh.

There are some impacts and activities adjacent to the site. These include the use of some the adjacent fields for grazing livestock (140). Some of the fields have been developed in recent years for holiday homes. This has affected the transition between the saltmarsh and terrestrial habitats in places. There is some recent development at the western side of the site (400). It is not known if these fields contained ASM habitat, but brackish habitat was present. Some low-lying fields (Info Point 8-9) are being developed. A new sea wall has been built around the lower boundary of these fields.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	C	0	2.716	Inside
1330	501	C	0	0.001	Inside
1330	871	C	-1	0.01	Inside
1330	900	C	0	0.27	Inside
1410	140	C	0	0.136	Inside
1410	900	C	0	0.01	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the 1995, 2000, and 2005 OSI aerial photo series. There are no previous surveys of the saltmarsh along this site.

The overall conservation status of this site is assessed as *favourable* (Table 5.1). Furbo is quite a small site with few features of significant interest. There are few impacts or activities affecting this site. Erosion is the main impact but this is natural along this exposed shoreline. Some development adjacent to the site has affected brackish or transitional habitats but it is not known if ASM habitat was destroyed by this development. This site is not protected by any nature conservation designations.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are poor. The saltmarsh at this site is likely to further erode due to the exposed nature of this shoreline in response to any sea-level rise. However, these are very general predictions.

A management is not available for this site as it remains undesignated.

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

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

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

Overall, the extent of this habitat is assessed as *favourable*. There are no indications of any loss of habitat due to erosion or to land-use changes. There are frequent signs of erosion on the saltmarsh at this site but this is assessed as natural on an exposed site of this nature, and is likely to be compensated by accretion in other parts of Galway Bay.

5.2.2 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 the structure

and functions of this habitat reached their targets. Several typical ASM communities were recorded on this site and some zonation was evident. There is some variation at particular locations related to freshwater influence from small streams or seepage. The saltmarsh topography was poorly developed but this is typical on a site of this small nature with a relatively narrow band of saltmarsh.

A species of local significance, Sea Wormwood, which is found frequently on saltmarshes around Galway Bay, is present at this site. This species has a scattered distribution in Ireland and is only found recently in eight 10 km^2 squares around the coast of Ireland (Preston *et al.* 2002). Webb *et al.* (1996) described its distribution as rare and very local although it is not recorded as a rare species in The Red Data Book (Curtis & McGough 1988).

The Atlantic salt meadows form part of a larger coastal ecosystem. There are natural transitions to other habitats at both the upper and lower saltmarsh boundaries, although some of the upper transitions have been modified. Exposed rock, shingle and pebble deposits are also frequently found in the intertidal area and the saltmarsh transitions to these habitats. The upper landward boundary of the saltmarsh was varies with wet grassland, scrub and dry grassland present.

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 site. Some development along the coast and adjacent to the saltmarsh habitats has the potential to affect this habitat in the future.

The habitat extent is not likely to be significantly reduced in the near future, although there are signs of erosion. In the longer-term there may be some reduction of extent due to erosion at this exposed site.

5.3 Mediterranean salt meadows (H1410)

5.3.1 Extent

Overall, the extent of this habitat is assessed as *favourable*. Only a small area of this habitat was recorded at this site, although it is more frequent at other saltmarshes around Galway Bay. There are no indications of any loss of habitat due to erosion or to land-use changes. There are frequent signs of erosion on the saltmarsh at this site but this is assessed as natural on an exposed site of this nature, and is likely to be compensated by accretion in other parts of Galway Bay.

5.3.2 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 it passed. All the attributes required for the structure and functions of this habitat reached their targets. The species composition of this habitat was typical of this habitat. Some zonation was noted in the habitat and this was noted from other saltmarsh species. Species such as Sea Pink were distributed along the lower, more seaward side of the habitat, while species such as Sea Beet and Spear-leaved Orache were distributed towards the upper part of this habitat. The topography was poorly developed, but this is typical of a small patch of habitat.

5.3.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts continue in the near future. There are few impacts or activities affecting this site. Some development along the coast and adjacent to the saltmarsh habitats has the potential to affect this habitat in the future.

The habitat extent is not likely to be significantly reduced in the near future, although there are signs of erosion. In the longer-term there may be some reduction of extent due to erosion at this exposed site.

6 MANAGEMENT RECOMMENDATIONS

There are no management recommendations for the saltmarsh habitats at this site.

7 REFERENCES

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

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.

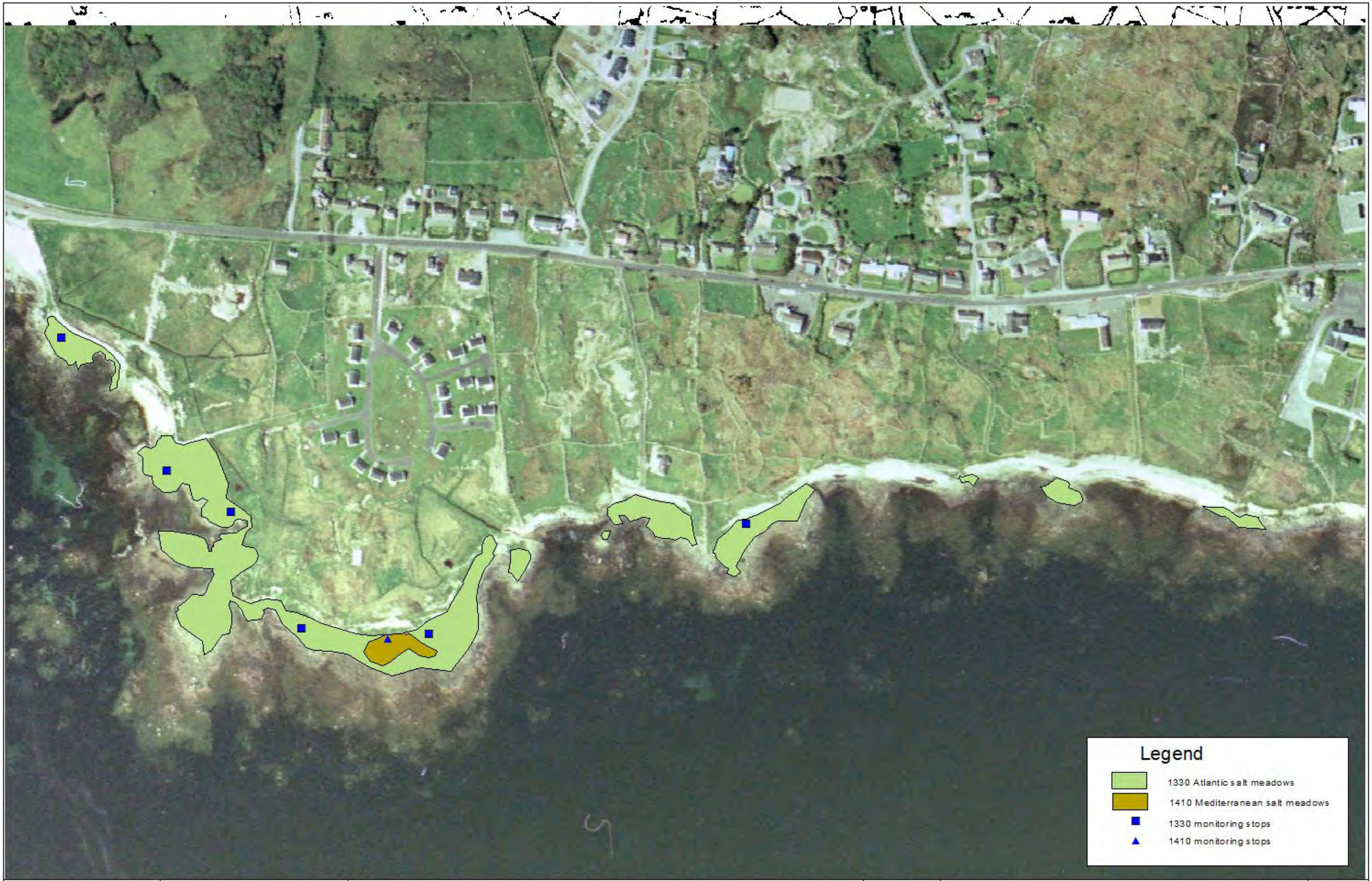
Preston, C.D. Pearman, A. & Dines, D. (2002). *New atlas of the British and Irish Flora*. Oxford University Press.

Webb, D.A., Parnell, J. & Doogue, D. (1996). *An Irish flora.* Dundalgan Press, Dundalk.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SMP 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	2.716		2.716			
4	1410 Mediterranean salt meadow	0.136			0.136		
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)						
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	**2.852**		**2.716**	**0.136**		



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

Saltmarsh Monitoring Project 2007-2008

Furbo

Not Designated

SMP code: SMP0097

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

0 50 100 150 200 250 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:3500

N

Kilcaimin

1 SITE DETAILS

SMP site name: **Kilcaimin**		SMP site code: **SMP0092**
Dates of site visit **11/10/2007**		CMP site code: **N/A**
SM inventory site name: **Kilcaimin**		SM inventory site code: **121**
NPWS Site Name: **Galway Bay Complex**		
NPWS designation	cSAC: **000208**	MPSU Plan: **old format plan available**
	pNHA: **000208**	SPA: **004031**
County: **Galway**		Discovery Map: **46** Grid Ref: **136250, 221100**
Aerial photos (2000 series): **O 3470-B,D; O 3471-C**		6 inch Map No: **Ga094, Ga095**

Annex I habitats currently listed as qualifying interests for Galway Bay Complex cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **Scanlan's Island, Kinavarra West, Kileenaran, Tyrone House-Dunbeacon Bay, Oranmore North, Roscom West & South, Seaweed Point, Barna,**

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

2 SITE DESCRIPTION

Kilcaimin saltmarsh is located at the east side of Galway Bay in Co. Galway. This saltmarsh site is one of the several saltmarshes that have developed in the long narrow inlets found on this part of Galway Bay. It is one of 19 Saltmarsh Inventory sites listed in Galway Bay (Curtis & Sheehy-Skeffington 1998). Kilcaimin saltmarsh is located in the upper part of Mweeloon Bay in the north-east section of Galway Bay and is about 4.5 km west of Clarinbridge. There are several small islands present in this narrow inlet. This part of Co. Galway is quite rural although there is some ribbon development in places along minor roads in the area and frequent dispersed habitation. The area is relatively low-lying and dominated by agricultural grassland.

Saltmarsh is dispersed along both the northern and southern shorelines of this inlet. The largest section of habitat is located at the head of the inlet, but there are several other smaller patches of habitat present at various sheltered sites around the inlet. There is a narrow ribbon of habitat of various widths (2-25 m) along most of the shoreline. Saltmarsh habitat is also found around some of the small islands found in the inlet. The inlet mainly contains mixed sediment in the intertidal zone seaward of the saltmarsh. At one location there are several tree stumps visible in the intertidal area along the shoreline.

The site is located within the Galway Bay Complex candidate Special Area of Conservation (cSAC 208). Three Annex I habitats are present at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All 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 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. There are also some omissions of Annex I habitat due to mistakes in drawing the cSAC boundary and the omission of shoreline areas at several locations, due to the wrong line being used on the OSI 2nd edition 6 inch map.

The saltmarsh was accessed from several points where minor roads pass along the shoreline and access slipways and small piers. The main section of saltmarsh at the east of the site was being grazed by horses and permission to access the site was obtained.

3 SALTMARSH HABITATS

3.1 General description

The main Annex I saltmarsh habitat found on this site is Atlantic salt meadow (ASM) (Table 3.1). Atlantic salt meadow is distributed along both sides of the inner bay. The main section of ASM is located at the head of the inlet with a relatively narrow ribbon of habitat extending along the shoreline. This ribbon develops into more extensive sections of habitat where there is some shelter and the topography is more suitable. There are sections of the shoreline on the north-east part of the inlet where the ribbon of saltmarsh disappears. Mediterranean salt meadow (MSM) is found at one location on the site and is associated with some enclosed pastures grazed by sheep and is part of a farm situated along the southern side of the inlet. There is only a minor amount of mapped *Salicornia* flat habitat on the site located near the western end of the southern side of the mapped area. *Salicornia* flats habitat is also found in very small amounts distributed along the seaward ASM boundary, particularly along the northern boundary and is unmapped. These patches may only be 1-2 m in diameter and are found on mixed muddy sediment.

The saltmarsh transitions to several different habitats along its upper boundary. There is natural transition to upper saltmarsh grassland dominated by Twitch (*Elytrigia repens*) in the largest area of saltmarsh located at the neck of the inner bay. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. Other species present along the strandline and indicating transition to terrestrial vegetation include Spear-leaved Orache (*Atriplex prostrata*), Frosted Orache (*Atriplex lacinata*), Sea Beet (*Beta maritima*), Curled Dock (*Rumex crispus*), Smooth Sow-thistle (*Sonchus oleraceus*) and Common Scurvygrass (*Cochlearia officinalis*). There is also some transition form saltmarsh to scrub (WS1) and Hedgerow (WL1). This section also contains several small mounds within the ASM that also contain CM2 grassland. There is also a small embankment located in the north-west section of this saltmarsh area with CM2 and coastal grassland and ASM on both sides. This embankment may not be natural as an old lane accesses this area. There is also transition to CM2, GS1 and WS1 on the larger islands (Bush Island). There are smaller rocky outcrops that just contain some saltmarsh habitat (Bird Island).

Much of the saltmarsh along the northern side of the inner bay has a rocky seawall adjacent to a minor road along much of its upper boundary. There are dry stone walls on grassy banks along the upper boundary of saltmarsh along the southern side of the inner bay. In some

cases the saltmarsh extends behind the dry stone walls into enclosed pasture and there are natural transitions to semi-improved grassland. In some cases the saltmarsh is included within the pasture to protect sheep from the adjacent rocky intertidal areas. Saltmarsh habitats develop into isolated patches of vegetation and isolated plants vegetating a cobble storm beach along the outer shore.

There are transitions to muddy mixed sediment along the seaward boundary of the saltmarsh. There are muddy intertidal mudflats with mixed sediment and scattered rock located at the head of the inlet. The mixed sediment seaward of the saltmarsh contains more gravel and cobble further west to the head of the inlet.

Table 3.1. Area of saltmarsh habitats mapped at Kilcaimin.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand	0.015
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	7.818
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.503
	Total	**8.336**

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

This habitat is found at several locations around the site, although it is not extensive and covers only a minor area. Only one small patch related to pioneer saltmarsh transitioning to vegetation on mixed sediment and cobble beach was mapped during the survey. This patch of habitat is situated on quite stony mixed sediment. These patches may be dominated by either Glasswort (*Salicornia* sp.) or by Annual Sea-blite (*Suaeda maritima*).

Small patches of this habitat can also be found near the upper boundary of the saltmarsh along the northern side of the inlet where deposited strandline debris has rooted and created bare patches of mud. These small patches (< 1 m wide) are re-vegetating with Glasswort.

There are also several patches along the northern boundary that were not mapped as they were too small (1-2 m in width). This *Salicornia* flat habitat is dominated by Glasswort (*Salicornia europaea*) and is situated along the seaward edge of pioneer ASM on quite stony mixed sediment. Some of the stony sediment is not marine in origin but is gravel spill from adjacent coastal protection and road improvement works.

3.3 Atlantic salt meadows (H1330)

The vegetation of this habitat is quite typical and similar to other saltmarsh sites around Galway Bay. Several typical saltmarsh communities are present at this site including a pioneer ASM community. Zonation of the saltmarsh vegetation is also evident and the different communities are best developed in the largest section of saltmarsh. The narrow saltmarsh strips are generally situated on moderately sloped shoreline.

The narrow saltmarsh strip along the northern side of the inlet is less than 5 m wide and is dominated by Common Saltmarsh-grass (*Puccinellia martima*) with Sea Aster (*Aster tripolium*), Lax-flowered Sea Lavender (*Limonium humile*), Glasswort, Annual Sea-blite, Spear-leaved Orache, Sea Plantain (*Plantago maritima*) and Common Scurvygrass. Sea Purslane is also present but is rare. There is a very narrow pioneer zone sometimes less than 1 m wide along the seaward edge of the ASM with mainly Lax-flowered Sea Lavender

along the narrow ribbon of saltmarsh habitat on quite stony or pebbly substrate. There is some Glasswort, Annual Sea-blite, Common Saltmarsh-grass and Sea Spurrey (*Spergularia* sp.) associated with the pioneer zone. The Sea Lavender seems to be spreading down the shoreline on mixed muddy sediment. This may be a response to adjacent coastal protection works.

A typical Red Fescue (*Festuca rubra*)-dominated upper saltmarsh community develops further west along the northern side of the inlet. This community also contains Spear-leaved Orache, Common Scurvygrass, Sea Beet and Sow-thistle along the strandline. This vegetation also contains Creeping Bentgrass (*Agrostis stolonifera*), Autumn Hawkbit (*Leontodon autumnalis*), Lesser Sea-spurrey (*Spergularia media*) and White Clover (*Trifolium repens*) at other locations such as on Bush Island and in the main section. Other species present in this section include Sea Arrowgrass, Sea Pink and Sea Plantain.

A typical mid-marsh vegetation community dominated by Sea Pink (*Armeria maritima*) and/or Sea Plantain is also present on the site and is best developed in the largest section of saltmarsh. It is also present at several other locations including Bush Island. Saltmarsh Rush (*Juncus gerardii*) is also present in a mid-upper saltmarsh community in the largest saltmarsh area. The mid marsh zone also contains Sea Arrowgrass (*Triglochin maritimum*), Common Saltmarsh-grass, Sea Aster, Sea Milkwort (*Glaux maritima*), Lax-flowered Sea Lavender, Red Fescue.

Most of the saltmarsh on the site is not significantly grazed and the vegetation height varies between 0.1-0.2 m high. There is one section where sheep grazing is moderate-high and a very low sward 1-2 cm high has developed.

The saltmarsh topography is moderately well developed in the largest section of saltmarsh located at the head of the inlet. There are some typical irregular pans and a mid marsh topography. This area also contains several mounds and one larger embankment that contain CM2 and GS1 dry coastal grassland. However there are no significant creeks draining the saltmarsh and this may be due to old drains affecting the drainage function. There are few other topographical features within the other saltmarsh habitat, but this is typical of relatively narrow saltmarsh habitat on moderately sloped shoreline.

The saltmarsh cliff varies in nature around the site. There is a typical low saltmarsh cliff (0.3-0.5 m high) along the edge of the main section of saltmarsh at the head of the inlet. There are some erosional features present along this boundary with tussocks and mud balls. The erosion may be poaching induced. There is a much lower saltmarsh cliff around other parts of the site where saltmarsh vegetation transitions to bare intertidal sediment on a natural shoreline slope.

Saltmarsh situated towards the western part of the inlet also contains occasional abundant brown algae on the saltmarsh. Brown algae are also scattered over the saltmarsh along the northern side of the inlet.

3.4 Mediterranean salt meadows (H1410)

This habitat is situated at one location along the western part of the southern side of the inner bay. The habitat is located within some pasture grazed by sheep. It was not surveyed in detail due to livestock on the site and the presence of a high dry stone wall along the outer

boundary. This area contains patches dominated by Sea Rush (*Juncus maritimus*). There are also significant patches of Red Fescue-dominated grassland typical of upper saltmarsh.

4 IMPACTS AND ACTIVITIES

Several impacts and activities affect this site, but most have low or neutral intensities (Table 4.1). Most of the site not grazed significantly (140). The northern side is not grazed. The eastern section was grazed by horses in the past but there were few signs of grazing during the site visit. There are signs of poaching in some small areas but it is localized. There is some moderate grazing of saltmarsh along the southern section by sheep. There are areas with a very close cropped sward. The sheep access the saltmarsh along the shoreline from adjacent pastures. In some cases there are sections of saltmarsh that have been enclosed by a dry stone wall (to protect sheep from rocky intertidal area) and the saltmarsh is included within the adjacent pasture. Some of these areas also have minor poaching induced erosion along the seaward boundary (142).

A minor road passes along much of the northern side of the inner bay. There have been significant road improvements and coastal protection works (871) along this road that were carried out in 1999. The height of the road was raised. Large boulders have been placed along the shoreline/edge of the road and there has been infilling behind these rocks. This side of the inlet probably only had a narrow ribbon of habitat prior to these works and most of this ribbon is still intact. However, these works have affected some of the intertidal areas, saltmarsh, transitional CM2 and shoreline habitats along this side of the bay. Smaller rocks and gravel have spilled in places into the intertidal zone.

There has been some recent dumping of soil along the shoreline (421). This is probably related to the accessibility of the shoreline from the adjacent minor road.

There are several tracks that cross the saltmarsh in places (501). The upper shoreline (and saltmarsh zone) is also used as a track at one location and this has eroded the saltmarsh found in this zone somewhat. There are also wheel ruts in some areas where vehicles are accessing the shoreline and farm vehicles are accessing saltmarsh (ASM and MSM) in pastures.

The largest section of saltmarsh located at the head of the inlet has been affected by drainage (810) in the past and this drainage was possibly related to former land enclosure on the saltmarsh. There are also signs of infilling in the past. There are other signs of human use of the saltmarsh zone with dry stone walls crossing the intertidal zone in places. Some of the saltmarsh is protected by old dry stone walls. This was possibly for enclosure of sheep rather than coastal defence as the stone wall is on the saltmarsh near its edge rather than along the seaward boundary. There are signs of coastal defence works in places with rocks piled along the seaward boundary of the saltmarsh in places that may not have been completed. Some of the old enclosures in the intertidal area may be related to sewed collection. This impacts and activities are not assed as they occurred before the current monitoring period.

There are some indications of erosion at the site (900). There are some signs of erosion along the lower saltmarsh boundary at the head of the inlet. A comparison of the OSI 2nd edition 6 inch map to the OSI 2000 series aerial photos shows that there has been some retreat of saltmarsh in the past 100 years. On average there has been a loss of about 5 m

and the loss increases to a maximum of 10-15 m at several points. This loss of saltmarsh is not assessed as it has mainly occurred outside the current monitoring period. However, it does indicate an erosional trend that is likely to be still be continuing. There are also physical signs of erosion in this section as well with mud balls and tussocks along this saltmarsh boundary. There are also signs of erosion along the northern side of the inlet. One section contains some minor sheep- grazing-induced poaching erosion. The impact of erosion is assessed as having a low negative impact on a portion of the saltmarsh. There are poor prospects for the landward retreat of saltmarsh at this site so the impact of erosion is assessed as having an irreparable influence.

There was no measurable loss of saltmarsh along the main section of saltmarsh at the head of the inlet within the current monitoring period. The presence of a narrow pioneer zone along the northern side of the inlet may be an indication of some natural response of the saltmarsh to the adjacent coastal protection works. There are no indications of accretion (910) around the site.

A new pool has been constructed on the shoreline, located along the western section of the southern side of the inner bay. This is probably related to fishing or aquaculture in the area. The pool has been constructed in an intertidal area adjacent to a narrow saltmarsh ribbon.

Impacts and activities adjacent to the site include dispersed habitation (403), fishing/aquaculture (200) and fertilization (120) and the grazing of livestock (140) related to farming practises.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	140	C	0	0.015	Inside
1310	871	C	-1	0.001	Inside
1330	140	C	0	6.818	Inside
1330	142	B	-1	1.00	Inside
1330	421	C	-1	0.001	Inside
1330	501	C	-1	0.1	Inside
1330	871	B	-2	0.05	Inside
1330	900	C	-2	0.35	Inside
1410	142	B	-1	0.503	Inside
1410	501	C	-1	0.503	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

The overall conservation status of this site is assessed as *unfavourable-inadequate* (Table 5.1). Kilcaimin is a typical relatively small saltmarsh situated in a narrow bay. There are few features of specific notable interest. A species of local distinctiveness (Sea Purslane) is present on the site. One monitoring stop out of a total of ten monitoring stops failed. The site is generally in good condition but the saltmarsh habitat has been affected by road improvement and coastal protection works along one side of the bay. There are indications of an erosional trend affecting the largest section of saltmarsh at the site, although there was no measurable erosion during the current monitoring period. Only a small area of saltmarsh is grazed at a moderate-high intensity by sheep.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are poor-moderate. There is some scope for landward transition of saltmarsh vegetation up slope into brackish CM2 and dry costal grassland at some locations. However, much of the saltmarsh have hard unmoveable features along the upper boundary with no prospects for saltmarsh migration. However, these are very general predictions.

This site is located within the Galway Bay Complex cSAC although not all the saltmarsh habitat is located within the cSAC boundary. An old format NPWS management plan is available for the saltmarsh habitats at this cSAC but it is now out of date.

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

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

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

5.2.1 Extent

The extent of this habitat is assessed as *favourable*. There is only a very small area of this habitat located at this site, although this is quite typical of these small sites. There are no indications of any loss of habitat due to erosion or to land-use changes. This habitat may have been affected by the road improvement and coastal protection works along the northern side of the inlet, but it is very difficult to quantify any impacts due to the very small extent of this habitat at this location.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. No monitoring stops were carried out in this habitat due to the small extent present at the site. However, a visual assessment of the habitat indicated that it would probably pass for all attributes. Several ecotypes were present with this habitat appearing along the seaward boundary of the saltmarsh and also appearing as a pioneer community along parts of the strandline.

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, although a very small extent is present. This makes it vulnerable to small changes at the site. The habitat extent is likely to remain small at this site as there are no suitable extensive intertidal mud and sandflats for this habitat.

5.3 Atlantic salt meadows (H1330)

5.3.1 Extent

The extent of this habitat is assessed as *favourable*. There indications of some possible loss of habitat related to road improvement works and coastal protection along the northern side of the inlet. However, there is no measurable loss of habitat when examining 1995 and 2000 series aerial photos. It is likely that any loss of habitat would be less than 0.07 ha (1% of total habitat area). The site also exhibits some erosional trends but there was no measurable erosion and loss of saltmarsh during the current monitoring period.

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 one failed. Most of the attributes required for the structure and functions of this habitat reached their targets. The saltmarsh is generally in good condition and grazing is not a significant impact on most of the saltmarsh. The saltmarsh has typical vegetation communities, zonation of vegetation is evident and well-developed in places and one section has a moderately well-developed saltmarsh topography. There are natural transitions to other coastal habitats at both the lower and upper saltmarsh boundaries. The Atlantic salt meadows form part of a larger coastal ecosystem.

The main reason for the failed stops was damage from overgrazing and poaching. This affects about 10% of the total saltmarsh and the actual grazing level only affects the sward height and does not seem to affect diversity. There may also be some sheep-grazing induced

erosion off the lower saltmarsh boundary. In addition, other sections of saltmarsh have been damaged by coastal protection works and there are indications of an erosional trend along the seaward boundary of the main section of saltmarsh.

Sea Purslane (*Atriplex portulacoides*) is also present at this site and was recorded at two 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^2 squares along the west coast (Preston *et al.* 2002). 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 continue in the near future. There are few impacts or activities of high intensity affecting this site apart from grazing on a small area and an erosional trend. The site is not likely to be further impacted by coastal protection works in the near future as these activities are controlled and licensed by the local authority. Most of the saltmarsh habitats are within a cSAC so the habitat should not be affected by other land-use changes.

5.4 Mediterranean salt meadows (H1410)

5.4.1 Extent

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

5.4.2 Habitat structure and functions

No monitoring stops were carried out in this habitat as it was inaccessible. However, a visual assessment of the habitat indicated that it was somewhat damaged by wheel ruts related to farm vehicles and to moderate-high levels of sheep grazing. The structure and functions of this habitat are assessed as *unfavourable-inadequate* due to these impacts.

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 few impacts or activities affecting this habitat at this site, although a small extent is present. This habitat is located outside the cSAC boundary and is therefore not protected by nature conservation designation.

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for the saltmarsh habitats 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.

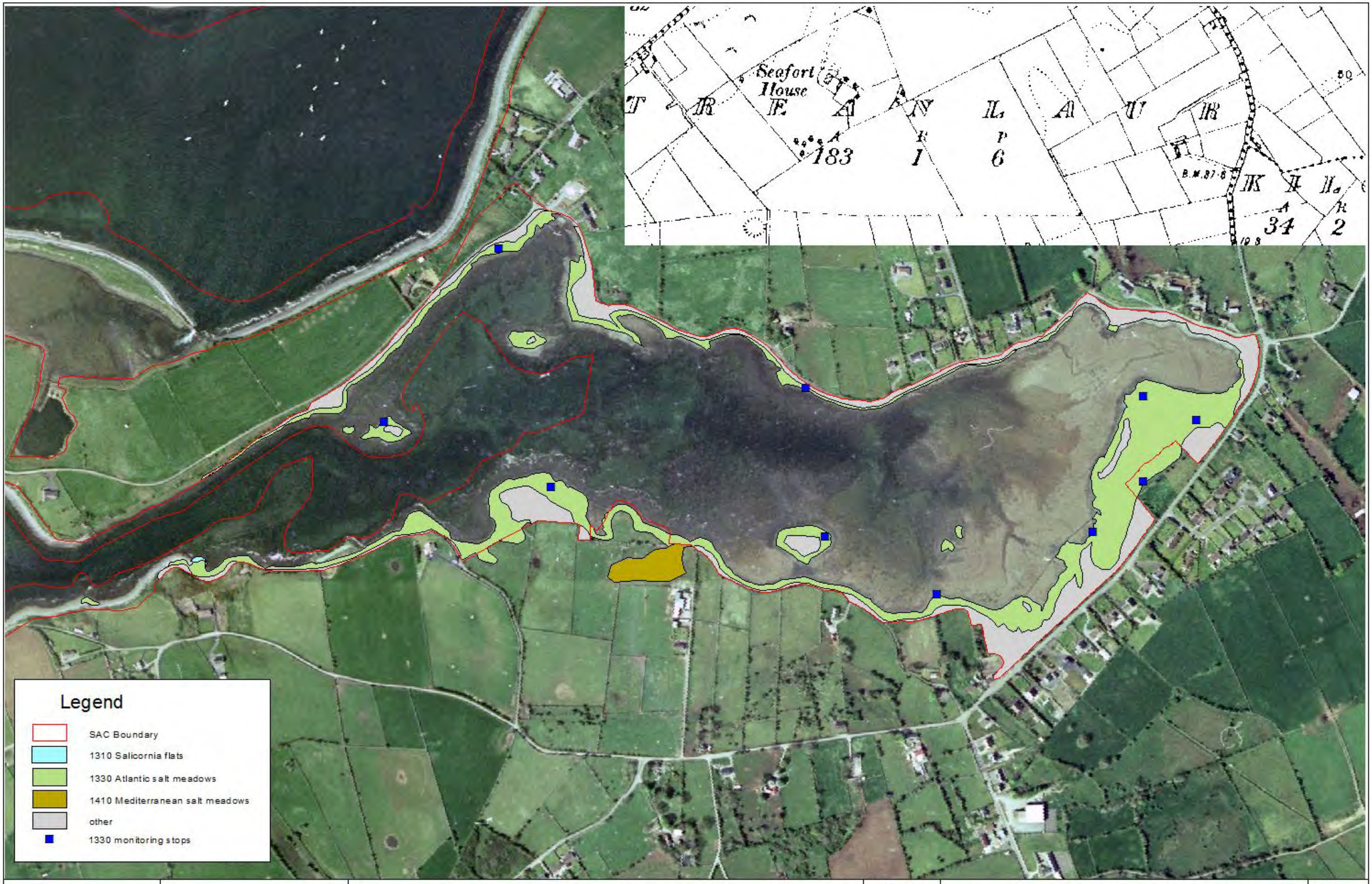
Curtis, T.G.F. & McGough, H.N. (1988). *The Irish Red Data Book*. Stationary Office, Dublin.

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

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats	0.015	0.015				
2	Spartina swards						
3	1330 Atlantic salt meadow	7.378		7.818			
4	1410 Mediterranean salt meadow	0.503			0.503		
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)	4.558					
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	**12.454**	**0.015**	**7.818**	**0.503**		



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

Saltmarsh Monitoring Project 2007-2008

Kilcaimin

Galway Bay Complex SAC (000268)

SMP code: SMP0092

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

0 70 140 210 280 350 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:5500

N

Kileenaran

1 SITE DETAILS

SMP site name: **Kileenaran**		SMP site code: **SMP0090**
Date of site visit: **15/10/2007**		CMP site code: **N/A**
SM inventory site name: **Kileenaran**		SM inventory site code: **125**
NPWS Site Name: **Galway Bay Complex**		
NPWS designation	cSAC: **000208**	MPSU Plan: **old format plan available**
	pNHA: **000208**	SPA: **004031**
County: **Galway**		Discovery Map: **52** Grid Ref: **137250, 216300**
Aerial photos (2000 series): **O 3570-A,C**		6 inch Map No: **Ga103**

Annex I habitats currently listed as qualifying interests for Galway Bay Complex cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **Scanlan's Island, Kinavarra West, Tyrone House-Dunbeacon Bay, Kilcaimin, Oranmore North, Roscom West & South, Seaweed Point, Barna,**

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

2 SITE DESCRIPTION

Kileenaran saltmarsh is located along the eastern side of Galway Bay. This saltmarsh site is one of the several saltmarshes that have developed in the long narrow inlets found on this part of Galway Bay. It is one of 19 Saltmarsh Inventory sites listed in Galway Bay (Curtis & Sheehy-Skeffington 1998). Kileenaran is located 7.3 km south-west of Clarinbridge. The main saltmarsh is located at the head and along the southern side of Brandy Harbour inlet. This inlet is enclosed by a narrow peninsula to the north. The survey site extends from Rincarna Point in the west, to Muckinish Point and Belmuckish Channel to the south of Brandy Harbour. The shoreline topography of the survey site is more complicated in the southern section with several spits or rocky outcrops (and associated saltmarsh) separated by narrow channels. There are also some barrier shingle/cobble bars at the southern side of the survey site and along the northern side of Rincarna Point. Saltmarsh has developed in the leeward side of some of the low-lying areas protected by these shingle/cobble bars. The shoreline topography is also quite intricate due to irregular glacial deposits and rocky outcrops, creating mounds and hollows or various sizes. Saltmarsh is associated with some of the lower hollows that are inundated by the tide creating a mosaic of saltmarsh and dry coastal grassland in places.

This part of Co. Galway is quite rural although there is some ribbon development in places along minor roads in the area and frequent dispersed habitation. The area is relatively low-lying and dominated by agricultural grassland although there are also some patches of semi-natural vegetation, with scrub and dry grassland, and some limestone pavement. The intertidal areas of Brandy Harbour contain rocky mixed sediment with abundant brown algae cover.

The site is located within the Galway Bay Complex candidate Special Area of Conservation (cSAC 208). Three Annex I habitats are present at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All these habitats are listed as qualifying interests for the Galway Bay Complex cSAC. Two species of local distinctiveness, Sea Purslane (*Atriplex portulacoides*) and Sea Wormwood (*Seriphidium maritimum*), are found at the site. Most of the saltmarsh habitats mapped at this site is located within the cSAC boundary. There are several fragments of Annex I habitats located outside the boundary around the site. Some are unintentional exclusions, as the 6 inch map was used to draw the cSAC site boundary and there are some errors between this map and the actual ground as indicated from the aerial photos.

The site was accessed via several points along the shoreline. Minor roads pass close to the shoreline along the north side of Rincarna Point. Much of the saltmarsh along the south side of Brandy Harbour is within commonage and permission was sought to enter this area, which was grazed by both sheep and cattle.

3 SALTMARSH HABITATS

3.1 General description

The main Annex I saltmarsh habitat found on this site is Atlantic salt meadow (ASM) (Table 3.1). This habitat is distributed around the entire site and is found in several different situations, increasing the diversity of the site. The main area of habitat is distributed along the south side of Brandy Harbour and continues south to Muckanish. The ASM has a complex topography due to underlying glacial deposits that has created frequent mounds and hollows of various sizes and shapes. The saltmarsh has developed in the lower lying sections inundated by the tide and therefore has an intricate upper boundary. There is also frequent scattered rock on parts of the saltmarsh. The ASM transitions to dry coastal grassland (GS1) and the upper boundary of the saltmarsh was sometimes difficult to identify where there were shallow slopes from one habitat to the other. The presence of Sea Wormwood is a positive indicator. Other transitional species include Silverweed (*Potentilla anserina*), Daisy (*Bellis perennis*), Mouse-eared Chickweed (*Cerastium fontanum*) and White Clover (*Trifolium repens*).

There are occasional small mounds containing dry coastal grassland and exposed rock that area surrounded by saltmarsh. There are several old dry stone walls marking different enclosures that cross the saltmarsh. Some of the saltmarsh also has dry stone walls along the lower seaward boundary to protect sheep and cattle from staying into the adjacent intertidal area.

Further south towards Muckanish there is some exposed limestone pavement on the shoreline. There presence of this habitat has created an unusual saltmarsh variant. Saltmarsh plants grow in the grikes of the limestone pavement.

There are several areas where there are narrow bands of saltmarsh. A narrow band of ASM is also present along the north side of Brandy Harbour. The ASM has developed on a thin band of sediment over-lying cobble beach. The saltmarsh transitions to upper saltmarsh dominated by Twitch (*Elytrigia repens*). These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. The saltmarsh has eroded away in places leaving only small patches in

association with the storm beach and the vegetation is more typical of stony banks. Saltmarsh habitats develop into isolated patches of vegetation and isolated plants vegetating cobble beach shoreline.

Saltmarsh was also mapped along the north side of the Rincarna Penensula. This side of the peninsula is more exposed and a storm beach or shingle/cobble bar has developed along the shoreline. This cobble bar has cut off or sheltered several low-lying hollows that contain intertidal pools and/or lagoons. The pools contain bare intertidal sediment and scattered cobble. Narrow bands of saltmarsh vegetation have developed on steep-sided slopes around these pools. There are transitions from saltmarsh to elements of vegetation of stony banks on these cobble bars. This type of habitat is also found at the southern side of the survey site at Muckanish.

Mediterranean salt meadows are found at one location on the site, at the head of Brandy Harbour. There are natural transitions between the surrounding ASM and the MSM. Only a small area of *Salicornia* flats is present at this site and is located at the southern end of the site.

The main intertidal habitats found adjacent to the saltmarsh are exposed rock, coarse pebble and cobble deposits and muddy mixed sediment. There are some patches of intertidal mud also present. There is abundant brown algae associated with the exposed rock.

Table 3.1. Area of saltmarsh habitats mapped at Kileenaran.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand	0.008
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	15.166
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.271
	Total*	**15.445**

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

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

This habitat is found at several locations across the site, but its overall extent is quite small. It is found in some of the pools sheltered by the cobble ridge along the northern side of Rincarna Point. These patches are dominated by Glasswort (*Salicornia* sp.). Annual Sea-blite (*Suaeda maritima*) also vegetates narrow bands of cobble on shingle/cobble bars around the small lagoons/pools. These patches of habitat are not classified as 1310 because the substrate is not mud or sand and it has more affinity to vegetation of stony bank.

Glasswort has also colonised small patches of mixed sediment at the southern end of the survey area, in some sheltered situations.

3.3 Atlantic salt meadows (H1330)

The vegetation of this habitat is quite typical and similar to other saltmarsh sites around Galway Bay, particularly Tawin Island. Both these sites contain saltmarsh whose topography is significantly impacted by underlying glacial deposits. Several typical saltmarsh communities are present at this site. Zonation of the saltmarsh vegetation is also evident and the different communities are best developed in the largest saltmarsh areas located along the

southern side of Brandy Harbour. The moderate levels of grazing has created a low close-cropped sward and miniaturized saltmarsh plants compared to other ungrazed sites.

The saltmarsh is mainly dominated by mid-upper saltmarsh vegetation. There are only several locations where a lower saltmarsh community dominated by Common Saltmarsh-grass (*Puccinellia martima*) is well developed on soft mud, although this community may be found along the lower saltmarsh boundary. This vegetation type also contains occasionally frequent Lax-flowered Sea Lavender (*Limonium humile*) and also some Sea Pink (*Armeria maritima*), Common Scurvygrass (*Cochlearia officinalis*), Annual Sea-blite, Sea Aster (*Aster tripolium*) and Glasswort. This vegetation community was poached in places.

A typical mid-marsh community dominated by Sea Pink and Sea Plantain (*Plantago maritima*) is not extensive but is present along the zonation along some slopes. This community is usually dominated by a mixture of Common Saltmarsh-grass and one or both of the species listed above.

The mid-upper saltmarsh is dominated by Red Fescue (*Festuca rubra*). There are usually small amounts of Sea Plantain and Sea Pink in this vegetation type. Species such as Buck's-horn Plantain (*Plantago coronopus*), Sea Milkwort (*Glaux maritima*), Autumn Hawkbit (*Leontodon autumnalis*), Lesser Sea Spurrey (*Spergularia media*) and Spear-leaved Orache (*Atriplex prostrata*) appear towards the upper boundary. Buck's-horn Plantain may become frequent. Other species present include Frosted Orache (*Atriplex lacinata*). Turf fucoids (an indicator of local distinctiveness) were also noted at this site and area associated with the mid-marsh zones. Saltmarsh Rush (*Juncus gerardii*) is present at several locations in the mid-upper saltmarsh, but is not frequent in cover.

The saltmarsh topography is well-developed with creeks and salt pans present. The underlying glacial deposits have also created a complex topography of mounds and hollows. This means there is a wide assortment of slopes and zonation. Some of the creeks and channels that drain the saltmarsh relate to the underlying topography of the glacial deposits and limestone bedrock. The limestone bedrock is sometimes exposed and loose limestone rock is also frequent in places. The ASM may form mosaics with rocky shore at some locations.

Narrow strips of ASM habitat are also found around small pools/lagoons along the north side of Rincarna Point. The habitat is situated on a steep slope and there is a transition from Common Saltmarsh-grass-dominated vegetation to Red Fescue-dominated vegetation. Other species present in the saltmarsh vegetation include Sea Plantain, Sea Pink, Annual Sea-blite, Common Scurvygrass, Lax-flowered Sea Lavender, Sea Arrowgrass (*Triglochin maritimum*) and Creeping Bentgrass (*Agrostis stolonifera*). There is a further transition upward to dry coastal grassland along the top of the cobble banks. Species such as Sea Beet (*Beta maritima*) and Spear-leaved Orache are found along the upper saltmarsh boundary. Sea Wormwood is also present in the upper saltmarsh and growing the scattered vegetation over the barer stony banks. Some of the grassland along the upper boundary is typical of CM2 upper saltmarsh and is dominated by Twitch (*Elytrigia repens*). There is generally no saltmarsh topography associated with these strips of saltmarsh habitat.

Sea Wormwood and Sea Purslane are also found in some of the narrow strips of saltmarsh vegetation located along the north side of Brandy Harbour.

Moderate levels of grazing have created a closely cropped sward but have not affected diversity of the saltmarsh habitat. The sward height is quite uniform in places. However, patches with Sea Wormwood are not grazed so intensively. Grazing does seem to affect the distribution of Sea Purslane. This species is found along the northern side of Brandy Harbour, which is not grazed significantly. No Sea Purslane was found along the southern side of Brandy Harbour, which is grazed. Some Sea Purslane was found in the limestone pavement area in some of the grikes, where it may be protected from grazing animals.

3.4 Mediterranean salt meadows (H1410)

This habitat is found at one location on the site near the head of the Brandy Harbour in the north-east part of the site. The habitat structure is dominated by tall tussocks of Sea Rush (20-40% cover). Red Fescue is abundant and other species include Saltmarsh Rush, Sea Mayweed (*Tripleurospermum maritimum*), Creeping Bentgrass, Autumn Hawkbit, White Clover, Spear-leaved Orache, Mouse-eared Chickweed (*Cerastium fontanum*) Birdsfoot Trefoil (*Lotus corniculatus*), Sea Plantain, Sea Arrowgrass and Common Scurvygrass.

Zonation of vegetation within the MSM is evident and is related to a slight slope. The lower area contains MSM with dense Sea Rush and the upper parts where transitional species like Mouse-eared Chickweed and Birdsfoot appear. This habitat is not grazed as intensively as the ASM. There is a distinct boundary between the MSM area and the adjacent ASM which is unusual. Sea Rush is not even found as isolated tussocks in the ASM. There are some pans in this area but no significant creeks. The distribution of the MSM may be related to a small drain/stream that flows past this section and into the head of Brandy Harbour.

4 IMPACTS AND ACTIVITIES

Several impacts and activities affect this site, but most generally have low or neutral intensities (Table 4.1). Most of the site along the southern side of Brandy Harbour is grazed by sheep and cattle and this has created a typical closely cropped sward 1-3 cm high over much of the saltmarsh. However grazing is at a moderate level on most of the habitat and there are few signs of damage from this grazing (142) such as heavy poaching, removal of vegetation cover and impacts on diversity. It should be noted that the height of the vegetation is somewhat taller in the coastal grassland compared to the saltmarsh, indicating livestock preference for saltmarsh.

There are sections (generally the lower saltmarsh) that are poached and damaged but these only cover a minor percentage of the overall saltmarsh habitat area. There are signs of poaching-induced erosion along the lower saltmarsh boundary at various locations but this is also minor (142). However, erosion is also induced due to the relatively thin nature of some of the sediment over glacial deposits that carry the saltmarsh habitat, which are more easily eroded by overgrazing. The north side of Brandy Harbour is not grazed.

The inlet north of Rincarna Point is used for shellfish aquaculture but this does not affect the saltmarsh in Brandy Harbour. There are several tracks that cross the saltmarsh that have eroded minor areas of saltmarsh (501). There are several other tracks along various parts of the shoreline that are used for shoreline access and access for farm vehicles to commonage areas. These tracks also occasional cross saltmarsh but the impacts are very minor. There are also several tracks across the commonage area that have been created by livestock

using the area (501). There are several spots with some very minor damage due to poaching and/or removal of vegetation cover.

Erosion (900) at the site is not significant. A comparison of the OSI 2nd edition 6 inch map to the OSI 2000 series aerial photos shows that there have been no significant losses of saltmarsh and no measurable erosion in the past 100 years. There have been some small changes with losses and gains mainly due to shifts in the shingle/cobble bars, but these largely compensate each other. There are also signs of erosion along the seaward boundary of the saltmarsh, but there was no measurable erosion of saltmarsh during the current monitoring period. The impact of erosion is assessed as neutral on a small portion of saltmarsh.

Old dry stone walls are occasionally found along some of the lower saltmarsh boundary at several locations. This may be related to some old coastal protection works. There are other dry stone walls along or close to the lower saltmarsh boundary that were constructed to enclose the saltmarsh and protect grazing animals from adjacent rocky intertidal areas.

Impacts and activities adjacent to the site include dispersed habitation (403), fishing/aquaculture (200) and fertilization (120) and the grazing of livestock (140) related to farming practises.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	140	C	0	0.008	Inside
1330	140	B	0	10.166	Inside
1330	142	B	-1	5.000	Inside
1330	501	C	-1	0.100	Inside
1330	900	C	0	0.7	Inside
1410	140	C	0	0.271	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

The overall conservation status of this site is assessed as *unfavourable-inadequate* (Table 5.1). Kileenaran is a moderately-sized saltmarsh with several features of interest, such as an

unusually complex topography affected by the underlying glacial deposits, the presence of limestone pavement colonised by some saltmarsh along the shoreline and the presence of several species of local distinctiveness. Four monitoring stops out of a total of seventeen monitoring stops failed but this probably over-emphasises the inadequate conservation status of this site. Much of the saltmarsh is located within commonage and this is grazed with a moderate intensity by sheep and cattle. Grazing has created a typical low close-cropped sward typical of these commonage areas grazed by sheep. Erosion at this site is not significant.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are moderate-good. There is considerable scope for landward transition of saltmarsh vegetation up slope into dry costal grassland. The irregular topography of much of the marsh has created a complex mosaic of coastal grassland and saltmarsh. However, these are very general predictions.

This site is located within the Galway Bay Complex cSAC although not all the saltmarsh habitat is located within the cSAC boundary. This site is located within the Galway Bay Complex cSAC. An old format NPWS management plan is available for the saltmarsh habitats at this cSAC but it is now old of date.

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

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

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

5.2.1 Extent

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

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. No monitoring stops were carried out in this habitat due to the small extent present at the site. However, a visual assessment of the habitat indicated that it would probably pass for all attributes. Several ecotypes were present with this habitat appearing along the seaward boundary of the saltmarsh on mixed sediment and in some of the small pools/lagoons created by the storm beach/cobble ridge.

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, although a very small extent is present. This makes it vulnerable to small changes at the site. The habitat extent is likely to remain small at this site as there are no suitable extensive intertidal mud and sandflats for 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 erosion or to land-use changes within the current monitoring period. There are indications of localised erosion along the seaward boundary but there has been no measurable loss of 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 four failed (25%). Most of the attributes required for the structure and functions of this habitat reached their targets. Moderate grazing intensities has created a typical close-cropped sward but diversity is not impacted. Several stops failed due to poaching damage and heavy grazing. Grazing has created a close-cropped low sward and the structural sward height is quite uniform. There are also signs of poaching-induced erosion along the seaward boundary of the saltmarsh.

However, the saltmarsh is generally in good condition. The saltmarsh has typical vegetation communities and zonation of vegetation is evident and well-developed in places. The saltmarsh topography is well developed in places. There are natural transitions to other coastal habitats at both the lower and upper saltmarsh boundaries. The Atlantic salt meadows form part of a larger coastal ecosystem.

A species of local significance, Sea Wormwood, which is found frequently on saltmarshes around Galway Bay, is present at this site. This species has a scattered distribution in Ireland and is only found recently in eight 10 km^2 squares around the coast of Ireland (Preston *et al.* 2002). Webb *et al.* (1996) described its distribution as rare and very local although it is not recorded as a rare species in The Red Data Book (Curtis & McGough 1988).

Sea Purslane (*Atriplex portulacoides*) is also present at this site and was recorded at two 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^2 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.

Turf fucoids were also noted on the site. This is another indicator of local distinctiveness and is generally associated with saltmarshes along the west coast of Ireland.

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 main impact affecting this site is grazing, which is having some localised negative impact in places. A small reduction in grazing intensity may be beneficial for this site. Most of the saltmarsh habitats are within a cSAC, so the habitat should not be affected by other land-use changes.

5.4 Mediterranean salt meadows (H1410)

5.4.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any loss of habitat due to erosion or to land-use changes.

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 it passed. All of the attributes required for the structure and functions of this habitat reached their targets. The habitat displays some zonation of vegetation, with transitional terrestrial species such as Mouse-ear Chickweed appearing in the habitat. There are some small pans present in the habitat but the saltmarsh topography is not well developed. The habitat is generally in good condition and grazing intensity is not as high compared to the ASM.

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 affecting this habitat at this site, although a small extent is present. This habitat is located within the cSAC boundary and is therefore protected by nature conservation designation.

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for the Annex I habitats at this site.

7 REFERENCES

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

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.

Natura (2006). *Galway City habitat inventory*. A report for Galway City Development Board. Galway County Council.

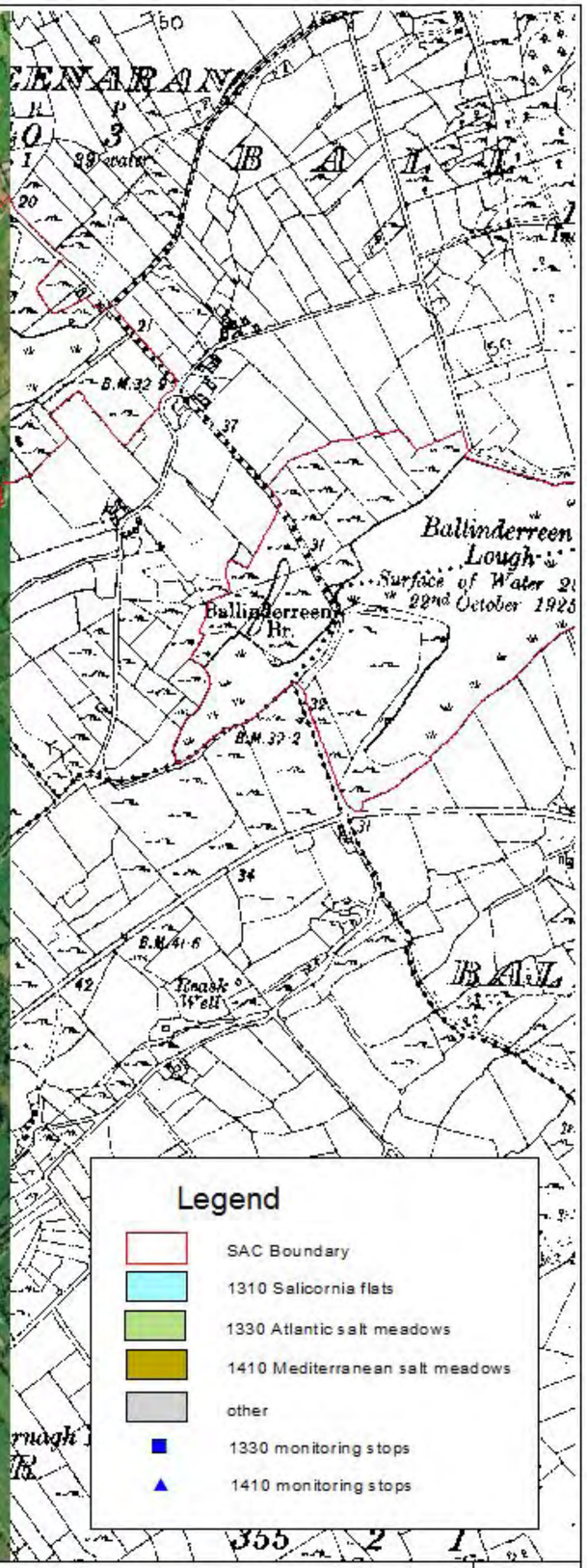
Preston, C.D. Pearman, A. & Dines, D. (2002). *New atlas of the British and Irish Flora*. Oxford University Press.

Webb, D.A., Parnell, J. & Doogue, D. (1996). *An Irish flora.* Dundalgan Press, Dundalk.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats	0.008	0.008				
2	Spartina swards						
3	1330 Atlantic salt meadow	15.166		15.166			
4	1410 Mediterranean salt meadow	0.271			0.271		
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)	22.984					
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	**38.429**	**0.008**	**15.166**	**0.271**		



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

Saltmarsh Monitoring Project 2007-2008

Kileenaran

Galway Bay Complex SAC (000268)

SMP code: SMP0090

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

0 100 200 300 400 500 Meters

N

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:7000

Kinvarra

1 SITE DETAILS

SMP site name: **Kinvarra**		SMP site code: **0102**
Dates of site visit: **01 & 02/11/2007**		CMP site code: **N/A**
SM inventory site name: **Kinavarra**		SM inventory site code: **100**
NPWS Site Name: **Kilkieran Bay and Islands**		
NPWS designation	cSAC: **2111**	MPSU Plan: **Old format plan**
	pNHA: **2075**	SPA: **N/A**
County: **Galway**		Discovery Map: **45** Grid Ref: **96000, 233000**
Aerial photos (2000 series): **O 3208-B,D; O 3209-A,C; O 3273-B; O 3274A**		6 inch Map No: **Ga 065, 078**

Annex I habitats currently listed as qualifying interests for Kilkieran Bay and Islands cSAC:

H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

H1410 Mediterranean salt meadows (Juncetalia maritimi)

Other SMP sites within this SAC/NHA: **Teeranea, Lettermullan West, Lettermore South, Bealadangain, Turloughbeg**

Saltmarsh type: **Fringe** Substrate type: **Peat**

2 SITE DESCRIPTION

Kinvarra saltmarsh is located in west Co. Galway, 6 km north of Rossaveel. The survey site incorporates a long narrow inlet over 3.5 km long that is connected to the inner part of Kilkieran Bay called Camus Bay. This part of the bay is quite sheltered. Blanket bog dominates the landscape on both sides of the inlet. A significant portion of the Blanket bog has been modified by peat cutting in the past, leaving frequent face-banks and dried out ridges dominated by Heather (*Calluna vulgaris*). There are also some rocky outcrops in the bog with exposed rock, scrub and wet grassland scattered around the site. Some of the ground adjacent to the inlet is quite low-lying while other sections have gradual slopes up low hills.

The tide enters the inlet from the mouth to the north at Kinvarra and flows south for a considerable distance. Tidal inundation in the inlet is delayed significantly so low tide within the inlet is 1-2 hours after low tide in the outer part of the bay. The inlet is variable in width with some sections being quite narrow (50-100 m wide) such as near the mouth of the inlet. Further south this relatively narrow channel widens out to create several small 'sea loughs' up to 400 m wide. There are several small islands within the inlet that also contain some peat cover. Several small streams flow into the inlet from the adjacent blanket bog. The inlet contains a narrow zone of intertidal mud along its edges in the mid-section but is quite deep in parts with a significant part of the inlet being sub-tidal and possibly deeper. There is exposed rock and mixed Wrack-covered substrate along the edge of the inlet along the northern channel. Therefore, at low tide there is still a significant area of the inlet covered in water.

The inlet eventually connects to a small brackish lough (Lough Carrafinla) via a narrow channel 10-20 wide at the southern end. This lough has typical freshwater marginal vegetation around its edges and some brackish indicators. This lough (Loch Cara Fionnla) is known as a brackish lagoon and has been included in some national surveys of Irish lagoons for NPWS (Roden 1998, Oliver 2005, NPWS 2007). Oliver (2005) classified this lagoon as a 'saline lake' type on rock/peat substrate type with a wide salinity range (10-32 psu). Roden (1998) described several communities around the margin of the lagoon including Sea Rush (*Juncus maritimus*) communities, Slender Spike-rush (*Eleocharis uniglumis*) communities and a Saltmarsh Rush (*Juncus gerardii*) community containing Brookweed (*Samolus valerandi*).

This area is sparsely populated and there are scattered dwellings along the regional (R336) that is located on the east side of the inlet and there are also several houses along the minor road on the west side of the inlet. Parts of this site are quite isolated and can only be reached by crossing a considerable area of blanket bog (1.5 km).

A significant area of saltmarsh has developed along both sides of the inlet. This saltmarsh has generally developed on blanket peat that is now low-lying and is inundated by the tide. The saltmarsh forms a band of vegetation of variable width along both sides of the inlet. In some cases the saltmarsh occupy a zone along the shoreline less than 10 m wide where there are moderate slopes onto higher bog adjacent to the site. Some of the saltmarsh is more extensive and occupies a zone about 300 m wide. One notable feature of this site is that saltmarsh has developed on blanket peat in areas that where formerly cut for turf. Some of the bog has been cut over to a level where it is now inundated by the tide. This has created areas where there is a mosaic of blanket bog and saltmarsh habitats, the blanket bog being on drier ridges and the saltmarsh vegetation extending up artificial channels along face-banks into the blanket bog. For this reason the site was difficult to map, particularly the upper boundary of the saltmarsh, and mosaics were used in several areas where there were complex mixtures of vegetation types.

This site is part of Kilkieran Bay and Islands candidate Special Area of Conservation (cSAC 2111). This large coastal cSAC contains a wide range of habitats of notable conservation interest, including open marine water, sub-tidal habitats, coastal habitats such as machair and lagoons. Two Annex I saltmarsh habitats are present at this site, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). This site is one of the few sites that have also been designated as a pNHA (Kinvarra Saltmarsh 002075) for the presence of saltmarsh habitats. Saltmarsh has also developed at several other locations around this bay in this cSAC. Several of these sites are listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and were also surveyed during the Saltmarsh Monitoring Project (see the site details table above).

Most of the saltmarsh habitat mapped at this site is located inside the cSAC boundary. This is mainly due to the fact that the upper shoreline on the OSI 6 inch map was used to draw the cSAC boundaries and this enclosed most of the land covered by spring tides. There are some patches of saltmarsh habitat extending beyond this boundary in places, particularly where there has been peat-cutting. There are also some notable differences between shoreline boundary on the OSI 6 inch map and the current shoreline.

Turf fucoids are the only species of local distinctiveness recorded at this site and these are typical of saltmarsh found on peat along the western coast of Ireland.

The saltmarsh was accessed from several locations around the site including the bridge at the northern end of the site, several bog roads on the south-west side of the site and via the regional road on the south-west side of the site.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh at this site is predominantly MSM that has developed on peat (Table 3.1). This is a typical 'fringe type' site. Most of the ASM is located in the north-west section of the survey site on both sides of the narrow channel near the mouth of the inlet. There is minor development of ASM around the rest of the saltmarsh. The overall extent of saltmarsh in the inlet decreases along a southern gradient. Roden (1998) surveyed the marginal vegetation around Carrafinla Lough and speculated that 'lagoon-like' vegetation may be more widespread along the narrow channel connecting the lough to the inlet.

The largest area of saltmarsh is located in the north-western section adjacent to the narrow channel. This area on the west side of the channel is quite low-lying and difficult to map because of the mosaic of blanket bog and MSM vegetation created by peat-cutting. Close to the inlet there is typical zonation of saltmarsh with ASM along the seaward side of the saltmarsh and MSM along the landward side. A saltmarsh cliff marks the lower ASM boundary and the height of this cliff varies between 0.5-1 m high with peat exposed along the edge.

There are small patches of blanket bog vegetation and scrub on natural mounds within the area mapped as MSM close to the shoreline. There are also signs of peat-cutting all through the saltmarsh and close to the shoreline in the north-western section. The extent of blanket bog increases towards the west side of the site. Some MSM vegetation extends west through the blanket bog to close to the minor access road that marks the western boundary of the survey site. The saltmarsh is found in low-lying trenches (10-20 m wide) or narrower channels through the blanket bog that have re-vegetated and are dominated by Sea Rush. Modified blanket bog is found on higher peat on both sides of these trenches with species such as Purple Moor-grass (*Molinia caerulea*), Deer-grass (*Trichophorum cespitosum*), Bog cottons (*Eriophorum* spp.), Heather, Cross-leaved Heath (*Erica tetralix*), Brittle Bones (*Narthecium ossifragum*) Creeping Bent (*Agrostis stolonifera*), Carnation Sedge (*Carex panicea*), and Black Bog-rush (*Schoenus nigricans*). Heather and Gorse (*Ulex europaeus*) dominate some drier bog ridges. There is very little Bog Moss (*Sphagnum* spp.) cover within the blanket bog/saltmarsh mosaic. Some of the blanket bog along the western side of the inlet has been burnt in the past. There may be 0.3-1 m in height difference between these two habitats in places depending on the depth of the trench or channel. Some of these trenches occur in a fairly regular formation. Some of the other channels vegetated by MSM through the blanket bog have an irregular topography and are likely to be naturally formed, creating a complex network of channels with bare peat cover that overlays the article modifications created by peat-cutting.

There is less saltmarsh on the eastern side of the channel and less frequent signs of peat-cutting. There is very little saltmarsh along the northern section and exposed rock and glacial till are the predominant habitats along the shoreline of the inlet.

The saltmarsh has a similar structure around the northern sea lough within the inlet. The western side of the inlet and the saltmarsh is particularly modified by peat-cutting. Some of the saltmarsh along the eastern side of this sea lough is eroded and there are patches along the shoreline with a mosaic of exposed rock/glacial till and saltmarsh.

The saltmarsh is confined to a narrower band of habitat on the western side of the southern sea lough. The saltmarsh habitat is dominated by MSM and there is very little ASM. The western side is not significantly modified by peat-cutting, but some old face-banks can still be seen. This area contains the most unmodified sections with natural transition between blanket bog and saltmarsh. The eastern side of this sea lough has been modified by the creation of some fields and some possible land improvement in the past. Both MSM and ASM are still found along the eastern shoreline in association with Blanket bog and wet grassland. There is an extensive patch of saltmarsh in the south-eastern corner of this area, between the inlet and the main road. This area contains frequent small natural mounds with rocky outcrops or more typically with blanket bog vegetation. Most of the transition along the upper boundary is to wet grassland and some scrub. Common Reed (*Phragmites australis*), Grey Club-rush (*Schoenoplectus lacustris* spp. *tabernaemontani*) and Sea Club-rush (*Bolboschoenus maritimus*) appear in the vegetation along the upper saltmarsh boundary, especially where there is freshwater run-off from the adjacent slopes. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification.

A narrow channel flows into the southern side of this southern sea lough. There is a narrow fringe of saltmarsh vegetation on both sides of this inlet, sometimes confined to a band less than 1 m wide on the eastern shore. This channel eventually connects in to Carrafinla Lough. There is some development of marginal brackish vegetation in the channel with stands of Common Reed and Sea Club-Rush appearing along this channel further south.

The marginal vegetation around the northern side of Lough Carrafinla has a very narrow zone dominated by Red Fescue (*Festuca rubra*) and contains saltmarsh species such as Sea Plantain (*Plantago maritima*), Saltmarsh Rush (*Juncus gerardii*), Autumn Hawkbit (*Leontodon autumnalis*), Sea Rush and Buck's-horn Plantain (*Plantago coronopus*). Other species such as Long-leaved Plantain (*Plantago lanceolata*) and White Clover (*Trifolium repens*) are found in association with the saltmarsh species. Eelgrass was noted within the narrow channel at the northern end of the lough.

Table 3.1. Area of saltmarsh habitats mapped at Kinvarra.

EU Code	Habitat	Area (ha)
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	6.390
H1410	Mediterranean salt meadows (Juncetalia maritimi)	37.878
	Total	**44.268**

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

3.2 Atlantic salt meadows (H1330)

The ASM found in the north-west section of the survey site is dominated by mid-marsh communities, with some mid-upper saltmarsh. A typical low closely cropped sward has developed on peat platforms. The most common community is dominated by Sea Plantain and contains frequent Sea Pink (*Armeria maritima*) and small amounts of Sea Aster (*Aster*

tripolium), Sea Milkwort (*Glaux maritima*), Red Fescue and Common Saltmarsh-grass (*Puccinellia martima*). Sea Arrow-grass (*Triglochin maritimum*), and Lax-flowered Sea Lavender (*Limonium humile*) were recorded rarely in this community. This community also contains some Glasswort (*Salicornia* sp.) close to the road bridge at the north of the inlet.

Some of the ASM has an irregular topography and is not particularly flat with low mound and channels present (height different 20 cm). However, this is significant enough to create some zonation within the ASM. The appearance of species such as Red Fescue, Saltmarsh Rush and Long-bracted Sedge (*Carex extensa*) indicate a transition to mid-upper saltmarsh. Red Fescue dominates some of this vegetation in association with Sea Plantain. The zonation of the mid and mid-upper communities is not typical and is related to the under-lying peat topography with small concentric bands of vegetation around low mounds. There is also some development of minor swards of Common Saltmarsh-grass (low marsh vegetation) in very minor drainage channels on the ASM.

Another upper saltmarsh community is present in some of the narrow naturally created channels that extend into the blanket bog at the southern end of the saltmarsh. This community was characterised by the presence of abundant Slender Spike-rush, Red Fescue, frequent Saltmarsh Rush and small amounts of Creeping Bent, Buck's-horn Plantain and Sea Arrow-grass. There is also significant portion of the cover with naturally occurring bare peat. This ASM community is notable for the presence of transitional species such as Jointed Rush (*Juncus articulatus*) and Knotted Pearlwort (*Sagina nodosa*) that probably reflects freshwater flow off the bog through these channels. This type of community was quite unusual as most of these low-lying channels that extended into the bog were vegetated by MSM dominated by Sea Rush.

This ASM has a well-developed saltmarsh topography within the ASM with several of the larger areas containing frequent irregular large salt pans containing bare peat. Some deep salt pans are present in the peat. Some Beaked Tassel-weed (*Ruppia martima*) was recorded in some of the salt pans. The ASM sward height is generally quite low and uniform due to relatively moderate-high grazing levels. There is also some dwarfing of the saltmarsh species. There is also some poaching damage in places caused by cattle.

3.3 Mediterranean salt meadows (H1410)

The MSM at this site is characterised by the dominance of Sea Rush. It should be noted that a significant amount of the area mapped as MSM also contains other habitats such as blanket bog ridges and mounds containing scrub, wet grassland and exposed rock.

Sea Rush creates typical dense swards along the inlet with 75-100% cover. Other species within this sward can include small amounts of Red Fescue, Saltmarsh Rush, Creeping Bent, Sea Milkwort, Common Scurvy-grass (*Cochlearia officinalis*), Long-bracted Sedge, Autumn Hawkbit (*Leontodon autumnalis*), Sea Aster, Sea Arrowgrass, Sea Pink, Buck's-horn Plantain and Sea Plantain. Other species rarely found within the MSM include White Clover, Sea Century, Brookweed and Spike-rush sp. However a significant part of the MSM has a naturally low diversity in places and few of these species are present or occur at low cover values. There is sometimes naturally high cover of bare peat within the MSM. The MSM also contains small patches of ASM in places that were not mapped.

There are some areas in the north-west area of the site where Sea Rush is colonising bare peat in naturally occurring channels over the blanket bog. There are monocultures of this

species developing. MSM dominated by grasses such as Red Fescue and Creeping Bent is increasingly found towards the southern side of the site, around the southern sea lough.

The MSM vegetation at this site is typical of a fringe type saltmarsh with extensive development of transitional type saltmarsh vegetation with a combination of typical MSM species and typical bog species. Much of the MSM can contain small quantities of Purple Moor-grass, Black-bog-rush, Carnation Sedge and Deer-grass. There can also be small tussocks present with terrestrial moss species such as *Hypnum* spp. There is a subtle change between typical MSM dominated by dense Sea Rush and Sea Rush-dominated vegetation that also contains more typical bog species that does not seem to be related to any significant changes in the underlying topography of the bog. This transition is typically observed in many of the low-lying channels and trenches that extend through the blanket bog in the north-west part of the site and were created by peat cutting. The lower central part of the trench or channel may be dominated by Sea Rush while there is a combination of Sea Rush and other species along the sides of these channels. Sea Rush was not distributed in more typical blanket bog vegetation in association with shrub or Heather cover. However, it occasionally was found in association with Bog Myrtle (*Myrica gale*).

This type of transitional MSM vegetation is also found around the upper zone of some of the naturally occurring low mounds covered by blanket bog and wet grassland in the south-west section of the site. The vegetation is characterised by frequent Purple Moor-grass and Sea Rush and occasional or rare cover of other terrestrial species such as Marsh Pennywort (*Hydrocotyle vulgaris*), Lousewort (*Pedicularis sylvatica*), Ragged Robin (*Lychnis flos-cuculi*) and Jointed Rush (*Juncus articulatus*) as well as saltmarsh species such as Sea Milkwort, Common Scurvy-grass, Sea Plantain and Buck's-horn Plantain.

The presence of this type of transitional vegetation and the modifications created by peat cutting made mapping the extent of saltmarsh very difficult due to problems of classification. The dominance of Sea Rush was taken as an indicator of saltmarsh so where the cover of saltmarsh was reduced below 50% and species such as Purple Moor-grass became more dominant the vegetation was mapped as wet grassland or blanket bog. The distribution of Sea Rush extends beyond the upper saltmarsh boundary in places, although mosaics were used to map adjacent vegetation in highly disturbed areas.

Some of the larger areas contain natural drainage channels and creeks. However the natural topography of the MSM in the north-west area has been significantly modified by peat-cutting.

4 IMPACTS AND ACTIVITIES

There are few impacts and activities affecting this site, mainly due to inaccessibility (Table 4.1). The main impact affecting this site is grazing (140) by sheep and cattle. Some of the saltmarsh along the mid east side of the survey site is enclosed in a series of fields between the shoreline and the regional road. There is minor localised poaching in these areas. Some of the shoreline around the east side of the inlet is grazed as commonage by sheep, which have access to the bog and the saltmarsh. The grazing intensity within the ASM was generally assessed as moderate or high, creating a low uniform sward height and some dwarfing of saltmarsh plants. There is some poaching damage and over-grazing in places (142). The grazing intensity within the MSM was generally assessed as low or absent. Horses graze saltmarsh along the narrow channel at the southern side of the site.

Part of the adjacent bog on the mid-west side of the inlet has been burnt recently and some MSM along the upper boundary has been damaged (180). However, this only affects a very minor area.

The structure of the saltmarsh at the site has been significantly influenced by hand cutting of peat in the past (310). This is mainly seen in the north-west corner although there are signs of peat cutting all around the inlet. Channels, face-banks and dried peat ridges extend into the saltmarsh and allow saltmarsh vegetation to spread into the adjacent bog. Some of the saltmarsh in the north-western section at this site has actually been created by peat cutting where low-lying peat has been cut away to a level that was then inundated by the tide.

The indicators of peat cutting are more recent in the north-western area whereas peat cutting has ceased for a longer period along the southern section and the mid-east section. Bare peat face-banks are still present in the north-west section whereas towards the southern end they have largely re-vegetated. Peat-cutting is also less intensive in the southern section compared to the northern section. There are still patches of shoreline in the southern section that have been relatively undisturbed by peat cutting and there is an intact natural transition from the blanket bog to the saltmarsh. It is not known when peat cutting ceased in the north-western area. There is still active peat cutting on the adjacent blanket bog in the mid-west area. The impacts of this peat cutting are not assessed as this activity occurred prior to the current monitoring period, although it is still having a significant residual impact on the structure and recent development of the saltmarsh.

There are signs of erosion (900) along the lower seaward boundary of the saltmarsh in places with high peat cliffs or face-banks being present. There is also some fragmentation of peat into tussocks in places along the lower saltmarsh boundary. These signs of erosion are more frequently seen in the northern channel where there is also likely to be greater erosional pressure from tidal scour. There are also some patches of bare peat cover in places along the lower saltmarsh boundary in the ASM. However, a comparison of the OSI 6 inch map to the current extent of the saltmarsh shows that there has been no measurable loss of saltmarsh caused by erosion during this period (past 100 years). The impact of erosion is assessed as having a neutral impact on a small portion of the saltmarsh.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	B	0	5.8	Inside
H1330	142	B	-1	0.5	Inside
H1330	900	C	0	0	Inside
H1410	140	C	0	32	Inside
H1410	180	C	0	0.05	Inside
H1410	900	C	0	1.5	Inside

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

Impacts and activities adjacent to the site include grazing (140) (of bog and wet grassland), peat-cutting (312), dispersed habitation (403) and minor roads (502). 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. The limited descriptions of this site in the NHA files indicate that the vegetation of this site has not significantly changed since this survey.

Kinvarra saltmarsh contains several features of notable conservation importance. This is quite a large saltmarsh and the saltmarsh habitat is spread over a relatively long inlet. A brackish gradient is present along this inlet and this is reflected in the development of the saltmarsh vegetation along the inlet. The relatively large size of the site and the presence of a brackish gradient along the inlet have created a diverse range of saltmarsh vegetation communities at this site. The site is also connected to Lough Carrafinla, which is a lagoon of significant conservation importance. The saltmarsh at this site has been significantly modified by peat-cutting, which has created a complex mosaic of saltmarsh and blanket bog vegetation in places. The overall conservation status of this site is assessed as *unfavourable-inadequate* (Table 5.1). This site is in good condition with only minor areas showing signs of damage.

This site is located within the Kilkieran Bay and Islands cSAC. An old format NPWS Conservation management plan is available for this cSAC but it is now out of date.

Lough Carrafinla lagoon has also been included in some surveys of coastal lagoons (Oliver 2005), which is also an Annex I habitat. It was also assessed during a national conservation assessment of coastal lagoons for NPWS (NPWS 2007). The assessment for Lough Carrafinla lagoon was '*favourable'* with no significant impacts affecting this site.

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

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

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

The 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*. Six monitoring stops were carried out in this habitat and one stop failed. Most attributes required for favourable conservation status reached their targets. The single stop failed due to damage from overgrazing by sheep. However, most of the ASM at this site is in satisfactory condition. The grazing intensity was assessed in general as moderate-high. There are only small areas of habitat with indicators of damage. Negative indicators such as high bare mud cover and a disturbed sward cover are present. The sward height of some sections was also quite uniform in places. There are some signs of erosion in the ASM but these are natural features.

The species diversity in this habitat is typical of ASM and several different vegetation communities were recorded at this site. ASM zonation is well-developed in some of the larger areas. These areas also contain well-developed saltmarsh pans and some drainage creeks. The ASM structure is not significantly affected by the old peat cutting. Some notable ASM communities with brackish or freshwater influence are also present. There is a brackish gradient visible in the vegetation from the mouth of the inlet to Lough Carrafinla.

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. Overgrazing is the main activity affecting the ASM at this site but this only affects a small portion of the habitat. The rest of the site is in good condition and there are few damaging activities. This site is very inaccessible so it is not vulnerable to development or amenity use.

There is no NPWS conservation management plan available for this site so there are few prospects for grazing management to improve the conservation status of this habitat. Much of the ASM is grazed as commonage. The overall grazing intensity on the blanket bog around the site is likely to be low and the ASM habitats are likely to be preferentially grazed by cattle and sheep due to the relative abundance of fodder, so the ASM is subjected to higher grazing intensities.

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. MSM type saltmarsh vegetation may have actually been less common in the north-west section, prior to peat-cutting in this area.

5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Seventeen monitoring stops were carried out in this habitat and all passed. All of the attributes required for the structure and functions of this habitat reached their targets. The MSM is generally in good condition. The main MSM area is not significantly affected by grazing and poaching, which affects the ASM to a greater extent. The main activity affecting the MSM was peat-cutting, which has significantly modified the structure of the saltmarsh in places. The impacts of peat cutting are not assessed although they are still having a residual impact on the site. The MSM has also been affected by burning but this only affects a very small area.

The species composition was typical of this habitat. This habitat also contains turf fucoids on peat in places. Several MSM vegetation types are present including extensive development of a transitional MSM/bog vegetation type with a combination of species from both habitats.

The topography of this site has been significantly modified by peat cutting with old trenches and drains along face-banks acting as drainage channels. The old peat cutting has created a complex mosaic of vegetation types in places. However, there are still some relatively intact areas with natural drainage channels and natural unmodified transitions to other habitats present. The topography of these unmodified areas reflects the underlying topography of the blanket bog.

Natural drainage channels seem to be developing to some extent in the largest area of MSM in the north-west section of the site. Much of the MSM also contains low mounds covered in blanket bog or containing wet grassland and exposed rock. This site is an excellent example of MSM habitat that has developed on a fringe type marsh. There is also some development of more brackish type MSM vegetation at the southern end of the channel close to Lough Carrafinla.

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 such as grazing continue in the near future. Grazing is the main activity currently affecting this site but overall the grazing intensity within the MSM is low and the majority of the habitat is in good condition. There are few other impacts or activities significantly affecting this habitat.

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.

NPWS (2007). *Conservation Assessment of Coastal lagoons in Ireland*. NPWS. www.npws.ie.

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

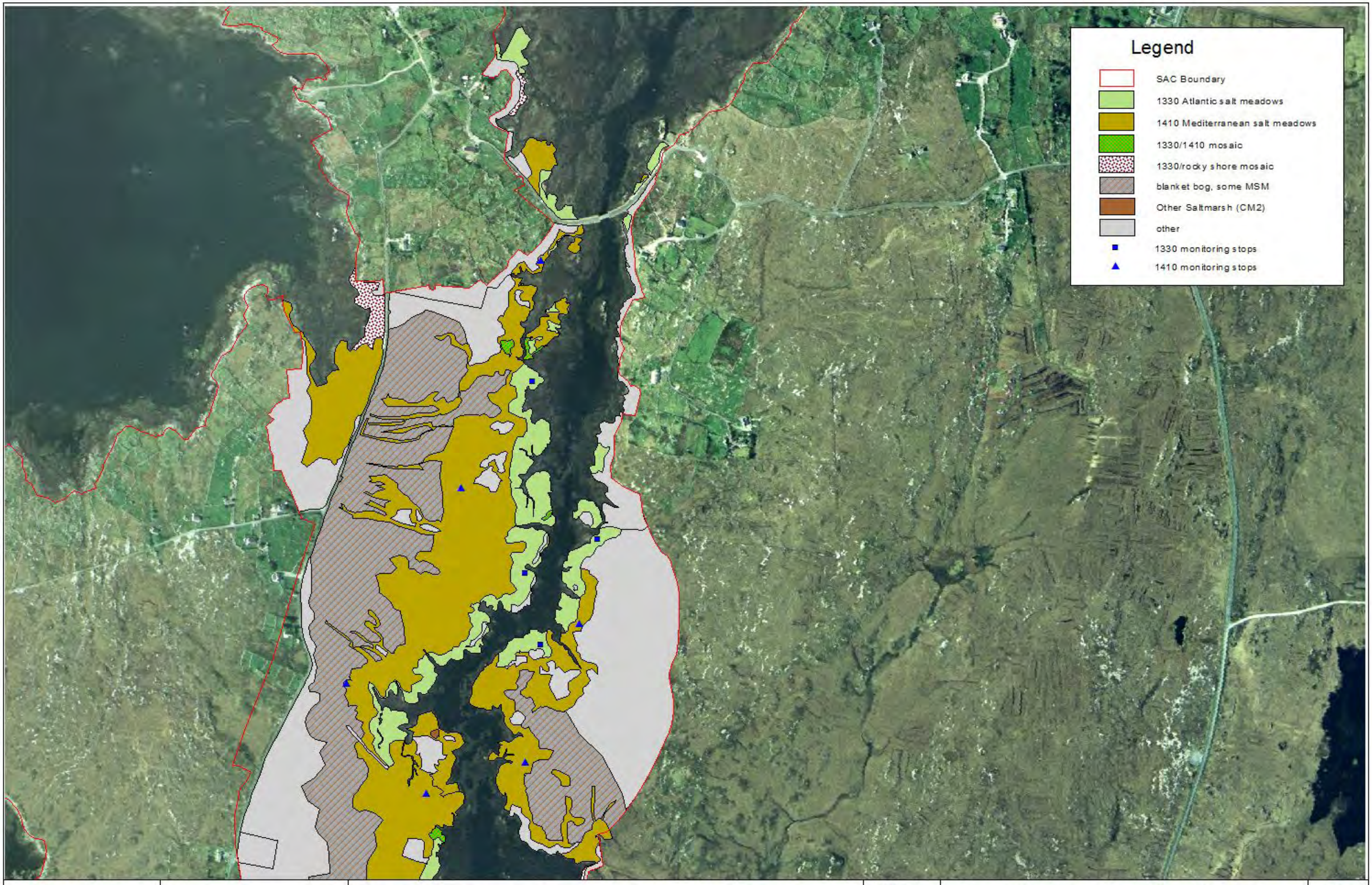
Roden, C. M. (1998). *Survey of Irish Lagoons Volume 1 Part 3 – Flora. A Survey of the Flora and Vegetation of Sixteen Irish Coastal Lagoons*. Unpublished Report for National Parks and Wildlife Service.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	*Spartina* swards
1	1310 *Salicornia* flats						
2	*Spartina* swards						
3	1330 Atlantic salt meadow	5.974		5.974			
4	1410 Mediterranean salt meadow*	39.643			35.679		
5	ASM/MSM mosaic (50/50)	0.239		0.120	0.120		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	41.990					
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)	0.106					
19	1330/rocky shore mosaic	0.592		0.296			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
22	blanket bog, some MSM	20.293			2.03		
	Total	**108.837**		**6.390**	**37.878**		

*90% of the mapped MSM area taken as MSM. The remaining 10% represents blanket bog hummocks within the MSM.



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

Saltmarsh Monitoring Project 2007-2008

Kinavarra (Map 1 of 3)

Kilkieran Bay SAC (002111)

SMP code: SMP0102

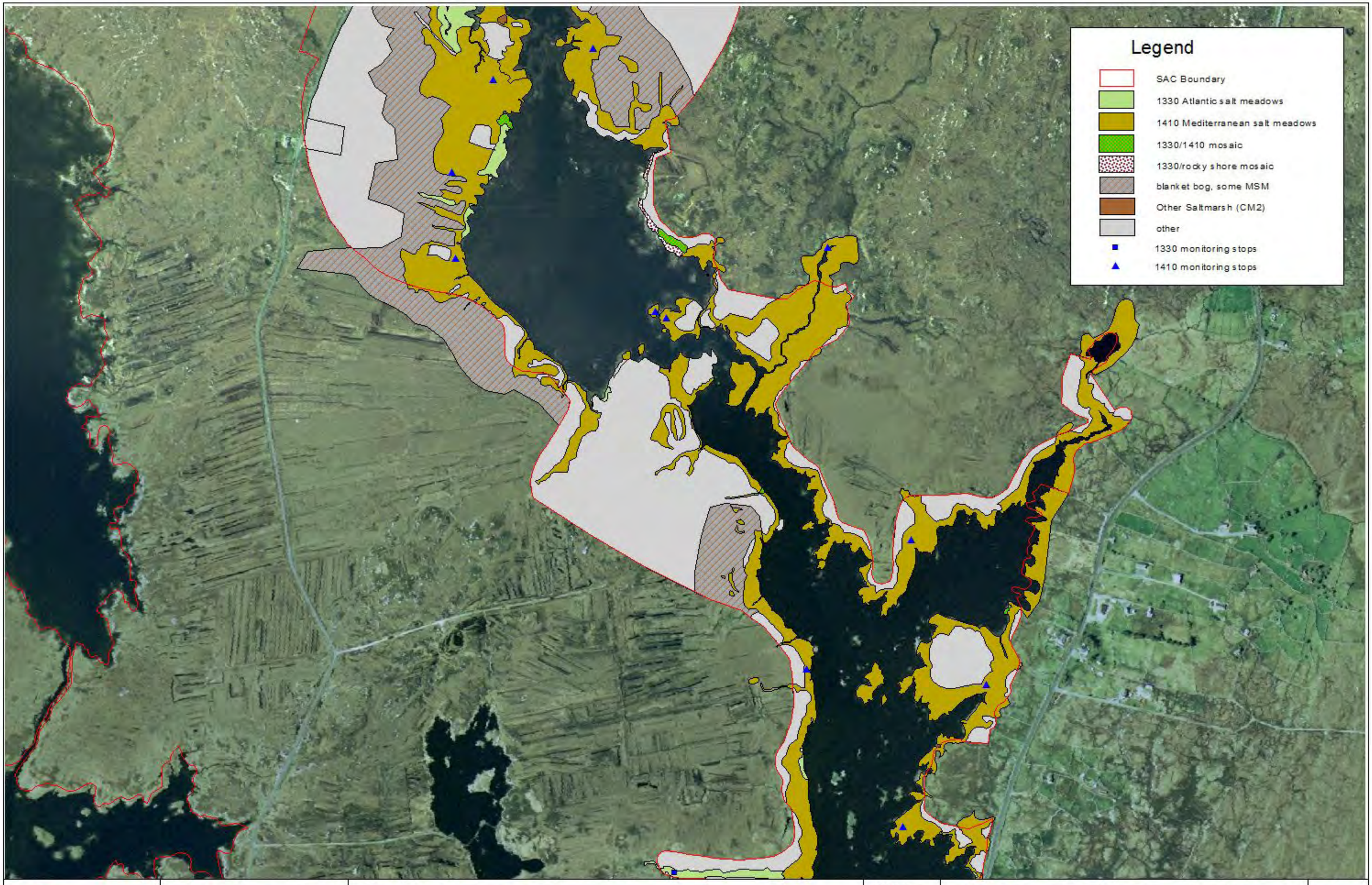
This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953)

0 80 160 240 320 400 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:6000

N



Saltmarsh Monitoring Project 2007-2008

Kinavarra (Map 2 of 3)

Kilkieran Bay and Islands SAC (002111)

SMP code: SMP0102

0 80 160 240 320 400 Meters

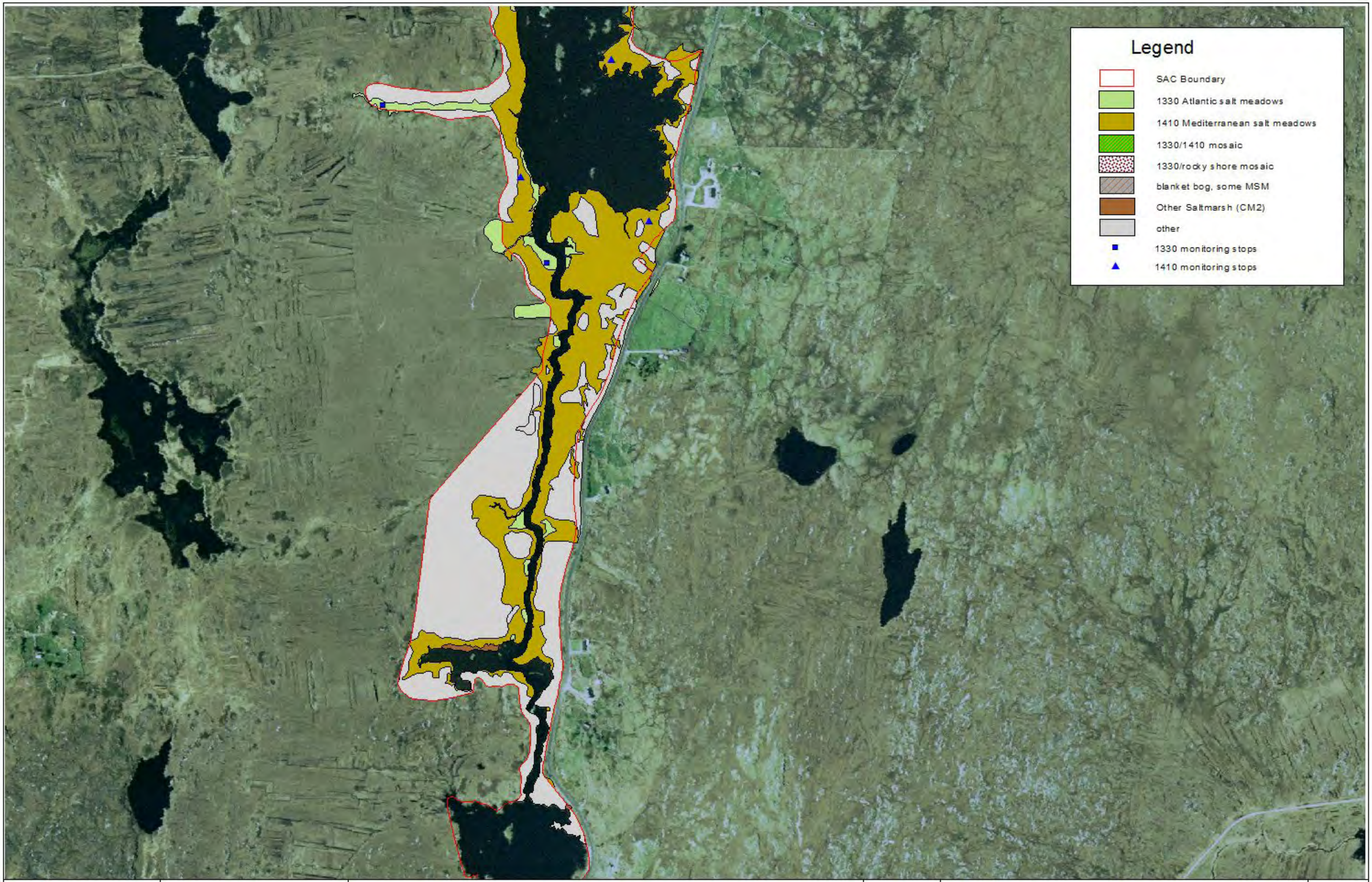
N

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

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:6000

Department of Environment, Heritage and Local Government
National Parks and Wildlife Service



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

Saltmarsh Monitoring Project 2007-2008

Kinavarra (Map 3 of 3)

Kilkieran Bay and Islands SAC (002111)

SMP code: SMP0102

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

0 80 160 240 320 400 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:6000

N

Kinvarra West

1 SITE DETAILS

SMP site name: **Kinvara West**		SMP site code: **SMP0089**
Dates of site visit **16 & 17/10/2007**		CMP site code: **N/A**
SM inventory site name: **Kinvara West**		SM inventory site code: **128**
NPWS Site Name: **Galway Bay Complex**		
NPWS designation	cSAC: **000208**	MPSU Plan: **old format plan available**
	pNHA: **000208**	SPA: **004031**
County: **Galway**		Discovery Map: **52** Grid Ref: **134825, 213000**
Aerial photos (2000 series): **O 3625-A,B,C,D**		6 inch Map No: **Ga112, Ga113**

Annex I habitats currently listed as qualifying interests for Galway Bay Complex cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **Scanlan's Island, Kileenaran, Tyrone House-Dunbeacon Bay, Kilcaimin, Oranmore North, Roscom West & South, Seaweed Point, Barna,**

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

2 SITE DESCRIPTION

Kinvara West is located along the south-east corner of Galway Bay in Co. Galway. It is one of 19 Saltmarsh Inventory sites listed in Galway Bay (Curtis & Sheehy-Skeffington 1998). The saltmarsh is one of two inventory sites located in Kinvara Bay with the other site being Kinvara South (inventory side code 127). Kinvara West is located 3.8 km north-west of Kinvara Town.

Kinvara Bay is a shallow bay with an irregular complex shoreline and a narrow neck at Doorus Point. Saltmarsh is distributed around most of the shoreline in sheltered areas and is associated with coastal grassland mosaics and with rocky intertidal areas. There is a secondary inlet along the western side of the bay. This area was surveyed as the Kinvara West survey site. This part of the bay is quite shallow and contains frequent islands of various sizes, from small rocky outcrops to islands containing scrub and coastal grassland. Many of these small islands also have saltmarsh around their shorelines. The intertidal areas of Kinvara West contain rocky mixed sediment with abundant brown algae cover. The bay and shoreline is quite isolated and some Seal were recorded in the Seal island area. Many of the islands are used by roosting birds.

A minor road accessing Doorus Point and Parkmore Quay passes over the western boundary of the site and has cut off or isolated part of the bay (Bridge Lough) from the main intertidal area. This western section is still influenced by the tide via culverts under the road and there is some minor saltmarsh development along the shoreline. However, tidal fluctuations have a reduced amplitude and the western side of this area contains brackish habitats. Bridge Lough

is further divided on the western side by another minor road and this extends into Lough Adoona, which is dominated by freshwater habitats.

This part of Co. Galway is quite rural although there is some ribbon development in places along minor roads in the area and frequent dispersed habitation. The area is relatively low-lying and dominated by agricultural grassland although there are also some patches of semi-natural vegetation, with scrub and dry grassland related to rocky outcrops and some limestone pavement.

The site is located within the Galway Bay Complex candidate Special Area of Conservation (cSAC 208). Two Annex I habitats are present at this site, *Salicornia* flats and Atlantic salt meadows (ASM)). Both of these habitats are listed as qualifying interests for the Galway Bay Complex cSAC. Two species of local distinctiveness, Sea Purslane (*Atriplex portulacoides*) and Sea Wormwood (*Seriphidium maritimum*), are found at the site. Most of the saltmarsh habitats mapped at this site is located within the cSAC boundary. There are minor amounts of Annex I habitats located outside the boundary around the site. Most 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. Sometimes the wrong (lower) shoreline boundary was used to draw the cSAC boundary and this excluded minor amounts of saltmarsh habitat.

This site was accessed via several points around the bay including Parkmore Quay, the minor road crossing the western side of the bay and where minor roads access some old quays at Doorus Demesne along the southern side of the site. Many of the small islands close to the shoreline could be accessed at low tide by crossing the intertidal zone.

3 SALTMARSH HABITATS

3.1 General description

The main saltmarsh habitat found at this site is Atlantic salt meadows (ASM) (Table 3.1). This habitat is distributed around most of the surveyed area. There are minor amounts of *Salicornia* flats at the site and these small patches are mainly associated with seaward boundary of the saltmarsh and other shoreline on mixed sediment.

The ASM is mainly found in irregular larger low-lying fragments along the shoreline connected by narrower strips of saltmarsh. The shoreline is quite intricate and complex and this has influenced the topography of the saltmarsh, with both the upper and lower boundaries having complex outlines. Most of the saltmarsh habitat is separated from the adjacent terrestrial land by old field boundaries marking the landward boundary of the saltmarsh, but occasionally the saltmarsh is enclosed within the field boundaries that are usually dry stone walls. These dry stone walls also occasionally cross the saltmarsh and enclose intertidal areas. These old walls have not been maintained and have been reduced to lines of rocks across the saltmarsh.

The saltmarsh topography is also affected by the underlying glacial and bed rock topography that has created frequent small mounds and hollows of various sizes and shapes. The topography is also affected by the depth of sediment that has been deposited. The limestone bed rock is exposed on the saltmarsh in places and there is also frequent loose exposed rock in places. The saltmarsh forms mosaics with mounds and banks containing dry coastal

grassland and with upper saltmarsh grassland dominated by Twitch (*Elytrigia repens*). These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. The upper saltmarsh grassland also contains Sea Mayweed (*Tripleurospermum maritimum*), Curled Dock (*Rumex crispus*), Spear-leaved Orache (*Atriplex prostrata*), Frosted Orache (*Atriplex lacinata*), Bramble (*Rubus fruticosus*) and Silverweed (*Potentilla anserina*). Occasionally the saltmarsh transitions directly to scrub and hedgerow in places. Doorus Demesne is not managed and scrub has covered a significant part of this area, as it is not grazed significantly. There are also patches of orchid-rich dry grassland (GS1) in close proximity to the shoreline and the saltmarsh habitats.

Atlantic salt meadows are also found on many of the small islands located within this part of Kinvara Bay. This part of the bay is quite shallow that there are some old tracked cleared in the intertidal zone for livestock to access these islands. Some of the islands are quite small and only contain patches of saltmarsh in mosaic with rocky shore. Some of the islands are larger and contain scrub and dry coastal grassland in the terrestrial sections.

There are also several parts of the survey site that are more exposed and contain narrow ribbons of saltmarsh habitat on thin bands of sediment that develop into isolated patches of vegetation and isolated plants vegetating more dominant cobble storm beach along the outer shore, such as close to Parkmore Quay. These narrow ribbons of saltmarsh are frequently covered by brown algae. Some of the saltmarsh is mapped as a mosaic of ASM and rocky shore. A rocky mosaic is found around some of the small islands with steep-sided shorelines.

Some brackish habitats containing Common Reed (*Phragmites australis*) and Sea Club-rush (*Bolboschoenus maritimus*) are located at the western side of Bridge Lough. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. This small lough is somewhat like a lagoon and has a reduced tidal influence, although it is still saline. This area was not surveyed due to access problems.

The main intertidal habitats found adjacent to the saltmarsh are exposed rock and coarse pebble and cobble deposits. There are minor areas of muddy mixed sediment. There is abundant brown algae associated with the rocky shoreline.

Table 3.1. Area of saltmarsh habitats mapped at Kinvara West.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand	0.018
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	13.295
	Total	**13.313**

*note that saltmarsh habitat continue outside the mapped area in Kinvara Bay.

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

This habitat is found at several locations around the site but its extent is quite minor in relation to the ASM. The largest patch is a strip about 1 m wide that has developed on mixed sediment along side a fairly new seawall. A second patch appears as a 0.5 m wide strip of Glasswort (*Salicornia* sp.) that is located in a small sheltered inlet along the edge of the saltmarsh. The Glasswort has developed on bare mud along the seaward edge of the saltmarsh.

There are also several small patches of this habitat on the saltmarsh where brown algae has induced 1310 formation in places. The brown algae covered the ASM and forms bare mud patches where vegetation has rotted and died back. Pioneer ASM has also developed by this process.

3.3 Atlantic salt meadows (H1330)

The vegetation of this habitat is quite typical and similar to other saltmarsh sites around Galway Bay, particularly Tawin Island and Kileenaran. Both these sites contain saltmarsh whose topography is significantly impacted by underlying glacial deposits and bedrock, created an intricate and complex shoreline. Several typical saltmarsh communities are present at this site. Zonation of the saltmarsh vegetation is also evident and the different communities are best developed in the largest saltmarsh areas located along the southern side of the survey site. This area also displays internal zonation related to channels and mounds within the saltmarsh. However, in contrast to Kileenaran, grazing is mainly by cattle so poaching is more frequent. Close-cropped swards are also less prevalent. The sward height varies and some sections contain tall rank Red Fescue-dominated grassland 10-20 cm high. The sward height of grazed areas varies between 2-5 cm high.

Several typical saltmarsh communities are present at this site. The lower saltmarsh is dominated by Saltmarsh Grass (*Puccinellia martima*) and this community is frequently heavily poached in places. This community also contains occasional Sea Aster (*Aster tripolium*), Sea Plantain (*Plantago maritima*), Lax-flowered Sea Lavender (*Limonium humile*), Common Scurvygrass (*Cochlearia officinalis*), and rare Sea Milkwort (*Glaux maritima*) and Sea-spurrey (*Spergularia media*). Some of the narrow bands of saltmarsh that contain this community also contain small pans contain cobbles. Glasswort and Annual Sea-blite (*Suaeda maritima*) are occasionally found in this community near the seaward boundary. Both *Salicornia europaea* and *Salicornia decumbens* are present. Higher up in this zone (low-mid) Sea Plantain is more frequent. This zone is also found along some of the narrow creeks and channels that drain the larger sections of saltmarsh and extend further landward.

Sea Purslane is also occasionally frequent in the lower saltmarsh zone on some of the more isolated islands where there is no or low grazing levels. It is situated along some of the minor creeks and along the drier saltmarsh cliff on the island.

A pioneer saltmarsh community is also present on the site and is located in the southern side of the site. A minor road crosses a low-lying area of the shoreline and there is saltmarsh on both sides of the road. The saltmarsh on the landward side surrounds a bare exposed area containing mud. This area contains some pioneer saltmarsh dominated by bare mud with Great Sea-spurrey, Glasswort, Annual Sea-blite, Common Saltmarsh-grass, Spear-leaved Orache and Frosted Orache. The development of this community is related to poaching damage and re-vegetation.

A mid marsh vegetation community dominated by Sea Plantain is also present, although not a prevalent as the lower and mid upper communities. This community is best developed along the southern side of the site, near the Doorus Demesne. Other species present include frequent Common Saltmarsh-grass and rare or occasional Glasswort, Annual Sea-blite, Sea Arrowgrass (*Triglochin maritimum*), Sea Aster and Red Fescue (*Festuca rubra*). Sea Pink (*Armeria maritima*) is present but is not as frequent compared to other sites. A typical low close-cropped sward has developed in this community.

A mid-upper saltmarsh zone is dominated by Red Fescue. Other species occasionally or frequently present include Sea Plantain, Saltmarsh Rush (*Juncus gerardii*), Autumn Hawkbit (*Leontodon autumnalis*), Buck's-horn Plantain (*Plantago coronopus*), Creeping Bentgrass (*Agrostis stolonifera*) and White Clover (*Trifolium repens*). Curled Dock is rare. A similar community with co-dominance of Saltmarsh Rush and Red Fescue is present but rare. This community is frequently found on small mounds.

The boundary between the saltmarsh and adjacent coastal grassland is sometimes difficult to distinguish as both communities are dominated by Red Fescue. However, the boundary is usually easier to define along steeper sided mounds, banks and ridges by the presence of other terrestrial species such as Ladies Bedstraw (*Galium verum*), Mouse-ear Chickweed (*Cerastium fontanum*), *Rhytidiadelphus loreus*, and Red Clover (*Trifolium pratense*). Sea Wormwood also grows occasionally along the upper saltmarsh boundary. Other species present include occasional Sea Beet (*Beta maritima*), Frosted Orache and Sea Mayweed.

The lower saltmarsh boundary is quite variable. The main habitat in the transitional zone is rocky shoreline. Some thin bands of ASM transition directly to cobbly shoreline and the saltmarsh boundary is only 0.05-0.1 m high. Higher saltmarsh cliffs have developed along some of the more sheltered sections (allowing more mud to build up) and these are up to 0.5 m high. There are some physical signs of erosion along these saltmarsh cliffs with tussocks and mud balls appearing. Some of the thin bands of saltmarsh are also eroded in places, but this may be influenced by poaching and vehicle use of the shoreline. There are also signs of erosion along the north-west side of Seal Island.

The general creek and pan topography of the saltmarsh is poorly developed due to the small size of saltmarsh fragments and generally narrow nature of the intertidal zone. Some creeks and pans have developed in association with typical mid-marsh vegetation at the southern side of the site and the creeks are also probably related to the under-lying glacial and bedrock topography. Some of the creeks are filled with loose rock.

Some sheltered sections of rocky shoreline collect abundant broad algae that lie over the saltmarsh. These areas are rich in organic material and are being colonised by Spear-leaved Orache and Sea Beet.

4 IMPACTS AND ACTIVITIES

Few impacts and activities affect this site and much of the shoreline is quite isolated (Table 4.1). The main impact is grazing (140 & 143). The grazing intensity varies over the site as the site covers several different land holdings, and this also affects the vegetation assemblages. There was no grazing at 9 monitoring stops, light grazing at 7 stops and moderate levels of grazing at 7 monitoring stops. Cattle mainly graze the northern and south-western parts of this site and there are frequent sings of poaching, particularly in the lower saltmarsh zones. The south western section is also grazed, but the intensity is much lower. There were signs of previously higher levels of grazing with old poaching damage. Sea Purslane is more frequently found on ungrazed more isolated islands and along some of the rockier parts of the shoreline, which are more inaccessible to cattle.

There are several tracks that cross the saltmarsh in places (501). The upper shoreline (and saltmarsh zone) is also used as a track at one location and this has eroded the saltmarsh

found in this zone somewhat. There are also wheel ruts in some areas where vehicles are accessing adjacent pastures via the shoreline (ASM).

There have also been some recent modifications along the shoreline at several locations. Some saltmarsh around small lagoon/pool containing bare mud has been recently enclosed by large limestone boulders creating a dry stone wall to enclose livestock. A relatively new seawall (871) has been built along the shoreline at one location to protect a lane accessing several properties. The development of *Salicornia* flats along adjacent shoreline may be related to infilling and the construction of this seawall.

Erosion (900) at the site is not significant. A comparison of the OSI 2nd edition 6 inch map to the OSI 2000 series aerial photos shows that there have been no significant losses of saltmarsh and no measurable erosion in the past 100 years. There are also signs of erosion along the seaward boundary of the saltmarsh, but there was no measurable erosion of saltmarsh during the current monitoring period. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh.

There are frequent signs of older use of the saltmarsh and shoreline area with frequent old dry stone walls crossing various sections of the saltmarsh and intertidal zone. Several paths have also been cleared across dense boulder beds in the intertidal zone to access some of the islands. Some old stone walls are located along the seaward edge of the saltmarsh at various locations including some of the islands. These impacts are not assessed as they occurred outside the current monitoring period.

Impacts and activities adjacent to the site include dispersed habitation (403), fishing/aquaculture in Kinvara Bay (200) and fertilization (120) and the grazing of livestock (140) related to farming practises.

Table 4.1. Intensity of various activities on saltmarsh habitats at Kinvara West.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	140	C	0	0.018	Inside
1310	871	C	+1	0.018	Inside
1330	140	B	0	9.295	Inside
1330	143	B	-1	4.000	Inside
1330	501	C	-1	0.25	Inside
1330	900	C	0	0.6	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

The overall conservation status of this site is assessed as *unfavourable-bad* (Table 5.1). Kinvara West is a saltmarsh site of moderate size with several features of interest, such as the presence of several species of local distinctiveness. The saltmarsh has a complex and intricate topography around the shoreline due to the under-laying bedrock and forms complex mosaics at some locations with dry coastal grassland. There have been few modifications along the upper and lower saltmarsh boundaries meaning there are natural transitions to terrestrial habitats and intertidal habitats. Cattle grazing has negatively affected the conservation status of this site and there is significant poaching damage of the lower saltmarsh boundary. Erosion at this site is not significant.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are moderate-good. There is considerable scope for landward transition of saltmarsh vegetation up slope into dry costal grassland. The irregular topography of much of the marsh has created a complex mosaic of coastal grassland and saltmarsh. However, these are very general predictions.

This site is located within the Galway Bay Complex cSAC. An old format NPWS management plan is available for the saltmarsh habitats at this cSAC but it is now out of date.

Table 5.1. Conservation status of Annex I saltmarsh habitats at Kinvara West.

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

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

5.2.1 Extent

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

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. No monitoring stops were carried out in this habitat due to the small extent present at the site. However, a visual assessment of the habitat indicated that it would probably pass for all attributes. Several ecotypes were present with this habitat appearing along the seaward boundary of the saltmarsh and also appearing as a pioneer community along parts of the strandline.

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, although a very small extent is present. This makes it vulnerable to small changes at the site. The habitat extent is likely to remain small at this site as there are no suitable extensive intertidal mud and sandflats for 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 erosion or to land-use changes within the current monitoring period.

5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-bad*. Twenty-three monitoring stops were carried out in this habitat and six failed. Most of the attributes required for the structure and functions of this habitat reached their targets. The saltmarsh is generally in good condition apart from poaching damage caused by moderate levels of cattle grazing. Poaching exposes bare mud and sediment and damages the sward structure, particularly in the lower saltmarsh zone. This affects about $^{1}/_{3}$ of the saltmarsh area. There are also signs of poaching-induced erosion. The saltmarsh has typical vegetation communities, zonation of vegetation is evident and well-developed in places and one section has a moderately well-developed saltmarsh topography. In contrast, the presence of a pioneer community can be related to poaching by cattle and the presence of this community increases the diversity of the site. There are natural transitions to other coastal habitats at both the lower and upper saltmarsh boundaries. The Atlantic salt meadows form part of a larger coastal ecosystem.

A species of local significance, Sea Wormwood, which is found frequently on saltmarshes around Galway Bay, is present at this site. This species has a scattered distribution in Ireland and is only found recently in eight 10 km^2 squares around the coast of Ireland (Preston *et al.* 2002). Webb *et al.* (1996) described its distribution as rare and very local although it is not recorded as a rare species in The Red Data Book (Curtis & McGough 1988).

Sea Purslane (*Atriplex portulacoides*) is also present at this site and was recorded at two 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^2 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-bad*. This assessment assumes that the current management activities and level of impacts continue in the near future. There main impact affecting this site is grazing, which is having some negative impact in places, mainly by causing poaching damage. A small reduction in grazing intensity may be beneficial for this site. Most of the saltmarsh habitats are within a cSAC, so the habitat should not be affected by other land-use changes.

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for Annex I saltmarsh species at this site.

7 REFERENCES

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

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.

Natura (2006). *Galway City habitat inventory*. A report for Galway City Development Board. Galway County Council.

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

Webb, D.A., Parnell, J. & Doogue, D. (1996). *An Irish flora.* Dundalgan Press, Dundalk.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats	0.018	0.018				
2	Spartina swards						
3	1330 Atlantic salt meadow			13.295			
4	1410 Mediterranean salt meadow						
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)	20.36					
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)	0.842					
19	1330/rocky shore mosaic	0.132		0.66			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**34.697**	**0.018**	**13.361**			

Legend

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

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

Saltmarsh Monitoring Project 2007-2008

Kinvarra-West

Galway Bay Complex SAC (000268)

SMP code: SMP0089

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

0 100 200 300 400 500 Meters

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:7000

N

Lettermore South

1 SITE DETAILS

SMP site name: **Lettermore South**		SMP site code: **0100**	
Dates of site visit: **31/10/2007**		CMP site code: **N/A**	
SM inventory site name: **Lettermore South**		SM inventory site code: **103**	
NPWS Site Name: **Kilkieran Bay and Islands**			
NPWS designation	cSAC: **2111**	MPSU Plan: **Old format plan**	
	pNHA: **N/A**	SPA: **N/A**	
County: **Galway**		Discovery Map: **44**	Grid Ref: **88350, 227600**
Aerial photos (2000 series): **O 3334-B,D; O 3335-A,C**		6 inch Map No: **Ga 078**	

Annex I habitats currently listed as qualifying interests for Kilkieran Bay and Islands cSAC:

H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

H1410 Mediterranean salt meadows (Juncetalia maritimi)

Other SMP sites within this SAC/NHA: **Teeranea, Lettermullan West, Bealadangain, Kinavarra, Turloughbeg**

Saltmarsh type: **Fringe** Substrate type: **Peat/Stumps**

2 SITE DESCRIPTION

Lettermore South saltmarsh is located in wet Co. Galway in Kilkieran Bay. The site is found along the southern shore of Lettermore Island, which is positioned in the mid section of this bay. The survey site extends along the shoreline west of the Carrigalegaun Bridge for 1.5 km and is found in the channel between Lettermore Island and Goruma Island. The landscape of Lettermore Island is quite rural and low-lying and is dominated by small fields that contain exposed rock, heath, wet grassland and some scrub and Bracken. There are also some patches of blanket bog. Some of these fields were improved in the past and have various levels of management, with some reverting back to wet grassland. A minor road runs west from Carrigalegaun Bridge and there is scattered habitation along this road. There are some access points to the shoreline along this road and there are several small coves and piers where boats are moored.

The saltmarsh development is quite fragmented and patchy along this shoreline and it forms a mosaic with exposed rock on the shoreline. The shallow channel between the two islands is subtidal in parts and a significant part of the shoreline is dominated by Wrack-covered exposed rock. There are several small rock outcrop islands with various development of heath and scrub and some associated saltmarsh.

This site is part of Kilkieran Bay and Islands candidate Special Area of Conservation (cSAC 2111). This large coastal cSAC contains a wide range of habitats of notable conservation interest, including open marine water, sub-tidal habitats, coastal habitats such as machair and lagoons. Three Annex I saltmarsh habitats are present at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Both the latter two habitats are listed as qualifying interests for this cSAC. Saltmarsh has also developed at several other locations around this bay in this cSAC. Several of these sites are listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and were also surveyed during the Saltmarsh Monitoring Project (see the above table). There are also numerous smaller fragments of saltmarsh habitat around the bay where the shoreline topography allows some saltmarsh development.

Most of the saltmarsh habitat mapped at this site is located inside the cSAC boundary. This is mainly due to the fact that the upper shoreline on the OSI 6 inch map was used to draw the cSAC boundaries and this enclosed most of the land covered by spring tides. There are some patches of saltmarsh habitat extending beyond this boundary in places.

Turf fucoids are the only species of local distinctiveness recorded at this site and these are typical of saltmarsh found on peat along the western coast of Ireland.

The shoreline was accessed from Carrigalegaun Bridge.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh habitat at this site is dominated by Atlantic salt meadows (ASM) (Table 3.1). There is also a small amount of Mediterranean salt meadows (MSM) also present. There is very minor development of *Salicornia* flats in one small patch near the Carrigalegaun Bridge. The saltmarsh is quite fragmented and generally poorly developed on thin substrate with most of the shoreline having a fringe less than 10 m wide. This saltmarsh has frequent scattered rocks over the habitat and also contain frequent small eroded patches or holes containing mixed substrate. Some of the saltmarsh is mapped as a mosaic between rocky shore and ASM where there are small eroding patches of ASM scattered along the shoreline interspersed with patches of mixed sediment and exposed rock. Most of the saltmarsh has developed adjacent to mixed substrate in the intertidal area with some development of soft mud in places. The lower boundary of the saltmarsh is generally quite intricate due to the presence of eroding patches.

The largest area of saltmarsh development is located at the western end of the site at Muragh Island. Saltmarsh has developed on deeper peat that has accumulated between this island and the shoreline and was subsequently inundated by the tide to create the saltmarsh. There

is a saltmarsh cliff marking the lower boundary of the saltmarsh with channels through this area that contain soft mud.

Habitats along the upper boundary of the saltmarsh along the shoreline are quite variable and depend on the local topography. Some of the saltmarsh fragments have developed adjacent to outcropping exposed rock. There is also some development of saltmarsh adjacent to wet grassland with a low embankment marking the boundary between these two habitats. Stands of species such as Yellow Flag (*Iris pseudacorus*) are found along the upper saltmarsh boundary.

There are also several minor patches of other brackish vegetation along the shoreline where there is some freshwater influence from runoff. These include small patches of Common Reed (*Phragmites australis*) and Sea Club-rush (*Bolboschoenus maritimus*) and there is some natural transition from ASM or MSM to these other vegetation communities. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification.

Table 3.1. Area of saltmarsh habitats mapped at Lettermore South.

EU Code	Habitat	Area (ha)
H1310	*Salicornia* and other annuals colonizing mud and sand	0.002
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	3.541
H1410	Mediterranean salt meadows (Juncetalia maritimi)	0.463
	Total*	**4.006**

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

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

There is only a very small patch of this habitat present at this site. This area is dominated by Glasswort (*Salicornia* sp.) that has developed on mud that also contains some gravel. There is no transition between the adjacent ASM and this patch of *Salicornia* flats, and the upper boundary of this habitat is quite distinct.

3.3 Atlantic salt meadows (H1330)

The ASM at this site is poorly developed and quite patchy along most of the site. The ASM is mainly represented by mid marsh and mid-upper marsh communities. The low-mid marsh community is dominated by a combination of Sea Plantain (*Plantago maritima*), Sea Pink (*Armeria maritima*) and Common Saltmarsh-grass (*Puccinellia martima*) and small amounts of other species such as Glasswort (*Glaux maritima*), Common Scurvy-grass (*Cochlearia officinalis*), Lax-flowered Sea Lavender (*Limonium humile*) and Sea Milkwort (*Glaux maritima*) are also present. Turf fucoids are also present in this community and there may be small amounts of bare substrate cover. The structure of this saltmarsh is poorly developed and much of this saltmarsh has developed on thin eroding and patchy substrate. There are also

rocks of various sizes scattered over the saltmarsh and also some exposed rock outcropping through the saltmarsh. These patches contain frequent pan-like features that contain mixed substrate.

The mid-upper marsh communities contain more frequent Red Fescue (*Festuca rubra*) and Saltmarsh Rush (*Juncus gerardii*). Other species present in this community include Autumn Hawkbit (*Leontodon autumnalis*), Buck's-horn Plantain (*Plantago coronopus*) and Creeping Bent (*Agrostis stolonifera*). White Clover (*Trifolium repens*) appears in the upper marsh and there may be small amounts of transitional species such as Silverweed (*Potentilla anserina*). Both zones may have small amounts of Sea Rush (*Juncus maritimus*). Zonation is mainly related to small changes in the underlying topography that creates a mosaic of zones along the shoreline. Some more typical zonation is found along channels into the shoreline.

3.4 Mediterranean salt meadows (H1410)

The MSM habitat is mainly found at the western side of the site. Swards dominated by Sea Rush have developed on deeper peat. There is also still some outcropping rock within the MSM. Other species present in these patches include abundant Red Fescue in places and smaller amounts of Creeping Bent-grass, Sea Plantain, Sea Aster, Sea Arrowgrass (*Triglochin maritimum*), Autumn Hawkbit and Common Scurvy-grass. There is very little indication of zonation within this habitat at this site. The larger patches of this MSM sward also contain some salt pans within the peat and there are natural drainage channels present. The sward is higher compared to the surrounding ASM and the grazing intensity is much lower.

4 IMPACTS AND ACTIVITIES

Several impacts and activities affect this site (Table 4.1). The main impact is grazing (140). The saltmarsh towards the western half of the site is grazed by cattle and sheep. Cattle and sheep graze part of the shoreline and access from adjacent fields with wet grassland. There is some localised poaching damage where there are negative indicators such as high bare substrate cover, generally covered by poaching. Some of the sward in the ASM is also quite low. The grazing intensity does not affect the MSM to the same extent.

There has been a small amount of infilling (803) at the east side of the site adjacent to Carrigalegaun Bridge. This is related to the construction of a car park adjacent to the church. This infilling has probably destroyed a very minor patch of ASM (0.001) at this location and the remaining ASM has a boulder embankment along the upper boundary. Several tracks (501) that access the shoreline cross the saltmarsh zone and have destroyed some saltmarsh habitat. These tracks access some boats moored to the shoreline.

There are indicators of erosion (900) along this site. These are to be expected along a moderately exposed shoreline in the channel between the two islands. Some of the saltmarsh is quite patchy where the thin substrate is eroding away. However, much of this erosion is due to natural processes and the saltmarsh was likely to be in a similar condition for a relatively long time. A comparison of the OSI 2nd edition 6 inch map to the current OSI aerial photos does not show any significant loss of saltmarsh habitat due to erosion. There has been no significant erosion during the current monitoring period. Erosion is assessed as having a negative impact on a small portion of saltmarsh.

Impacts and activities adjacent to the site include grazing (140) (of bog and wet grassland), dispersed habitation (403), car parks and minor roads (502). These activities have little or no measurable impact on the saltmarsh habitats.

Table 4.1. Intensity of various activities on saltmarsh habitats at Lettermore South.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	C	0	0.5	Inside
H1330	143	B	-1	1.5	Inside
H1330	501	B	-2	0.01	Inside
H1330	803	A	-2	0.05	Inside
H1410	140	C	0	0.463	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

Lettermore South is a saltmarsh with no features of particular conservation interest. The saltmarsh is poorly developed and quite patchy along the shoreline. Some of the saltmarsh

developed on thin substrate is eroding away. The overall conservation status is *unfavourable-inadequate* due to localised damage from overgrazing and poaching.

This site is located within the Kilkieran Bay and Islands cSAC. An old format NPWS Conservation management plan is available for this cSAC but it is now out of date.

Table 5.1. Conservation status of Annex I saltmarsh habitats at Lettermore South.

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

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 patch of this habitat was present at this site. There are no indications that this habitat was more extensive in the past. 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 due to the small habitat extent. However, a visual assessment indicated that this habitat was in a favourable condition. This habitat is not affected by any negative 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 such as grazing continue in the near 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 land-use changes or erosion within the current monitoring period. There was a small loss of habitat due to infilling near the bridge but this represents less than 1% of the total saltmarsh habitat.

5.3.2 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 two stops failed. The failure of these two stops was related to the presence of negative indicators such as high bare substrate cover and disturbance of the sward surface caused by heavy grazing and poaching. Most of the saltmarsh at this site is in good condition but grazing is causing some localised damage. There are no other significantly damaging activities.

The ASM is poorly developed at this site. Several zones are present but none are well-developed. The ASM is mainly a mosaic with patchy saltmarsh developing on thin substrate around scattered rocks. Some of the larger sections do contain typical features such as salt pans. There is some transition to other habitats such as stands of Sea Club-rush and Common Reed that increase the diversity of the site as a whole.

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. Grazing is causing some localised damage at present and is likely to continue to do so in the future.

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 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*. Three monitoring stops were carried out in this habitat and they all passed. All of the attributes required for favourable conservation status reached their targets. The MSM is generally in good condition and the grazing intensity in this habitat is lower compared to the surrounding ASM. The MSM has a typical species assemblage. The structure of this habitat is poorly developed, which is to be expected in a relatively small area of 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 such as grazing continue in the near future. There are no significantly damaging activities affecting this site.

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.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	**SM habitat description**	**Mapped Area (ha)**	**Area (ha)**				
			H1310	H1330	H1410	H1420	*Spartina* swards
1	1310 *Salicornia* flats	0.002	0.002				
2	*Spartina* swards						
3	1330 Atlantic salt meadow	3.495		3.495			
4	1410 Mediterranean salt meadow	0.462			0.462		
5	ASM/MSM mosaic (50/50)	0.001		0.0005	0.0005		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	4.367					
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)	0.095					
19	1330/rocky shore mosaic	0.135		0.045			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**8.557**	**0.002**	**3.541**	**0.462**		

Legend

- SAC Boundary
- 1310 Salicornia flats
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- 1330/1410 mosaic
- 1330/rocky shore mosaic
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stops
- 1410 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

Lettermore South

Kilkieran Bay and Islands SAC (002111)

SMP code: SMP0100

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

0 50 100 150 200 250 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:4000

N

Lettermullan-West

1 SITE DETAILS

SMP site name: **Lettermullan-West**		SMP site code: **0099**
Dates of site visit: **30/10/2007**		CMP site code: **N/A**
SM inventory site name: **Lettermullan-West**		SM inventory site code: **104**
NPWS Site Name: **Kilkieran Bay and Islands**		
NPWS designation	cSAC: **2111**	MPSU Plan: **Old format plan**
	pNHA: **N/A**	SPA: **N/A**
County: **Galway**		Discovery Map: **44** Grid Ref: **83500, 222600**
Aerial photos (2000 series): **O 3396-D; O 3397-C; O 3458-B; O 3459-A**		6 inch Map No: **Ga 089**

Annex I habitats currently listed as qualifying interests for Kilkieran Bay and Islands cSAC:

H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

H1410 Mediterranean salt meadows (Juncetalia maritimi)

Other SMP sites within this SAC/NHA: **Teeranea, Lettermore South, Bealadangain, Kinavarra, Turloughbeg**

Saltmarsh type: **Fringe** Substrate type: **Peat**

2 SITE DESCRIPTION

Lettermullan West is located in Kilkieran Bay, west Co. Galway. The site is located on the south-west side of Lettermullan Island, in a channel between this island and an adjacent smaller island called Crappagh. Lettermullan Island is one of a series of islands located in the outer part of Kilkieran Bay that are connected to the mainland via a series of bridges and causeways across narrow intertidal channels. The shoreline of the island is generally quite exposed due to its location but there are some sheltered channels and inlets were there is minor saltmarsh development. The landscape of Lettermullan Island is quite rural and low-lying and is dominated by small fields that contain exposed rock, heath, wet grassland and some scrub and Bracken. There are also some patches of blanket bog. Some of these fields were improved in the past and have various levels of management, with some reverting back to wet grassland. There is some scattered habitation along a minor road in this area.

The saltmarsh has developed in a narrow sheltered intertidal zone between Lettermullan Island and Crappagh Island. This area contains a series of small low-lying rocky outcrops and there has been some blanket peat development around these outcrops that has subsequently been inundated by the sea to create the saltmarsh. This area has been modified by the construction of a track across the intertidal zone and these rocky outcrops onto Crappagh Island. There is saltmarsh development on both sides of this track.

This site is part of Kilkieran Bay and Islands candidate Special Area of Conservation (cSAC 2111). This large coastal cSAC contains a wide range of habitats of notable conservation interest, including open marine water, sub-tidal habitats, coastal habitats such as machair and lagoons. Two Annex I saltmarsh habitats are present at this site, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Both these habitats are listed as qualifying interests for this cSAC. Saltmarsh has also developed at several other locations around this bay in this cSAC. Several of these sites are listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and were also surveyed during the Saltmarsh Monitoring Project (see the site details table above). There are also numerous smaller fragments of saltmarsh habitat around the bay where the shoreline topography allows some saltmarsh development.

The majority of the saltmarsh habitat mapped at this site is located inside the cSAC boundary. This is mainly due to the fact that the upper shoreline on the OSI 6 inch map was used to draw the SAC boundaries and this enclosed most of the land covered by spring tides. There are some patches of saltmarsh habitat extending beyond this boundary in places.

Turf fucoids are the only species of local distinctiveness recorded at this site and these are typical of saltmarsh found on peat along the western coast of Ireland.

The saltmarsh was access from the track crossing to Crappagh Island. This land is private and permission was sought from a local farmer who owned some land on the island.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh habitat has developed on both sides of the track to Crappah Island. This saltmarsh is dominated by MSM (Table 3.1). Most of the saltmarsh is found north of the track. Most of the saltmarsh has developed on deep peat and there are tall saltmarsh cliffs along the seaward edge of these sections. Exposed rock also appears within the patches of saltmarsh. The saltmarsh on both sides of the track is quite fragmented and bare blanket peat is exposed along the edges of these channels with some soft mud, loose peat and mixed sediment within these channels. Some saltmarsh has also developed on thinner substrate overlaying bedrock or mixed glacial material and this saltmarsh is being eroded in places.

Saltmarsh has developed around the edges of several small outcrops so there are landward transitions at the upper boundary to exposed rock, blanket bog, heath and scrub in the central part of these outcrops. Saltmarsh has also developed in some low-lying depressions within these outcrops. The construction of a track and bridge over to the island has cut out an intertidal pool in the south-east section. There is some saltmarsh development around the edge of this pool, which is quite sheltered.

Table 3.1. Area of saltmarsh habitats mapped at Lettermullan-West.

EU Code	Habitat	Area (ha)
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.533
H1410	Mediterranean salt meadows (Juncetalia maritimi)	2.011
	Total	**2.544**

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

3.2 Atlantic salt meadows (H1330)

The ASM is poorly developed at this site and is quite fragmented. Several zones are present but they are generally poorly developed. The structure of this habitat is also poorly developed and there are few typical features within the patches of ASM, mainly because they are quite small. The sward cover also contains a significant area of bare substrate cover in places with mud or peat is exposed.

The main zone present at this site is a mid marsh zone dominated by Sea Plantain (*Plantago maritima*) with frequent Common Saltmarsh-grass (*Puccinellia martima*). Other species present include Sea Pink (*Armeria maritima*), Sea Aster (*Aster tripolium*), Common Scurvy-grass (*Cochlearia officinalis*), Sea Milkwort (*Glaux maritima*), and Lax-flowered Sea Lavender (*Limonium humile*). Some zonation can be seen with these species and small patches of a lower marsh zone have develop on some lower peat platforms that is dominated by Common Saltmarsh-grass and also contains some Glasswort (*Salicornia* sp.). There is also some zonation and development of a mid-upper marsh zone with the increase in abundance of species such as Red Fescue (*Festuca rubra*), Saltmarsh Rush (*Juncus gerardii*) and Creeping Bent (*Agrostis stolonifera*).

Some of the ASM forms a mosaic with the MSM and there are scattered tussocks of Sea Rush (*Juncus maritimus*) and larger clumps of MSM within the ASM habitat.

3.3 Mediterranean salt meadows (H1410)

The MSM at this site has a typical species assemblage similar to that recorded at other saltmarshes around Kilkieran Bay. The sward is dominated by Sea Rush but is somewhat variable. Some of this habitat is quite patchy and tussocky and there are patches of ASM vegetation within the MSM habitat. Some of the MSM habitat does have a very dense sward with few other species other than Sea Rush. The ground cover within this sward also includes significant cover of bare peat. There are some small salt pans present and some minor natural drainage channels in cracks within the peat.

Other common species found frequently in this habitat include Red Fescue, Saltmarsh Rush and Creeping Bent. Species found occasionally within the habitat include Sea Plantain, Sea Pink, Sea Aster, Sea Arrowgrass (*Triglochin maritimum*), Autumn Hawkbit (*Leontodon autumnalis*), Common Saltmarsh-grass, Scurvy-grass, White Clover (*Trifolium repens*),

Greater Sea-spurrey (*Spergularia media*) and Sea Milkwort. Some zonation can be seen within this habitat in the patches of ASM with some patches of Sea Plantain dominated sward with Common Saltmarsh-grass found around the seaward edges of the MSM and on patches of habitat located on lower peat platforms. MSM located on higher mounds is grassier and contains upper marsh species.

4 IMPACTS AND ACTIVITIES

The main impact and activity affecting this site is grazing by cattle. The saltmarsh is grazed as part of the commonage on the island and animals grazing on the island have easy access to the shoreline. The grazing intensity is quite high and is damaging the saltmarsh (143). There is frequent evidence of heavy poaching which is damaging the surface of the saltmarsh. The peat substrate makes this saltmarsh habitat more vulnerable to this type of damage as it is quite soft. There are no other activities significantly damaging this site.

There are also some signs of erosion (900) at this site. These are to be expected along a moderately exposed shoreline in the channel between the two islands. There are tall saltmarsh cliffs marking the seaward boundary around some of the saltmarsh and there was some slumping around this seaward boundary in places. However, much of this erosion is due to natural processes and the saltmarsh was likely to be in a similar condition for a relatively long time. A comparison of the OSI 2nd edition 6 inch map to the current OSI aerial photos does not show any significant loss of saltmarsh habitat due to erosion. There has been no significant erosion during the current monitoring period. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh.

Table 4.1. Intensity of various activities on saltmarsh habitats at Lettermullan-West.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	143	A	-1	0.533	Inside
H1330	900	C	0	0.1	Inside
H1410	140	C	0	1.51	Inside
H1410	143	C	-1	0.5	Inside
H1410	900	C	0	0.2	Inside

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

Impacts and activities adjacent to the site include grazing (140), dispersed habitation (403), tracks (501) and a minor road (502). The construction of the track before the current

monitoring period has had a significant impact on the structure of the saltmarsh at this site. The other 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. The limited descriptions of this site in the NHA files indicate that the vegetation of this site has not significantly changed since this survey.

Lettermullen West is a saltmarsh with few features of particular conservation interest other than it has developed in a sheltered area along moderately exposed part of the coastline. The saltmarsh is poorly developed and quite patchy along the shoreline. The structure of the saltmarsh has been modified in the past by the construction of the track between the two islands. The overall conservation status is *unfavourable-bad* due to significant damage from overgrazing and poaching.

This site is located within the Kilkieran Bay and Islands cSAC. An old format NPWS Conservation management plan is available for this cSAC but it is now out of date.

Table 5.1. Conservation status of Annex I saltmarsh habitats at Lettermullan-West.

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

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 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-bad*. Three monitoring stops were carried out in this habitat and two stops failed. The failure of these two stops was related to the presence of negative indicators such as high bare substrate cover and substantial disturbance of the sward surface caused by heavy cattle grazing and poaching. Most of the saltmarsh at this site is in poor condition due to heavy grazing levels. There are no other significantly damaging activities currently affecting this small site.

The ASM is poorly developed at this site. Several zones are present but none are well-developed. The ASM is mainly a mosaic with patchy saltmarsh developing on peat around rock outcrops in the intertidal area. There is some transition to other habitats such as MSM, wet grassland and heath vegetation.

5.2.3 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 such as grazing continue in the near future. Grazing is causing significant damage at present and is likely to continue to do so in the future.

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 significant 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 *unfavourable-inadequate*. Five monitoring stops were carried out in this habitat and only one stop failed. Most of the attributes required for favourable conservation status reached their targets. The MSM is generally in good condition and the grazing intensity in this habitat is lower compared to the surrounding ASM. There is some localised damage in the MSM due to the heavy grazing levels.

The MSM has a typical species assemblage. The structure of this habitat is poorly developed, which is to be expected in a relatively small area of habitat. However, there are some natural features such as small salt pans. There is some transition to other habitats such as MSM, wet grassland and heath 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 such as grazing continue in the near future. Grazing is causing some damage to this habitat at present and is likely to continue to do so in the future.

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.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	*Spartina* swards
1	1310 *Salicornia* flats						
2	*Spartina* swards						
3	1330 Atlantic salt meadow	0.398		0.398			
4	1410 Mediterranean salt meadow	1.876			1.876		
5	ASM/MSM mosaic (50/50)	0.269		0.1345	0.1345		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	1.041					
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	**3.584**		**0.533**	**2.311**		

Legend

SAC Boundary

1330 Atlantic salt meadows

1410 Mediterranean salt meadows

1330/1410 mosaic

other

1330 monitoring stops

1410 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

Lettermullan West

Kilkieran Bay and Islands SAC (002111)

SMP code: SMP0099

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

0 30 60 90 120 150 Meters

Date of production: 20/02/2009

Map version: 1

Original Drawing Size: 297 x 420 (A3)

Scale 1:2000

N

Oranmore North

1 SITE DETAILS

SMP site name: **Oranmore North**		SMP site code: **SMP0093**
Dates of site visit **10/10/2007**		CMP site code: **N/A**
SM inventory site name: **Oranmore North**		SM inventory site code: **119**
NPWS Site Name: **Galway Bay Complex**		
NPWS designation	cSAC: **000208**	MPSU Plan: **old format plan available**
	pNHA: **000208**	SPA: **004031**
County: **Galway**		Discovery Map: **46** Grid Ref: **137500, 224900**
Aerial photos (2000 series): **O 3410-A,B,C**		6 inch Map No: **Ga095**

Annex I habitats currently listed as qualifying interests for Galway Bay Complex cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **Scanlan's Island, Kinavarra West, Kileenaran, Tyrone House-Dunbeacon Bay, Kilcaimin, Roscom West & South, Seaweed Point, Barna,**

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

2 SITE DESCRIPTION

Oranmore North saltmarsh is located along the north-east shoreline of Galway bay in Co. Galway. It is located to the north-west of Oranmore Village and extends along the shoreline adjacent to R339 Galway-Oranmore Road. The survey site extends from Cartron Townland to Innplot (Oranmore) and is not a definitive area. Saltmarsh frequently appears in sheltered sections of this part of the Galway Bay shoreline and is distributed to the west (Roscam East) and the south (Oranmore-Rocklands) of the survey site. The intertidal area is dominated by exposed rock and mixed sediment with abundant brown algae cover.

The shoreline along the western side of the survey site is still quite rural and the dominant habitat is improved grassland used by grazing livestock. There has been some ribbon development along the R339 and recent construction has affected saltmarsh in this area. Road improvements along the R339 have also affected the saltmarsh in the past. The shoreline becomes increasingly more modified further east and there has been significant modification where the Millplot stream reaches the tidal influence at a road bridge crossing into Oranmore. Much of this modification is related to construction of improved water works in the area.

The site is located within the Galway Bay Complex candidate Special Area of Conservation (cSAC 208). One Annex I habitat is present at this site Atlantic salt meadows (ASM). This habitat is listed as a qualifying interest for the Galway Bay Complex cSAC. Most of the saltmarsh mapped at this site is located within the cSAC boundary. There are several fragments of Annex I habitats located outside the boundary around the site. Some are unintentional exclusions, as the 6 inch map was used to draw the SAC site boundary and

there are some errors between this map and the actual ground as indicated from the aerial photos. One relatively large are of ASM that occurs on the north side of the R339 road has also been excluded.

This site was accessed by crossing adjacent farmland to access the shoreline. The shoreline was followed east to Oranmore. The area south of the road bridge was accessed via a narrow lane.

3 SALTMARSH HABITATS

3.1 General description

The only Annex I habitat recorded at this site was Atlantic salt meadows (Table 3.1). A ribbon of ASM was distributed along the shoreline. The ribbon of habitat widened in places to form some larger areas of habitat. Some ASM was located along the north side of the R339 road and is flooded by a culvert under the road. The ASM generally transitioned to upper saltmarsh (CM2) and transitional grassland vegetation dominated by Twitch (*Elytrigia repens*) and containing Sea Mayweed (*Tripleurospermum maritimum*) and Spear-leaved Orache (*Atriplex prostrata*) along the shoreline. The area of saltmarsh located north of the road transitioned to semi-improved grassland that is grazed by livestock. This area was not surveyed due to the presence of livestock.

A more unusual saltmarsh-terrestrial grassland transitional community has developed at one location on the site. This vegetation community is located in a relatively flat area and was dominated by Creeping Bent-grass with Red Fescue and also contained a lot of transitional species such as Curled Dock (*Rumex crispus*), Broad-leaved Dock (*Plantago major*), Autumn Hawkbit (*Leontodon autumnalis*) and Spear-leaved Orache (*Atriplex prostrata*). There is obviously some brackish influence in this area but it could not be classified as ASM (Glauco-Puccinellietalia maritimae). The upper saltmarsh boundary is difficult to pin-point in this area. One unusual feature is that Broad-leaved Plantain extends seawards into the upper saltmarsh in places.

A second transitional community is located adjacent to the road bridge and contains frequent Sea Club-rush (*Bolboschoenus maritimus*). These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. The saltmarsh transitions to mixed sediment, exposed rock and abundant brown algae cover at its lower boundary.

Table 3.1. Area of saltmarsh habitats mapped at Oranmore North.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	4.838
	Total	**4.838**

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

3.2 Atlantic salt meadows (H1330)

The western side of the site contains a narrow band of saltmarsh vegetation up to 20 m wide. The saltmarsh zone is disturbed in places by rocks and cobbles scattered over the marsh.

Some sections have been infilled. There are piles of cobbles and rocks scattered along the lower saltmarsh boundary, presumably to reduce coastal erosion. There is a low saltmarsh cliff (< 0.3 m high) along this section. The topography is therefore damaged, although some small pans are evident.

Zonation of the saltmarsh vegetation is still also evident although it is also disturbed in places. Several typical Atlantic salt meadow communities are present. Species such as Common Saltmarsh-grass, Sea Pink, Saltmarsh Rush and Sea Milkwort are present growing amongst the rocks and cobbles. Other species present include Spear-leaved Orache, Sea Plantain and Buck's-horn Plantain (*Plantago coronopus*). An upper saltmarsh community is present and contains Red Fescue, Creeping Bentgrass, Curled Dock, Autumn Hawkbit, Scurvygrass (*Cochlearia officinalis*), Twitch and Sea Spurrey sp.

Further east the saltmarsh is less disturbed. Typical lower marsh communities dominated by Common Saltmarsh-grass and smaller amounts of Sea Plantain are present. This community also contains Sea Aster (*Aster tripolium*). The mid and upper saltmarsh zones are generally dominated by Red Fescue with smaller amounts of Creeping Bentgrass and Saltmarsh Rush.

The saltmarsh topography is poorly developed at this site as there are few significant flat areas present. Most of the saltmarsh is present as a relatively narrow coastal strip. Some of the natural saltmarsh topography has been disturbed by the infilling and seawall development. The best section of saltmarsh topography is located to the road of the road. This area contains typical saltmarsh creeks and pans. There is a low saltmarsh cliff along the lower saltmarsh boundary with minor signs of erosion along the lower boundary in places.

4 IMPACTS AND ACTIVITIES

This site has been quite disturbed by a range of impacts and activities during the current monitoring period (Table 4.1). The site spans several different land-holdings and some parts are not grazed, some parts are grazed lightly (140), while other sections have been damaged by poaching and overgrazing (143).

Saltmarsh along the western part of the site has been damaged by coastal defence works to protect farmland (871). A new seawall about 1 m high has been constructed with large rocks along the seaward boundary and there has been some infilling behind the seawall. Further east, looser rocky material has been deposited along the lower saltmarsh boundary. Some of this material is also scattered over the saltmarsh, giving the appearance of a rocky/ASM mosaic. Further east, there has been some infilling within the monitoring period along the shoreline and saltmarsh related to road improvement works along the R339 (802). Some of these modifications to the shoreline are irreparable (infilling).

A second location midway along the site has also been affected by infilling (801) and by the construction of a seawall (871). Building work was being carried out on the site at the time of the survey. Construction has also been carried out at the eastern side of the site. A new pump house and pipeline was built on the shoreline and on saltmarsh. The path of the pipeline follows part of the saltmarsh ribbon. The pump-house area was infilled. This has resulted in some loss of habitats (801). The pipeline path was excavated and then refilled (512). Some of this damage is irreparable.

Erosion (900) at the site is not significant. The lower saltmarsh boundary has a low saltmarsh cliff with some erosional features at some locations along the site, with small isolated hags or mud balls appearing. A comparison of the OSI 2nd 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. A comparison of the 1995 and 2000 OSI aerial photos also indicates that there was no measurable erosion during this part of the monitoring period. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh face.

Impacts and activities adjacent to the site include urbanization (401), dispersed urbanisation (403), roads (502) and grazing of livestock (140). These activities have little or no measurable impact on the saltmarsh habitats.

Table 4.1. Intensity of various activities on saltmarsh habitats at Oranmore North.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	C	0	3.838	Inside
1330	143	B	-1	1.00	Inside
1330	512	A	-1	0.478	Inside
1330	801	C	-1	0.1	Inside
1330	801	A	-2	0.15	Inside
1330	802	A	-2	0.1	Inside
1330	871	A	-1	0.250	Inside
1330	871	C	-1	0.1	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

The overall conservation status of Oranmore North saltmarsh is *unfavourable-bad* (Table 5.1). There are several impacts and activities that have affected separate sections of this site at different times during the current monitoring period that have caused irreversible damage. There are several sections that have been infilled and have been built on, or are being used for construction. A significant section of the saltmarsh has also been affected by coastal defence works and the excavation of a pipe-line. The saltmarsh is still intact in these areas, but has been significantly disturbed. Two monitoring stops out of a total of nine failed at this site.

Oranmore North is a relatively small site that is part of the Galway Bay suite of sites. It is probably one of the most disturbed sites in Galway Bay and this is related to development in this area. It has few features of specific interest and the saltmarsh communities and topography are typical of the area. The presence of one unusual grassland community with elements of upper saltmarsh and dry terrestrial grassland is notable. No species of local distinctiveness were noted on the site.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are poor-moderate. The saltmarsh is distributed along an irregular shoreline with some low-lying areas where there may be some migration and some sections that are enclosed by seawalls or grassy banks. . However, these are very general predictions.

This site is located within the Galway Bay Complex cSAC. An old format NPWS management plan is available for the saltmarsh habitats at this cSAC but it is now out of date.

Table 5.1. Conservation status of Annex I saltmarsh habitats at Oranmore North.

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

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

The extent of this habitat is assessed as *unfavourable-inadequate*. There are several indications of minor losses of habitat due to infilling and coastal defence within the current monitoring period (about 0.3 ha). There are frequent signs of erosion along the saltmarsh at this site but this is assessed as being typical of a site of this type. There have been no significant changes in the extent of saltmarsh habitat in the past 100 years due to erosion, when the OSI 2nd edition 6 inch map is compared to recent aerial photos.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-bad*. Nine 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 damage from overgrazing and poaching. In addition, other sections of saltmarsh have been damaged by coastal protection works and by the excavation of a pipeline. Several typical ASM communities were recorded on this site and zonation was evident with upper mid and lower zone saltmarsh communities, but zonation in some sections was affected by the disturbance. The saltmarsh topography is poorly developed. There are natural transitions to other coastal habitats at both the lower and upper saltmarsh boundaries. The Atlantic salt meadows form part of a larger coastal ecosystem.

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 site is affected by overgrazing in some sections. The extent and structure and functions have been affected by infilling, coastal protection works and excavation works in the current monitoring period. These impacts and activities should be minimized in the future as most of the saltmarsh habitat is located within the cSAC and these impacts and activities should be licensed and controlled by the local authorities for the benefit of nature conservation.

The habitat extent is not likely to be significantly reduced in the near future, although there are some signs of erosion.

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for this relatively small 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)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	4.473		4.473			
4	1410 Mediterranean salt meadow						
5	ASM/MSM mosaic (50/50)						
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic	0.634		0.317			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	5.866					
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)	0.997					
19	1330/rocky shore mosaic	0.096		0.048			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**12.066**		**4.838**			

Legend

- SAC Boundary
- 1330 Atlantic salt meadows
- 1330/other SM (CM2) mosaic
- 1330/rocky shore mosaic
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

Oranmore North

Galway Bay Complex SAC (000268)

SMP code: SMP0093

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

0 60 120 180 240 300 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:4750

N

Roscam West and South

1 SITE DETAILS

SMP site name: **Roscam West and South** SMP site code: **SMP0094**

Dates of site visit **10/10/2007** CMP site code: **N/A**

SM inventory site name: **Roscam West and South** SM inventory site code: **118**

NPWS Site Name: **Galway Bay Complex**

NPWS designation cSAC: **000208** MPSU Plan: **old format plan available**

pNHA: **000208** SPA: **004031**

County: **Galway** Discovery Map: **46** Grid Ref: **133700, 224800**

Aerial photos (2000 series): **O 3409-A,C** 6 inch Map No: **Ga094**

Annex I habitats currently listed as qualifying interests for Galway Bay Complex cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **Scanlan's Island, Kinavarra West, Kileenaran, Tyrone House-Dunbeacon Bay, Kilcaimin, Oranmore North, Seaweed Point, Barna,**

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

2 SITE DESCRIPTION

Roscam West and South saltmarsh is located along the north-east part of the Galway Bay shoreline and 1km east of Galway City. The site is located along the west side of a small peninsula containing Roscam Townland. It is one of 19 Saltmarsh Inventory sites listed in Galway Bay (Curtis & Sheehy-Skeffington 1998). There was a mix up on the Saltmarsh Inventory with an adjacent site Roscam East (117). The sites on the inventory are labelled in an anti-clockwise direction around Ireland, so Roscam West and South should have been listed as 117. The grid references on the saltmarsh inventory for these sites have also been mixed up.

This part of Galway Bay is still quite rural, although there are frequent single dwellings along the minor roads that access this area. Land at Roscam is farmed with grazing livestock prevalent. The Galway-Dublin railway is located to the north of the site, about 100 m from the north end of the saltmarsh. Scrub has developed in unmanaged areas between the railway and the shoreline. The intertidal zone contains several habitats with mudflats and mixed sediment with exposed rock and loose cobble prevalent. The shoreline is somewhat sheltered and parts are lined with very large boulders.

The site is located within the Galway Bay Complex candidate Special Area of Conservation (cSAC 208). 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 adjacent Galway Bay Complex cSAC. All of the saltmarsh habitats mapped at this site is located within the cSAC boundary. Sea Wormwood (*Seriphidium maritimum*) is one species of local distinctiveness that is present at this site.

The shoreline was accessed by parking on minor roads near the shoreline and accessing the shoreline at the end of a cul-de-sac. The land is owned by a local farm situated to the east of the site.

This area was also surveyed as part of the Galway City Habitat Inventory (Natura 2006).

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh at this site is dominated by ASM. It is mainly situated at the north and southern ends of a small circular-shaped bay at the north-west corner of the peninsula. The main saltmarsh segments are separated by a dense large boulder field along the shoreline of the inner part of this small bay. The boulder field was probably created by land improvement in adjacent fields for the construction of several houses. The saltmarsh at the southern end of the bay has mainly developed in a sheltered area at the landward side of a vegetated stony bank.

This saltmarsh transitions to dry coastal grassland on the stony bank and on the adjacent fields. There is a subtle change from ASM to coastal grassland that is indicated by the presence of Yarrow (*Achillea millefolium*) Birdsfoot (*Lotus corniculatus*), Silverweed (*Potentilla anserina*), although it may still be dominated by Red Fescue (*Festuca rubra*) or Creeping Bentgrass (*Agrostis stolonifera*). Sea Beet (*Beta maritima*) and Sea Mayweed (*Tripleurospermum maritimum*) are both present where the upper saltmarsh boundary is disturbed, like along the track. The upper section of saltmarsh transitions at its upper boundary to scrub, to small patches of coastal grassland or to patches of vegetation dominated by Twitch (*Elytrigia repens*). These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. This zone also contains Sea Beet, Common Scurvygrass (*Cochlearia officinalis*), Spear-leaved Orache (*Atriplex prostrata*) and Frosted Orache (*Atriplex lacinata*).

This saltmarsh is drained by one main channel that develops into a wide shallow pool/lagoon further south that contains scattered cobbles. Part of the pool is dry and exposed mud is present. Part of this channel contains large boulders that may have been placed there during adjacent land improvement. The ASM transitions at its lower boundary to mud and sandflats, mixed sediment and loose cobble. There is a saltmarsh cliff around the lower ASM boundary within the small bay. Some sections have scattered cobbles along the seaward edge of the ASM before transition to mudflats.

Patches of ASM have also developed along the seaward side of the stony ridge further south along the shoreline of the peninsula. Patches of ASM occur around the coastline towards Roscam East and Lough Atalia, adjacent saltmarsh inventory sites. Saltmarsh is also found on most of the small islands that are situated close to the shoreline in this part of Galway Bay.

There is a small patch of *Salicornia* flats that has developed in part of the large bare mud hollow that has developed on the landward side of the stony ridge. There is a natural transition up slope from mudflats dominated by Glasswort, to pioneer ASM and then to mid marsh ASM.

Table 3.1. Area of saltmarsh habitats mapped at Roscam West and South.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand	0.023
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	3.302
	Total*	**3.335**

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

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

This habitat is located in the small hollow or lagoon containing bare mud. A dense patch is present dominated by Glasswort (*Salicornia* europaea agg.) with some Greater Sea Spurrey (*Spergularia media*). Some Common saltmarsh-grass (*Puccinellia martima*) is present in the upper part of this habitat. The Glasswort has vegetated bare mud and is only situated at the shallow end of the hollow/lagoon.

Scattered Glasswort also occurs as a small band along the creek on peaty mud. Sea Spurrey is also present in this pioneer band of saltmarsh vegetation. There is some minor poaching in this zone.

3.3 Atlantic salt meadows (H1330)

Zonation in the ASM is clearly evident. There are several typical ASM saltmarsh communities present. The lower zone is dominated by Common Saltmarsh-grass with Sea Aster (*Aster tripolium*) and Glasswort. Other species present include Lax-flowered Sea Lavender (*Limonium humile*) and Sea Milkwort (*Glaux maritima*). This zone is found along the edges of the main creek or channel that drains the main area of ASM and is also found along the seaward edge of the northern section of saltmarsh. A pioneer zone is present between the ASM and 1310 in the small hollow/lagoon present to the landward side of the stony bank. The northern section of saltmarsh also has a small area in the sheltered north-west corner of the small bay that is accreting and there is an accretion ridge onto sandflats. This pioneer zone contains Common Saltmarsh-grass, Glasswort, Sea Aster and rare Lax-flowered Sea Lavender.

The mid-marsh zone is more prevalent and is indicated by the appearance of frequent Sea Plantain (*Plantago maritima*) and Red Fescue (*Festuca rubra*). There is some minor development of a typical low *Plantago-Armeria* sward but otherwise, this zone is dominated by Red Fescue. Other species present include Lax-flowered Sea-lavender (*Limonium humile*), Sea Pink (*Armeria maritima*), Sea Arrowgrass (*Triglochin maritimum*), Common Scurvygrass and Autumn Hawkbit (*Leontodon autumnalis*). A second mid-upper community with more frequent Saltmarsh Rush (*Juncus gerardii*) is also present.

The upper saltmarsh zone is dominated by Red Fescue and Creeping Bent-grass. Other species present include Autumn Hawkbit Sea Milkwort, Spear-leaved Orache, Curled Duck (*Rumex crispus*), Buck's-horn Plantain (*Plantago coronopus*), and Frosted Orache. This zone transitions to dry coastal grassland. Sea Wormwood was found at one location in the northern section of this site in the upper saltmarsh zone.

The saltmarsh follows the natural shoreline topography and the glacial deposits that underlie this area. The mounds and slopes on the saltmarsh and transitions to coastal grassland reflect these deposits. There are occasional pans within the ASM in some of the flatter mid-upper sections. The saltmarsh topography with creeks and pans is moderately well-developed. The lower saltmarsh boundary around the bay is indicated by a low saltmarsh cliff (0.3-0.5 m high) with some old erosion features. Mud mounds are present but there is no indication of any significant erosion at this site. The substrate on the site is mainly muddy, but is somewhat peaty along the upper saltmarsh boundary in the northern section.

The fragments of ASM further south along the seaward edge of the peninsula contain more frequent exposed rock, loose cobble and loose boulders. Some of these patches could be considered exposed rock/ASM mosaic. These patches have developed on thinner bands of muddy sediment and have frequent eroded patches with exposed cobbles. There is no saltmarsh cliff present along the edges of these patches, which transition to loose cobbles and exposed rock.

The southern section is grazed by cattle but the grazing intensity is low with some minor poaching. The sward height varies between 5-10 cm high in the mid-upper zones. Horses are also present on the site but a single strand fence keeps them from straying onto the saltmarsh and the shoreline. The northern section is also grazed lightly and there is some light poaching by cattle or horses in this area. The loose rocks cobbles and exposed rock are occasionally scattered over the ASM that is sheltered by the stony bank.

4 IMPACTS AND ACTIVITIES

Several impacts and activities affect this site, but generally have low or neutral intensities (Table 4.1). The site is grazed by cattle (140) but the grazing intensity was low and overall there is only minor poaching. Some negligible areas had moderate-high levels of poaching. An old track or green lane (501) accesses the shoreline and may be an old right or way for seaweed collection. The track mainly crosses over the coastal grassland along the upper SM boundary and along the upper ASM transition. Some local people use the track for walking (622) but the intensity is also low. There was a collection of large boulders (Info Point 2) placed in the narrow channel that drains the main section of saltmarsh. These limestone boulders may have been placed here after adjacent land improvement (103). It is not known if this work occurred within the current monitoring period. The Galway City Habitat Inventory (Natura 2006) also noted some dumping in and around the saltmarsh at Roscam (421).

Erosion (900) at the site is not significant. Some of the saltmarsh patches further south on the more exposed seaward edge of the peninsula do show signs of erosion but these signs are typical for saltmarsh in this type of more exposed location. A comparison of the OSI 2nd 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 and no measurable erosion in the past 100 years. An accretion ridge was noted along the edge of the northern section and a comparison of the OSI 2nd edition 6 inch map to the OSI 2000 series aerial photos shows there has been some saltmarsh growth in this area in the past 100 years. Accretion is still continuing but there has been no measurable growth of saltmarsh in the current monitoring period. Erosion is assessed as having a neutral impact.

Impacts and activities adjacent to the site include dispersed habitation (403), and fertilization (120) and the grazing of livestock (140) related to farming practises.

The site is likely to have been affected somewhat by the clearance of rocks and boulders from adjacent land at the north-west corner of the peninsula and the placing of these boulders on the shoreline (103). It is likely that a narrow band of saltmarsh occurred around this shoreline prior to the placing of these boulders in this zone. The boulders also act as coastal defence and protect the area containing several houses. This activity is likely to have occurred prior to the current monitoring period. Farmland adjacent to the saltmarsh has been improved in the past (103) with coastal grassland and exposed rock transformed into improved grassland.

Table 4.1. Intensity of various activities on saltmarsh habitats at Roscam West and South.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	140	C	0	0.023	Inside
1330	103	B	-1	0.1	Inside
1330	140	B	0	3.301	Inside
1330	143	C	-1	0.001	Inside
1330	421	C	-1	3.302	Inside
1330	501	C	0	0.01	Inside
1330	622	C	0	3.302	Inside
1330	900	C	0	0.15	Inside
1330	910	C	+1	0.05	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

The overall conservation status of this site is *favourable* (Table 5.1). There are no impacts or activities that are significantly affecting this site. Roscam West and South is a relatively small saltmarsh but with several features of interest such as natural transitions to other coastal habitats and to dry coastal grassland in terrestrial areas. A species of local distinctiveness (Sea Wormwood) is present on the site. No monitoring stops failed. The largest section of saltmarsh is protected from erosion by the stony bank along the outer edge of the saltmarsh. Some of the adjacent farmland has been improved in the past, with rocks removed and improved grassland developed.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are good. The saltmarsh at this site is mainly distributed according to the underlying glacial deposits and there is some scope for landward transition of saltmarsh vegetation up slope into coastal grassland vegetation. However, these are very general predictions.

This site is located within the Galway Bay Complex cSAC. An old format NPWS management plan is available for the saltmarsh habitats at this cSAC but it is now out of date.

Table 5.1. Conservation status of Annex I saltmarsh habitats at Roscam West and South.

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

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 distributed in the interior of the saltmarsh along the edge of a small pool/lagoon and the channel that drains this area. There are no indications of any loss of habitat due to erosion or to land-use changes. There are no indications that this habitat occurred on mudflats or sandflats in the small bay at the north-west corner of the peninsula.

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 it passed. All the attributes required for the structure and functions of this habitat reached their targets. There was a natural transition along a moderate slope from adjacent ASM to 1310 *Salicornia* flats. The habitat may be affected by temporary changes in the water level within the lagoon. This habitat is also found along the edges of some of the creeks and the main channel that drains the saltmarsh.

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, although a very small extent is present. This makes it vulnerable to small changes at the site.

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 erosion or to land-use changes within the current monitoring period.

The area of Annex I ASM habitat may have decreased slightly by the placing of boulders along a section of shoreline that was likely to have contained a narrow band of saltmarsh but this loss may be compensated somewhat by accretion in the past 100 years. 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 *favourable*. Nine monitoring stops were carried out in this habitat and they all passed. All the attributes required for the structure and functions of this habitat reached their targets. 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 saltmarsh vegetation is present at this site. The saltmarsh topography is moderately well-developed. There are natural transitions to other coastal habitats at both the lower and upper saltmarsh boundaries. The Atlantic salt meadows form part of a larger coastal ecosystem.

A species of local significance, Sea Wormwood, which is found frequently on saltmarshes around Galway Bay, is present at this site. This species has a scattered distribution in Ireland and is only found recently in eight 10 km^2 squares around the coast of Ireland (Preston *et al.* 2002). Webb *et al.* (1996) described its distribution as rare and very local although it is not recorded as a rare species in The Red Data Book (Curtis & McGough 1988).

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 site. There are little prospects for the loss of habitat due to erosion in the future. The site is within a cSAC so the habitat should not be affected by land-use changes.

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for the Annex I habitats at this site.

7 REFERENCES

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

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.

Natura (2006). *Galway City habitat inventory*. A report for Galway City Development Board. Galway County Council.

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

Webb, D.A., Parnell, J. & Doogue, D. (1996). *An Irish flora.* Dundalgan Press, Dundalk.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SMP Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats	0.023	0.023				
2	Spartina swards						
3	1330 Atlantic salt meadow	3.302		3.302			
4	1410 Mediterranean salt meadow						
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)	3.691					
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	**7.016**	**0.023**	**3.302**			

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

Saltmarsh Monitoring Project 2007-2008

Roscom West and North

Galway Bay Complex SAC (000268)

SMP code: SMP0094

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

0 60 120 180 240 300 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:4250

N

Seaweed Point

1 SITE DETAILS

SMP site name: **Seaweed Point**		SMP site code: **SMP0095**
Dates of site visit **09/10/2007**		CMP site code: **N/A**
SM inventory site name: **Seaweed Point**		SM inventory site code: **115**
NPWS Site Name: **Galway Bay Complex**		
NPWS designation	cSAC: **000208**	MPSU Plan: **old format plan available**
	pNHA: **000208**	SPA: **004031**
County: **Galway**		Discovery Map: **45** Grid Ref: **126000, 223000**
Aerial photos (2000 series): **O 3406-D; O 3407-C,D; O 3469-A,B**		6 inch Map No: **Ga093, Ga094**

Annex I habitats currently listed as qualifying interests for Galway Bay Complex cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **Scanlan's Island, Kinavarra West, Kileenaran, Tyrone House-Dunbeacon Bay, Kilcaimin, Oranmore North, Roscom West and North, Barna,**

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

2 SITE DESCRIPTION

This site is located along the northern side of Galway Bay, 2 km west of Salthill. The saltmarsh is located in a small narrow inlet between Blake's Hill (a steep sided hill) and Seaweed Point (a narrow pebble/cobble bar). It is one of 19 Saltmarsh Inventory sites listed in Galway Bay (Curtis & Sheehy-Skeffington 1998). This part of the Galway Bay shoreline is quite urbanised. A caravan park and camping site and a golf course is located adjacent to the east site in Knocknacarragh. Further east, the coast is built up at Salthill. West of the site, there is some improved grassland on Blake's Hill. The land around the northern side of the saltmarsh is also urbanized. There are extensive loose cobble and pebble (LS1) and some exposed rock (LR2) along the shoreline in this area.

The site is located within the Galway Bay Complex candidate Special Area of Consevation (cSAC 208). Three Annex I habitats are present at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All these habitats are listed as qualifying interests for the Galway Bay Complex cSAC. Most of the saltmarsh habitats mapped at this site is located within the cSAC boundary. A small patch of MSM and some of the adjacent brackish or transitional CM2 habitats at the northern end of the saltmarsh are located outside the cSAC boundary. These were unintentional exclusions, as the 6 inch map was used to draw the cSAC site boundary. Sea Purslane (*Atriplex portulacoides*) is one species of local distinctiveness that is present at this site. This species is mainly distributed along the eastern coast of Ireland and is only found in six 10 km^2 squares along the west coast.

The site is easily assessed from this park. There is a path along the coastline along the edge of the caravan park to the tip of Seaweed Point.

This area was also surveyed as part of the Galway City Habitat Inventory (Natura 2006).

3 SALTMARSH HABITATS

3.1 General description

The main part of the saltmarsh occurs at the head of the inlet. The saltmarsh is listed as a 'bay type' saltmarsh but it may have lagoon type influences. The basin at the head of the inlet was filled with water at the time of the survey and the outflow is quite narrow and was not flowing out significantly. The basin at the head of the inlet may contain a small permanent pool of water that only partially empties depending on the depth of the basin compared to the depth of the outflow.

Atlantic salt meadow habitat is situated around the seaward edge of the main section, with MSM developing further seaward. There is a definite boundary between the ASM and the MSM, identified by the presence of Sea Rush (*Juncus maritimus*). The MSM then transitions landward to brackish transitional vegetation (CM2) dominated by Sea Club-rush (*Bolboschoenus maritimus*). Common Reed (*Phragmites australis*) fringes the north-east side of the MSM. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. There is some freshwater influence acting on the site along some of the channels or drains that were dug across the marsh. Common Reed and other species occur along the landward end of some of these channels, particularly along the central channel that divides the saltmarsh. Some of the CM2 vegetation extends relatively far down the marsh into the MSM and ASM habitats.

A narrow band of ASM occurs along both sides of the inlet and there are further small fragments of saltmarsh further south near the near of the inlet on both sides, associated with the shingle/cobble banks. Further south along the inlet the ASM transitions landwards to a band of vegetation on a steeper slope dominated by Twitch (*Elytrigia repens*) and containing Radish (*Raphanus raphanistrum*), Spear-leaved Orache (*Atriplex prostrata*) and Sea Beet (*Beta maritima*). These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification.

The lower saltmarsh boundary is marked by a saltmarsh cliff and the ASM transitions to muddy and mixed intertidal sediment within the inlet. Near the neck of the inlet, the ASM patches transition to loose cobble and shingle.

Table 3.1. Area of saltmarsh habitats mapped at Seaweed Point.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand	0.003
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	1.416
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.948
	Total	**2.367**

There are several small patches of *Salicornia* flats at this site. These are situated along the seaward edge of the ASM along the western side of the inlet. There are also several small patches located in pans in the ASM located on the eastern side of the inlet on the shingle/cobble bank.

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

Several small patches of this habitat occur in some of the pans within the ASM (Photo 5). These pans are only several metres in diameter and are filled with Glasswort (*Salicornia europaea* agg.) The pans also contain loose cobbles blown in from the adjacent cobble/shingle bar. These patches only cover about 5 m^2 in area.

The small patches that occur along the seaward edge of the ASM on the western side of the inlet occur on mixed sediment and pebble substrate.

3.3 Atlantic salt meadows (H1330)

The main body of ASM is located at the head of the inlet. There are also narrow bands of ASM extending from this area south along the sides of the inlet. Further south on the eastern side there are several breaks in the distribution of ASM along the cobble/shingle bar, where loose cobble is dominant. The ASM at the head of the inlet was used by roosting ducks.

The ASM at this site contains several typical saltmarsh communities. The lower zone along the saltmarsh cliff is dominated by rank ungrazed Common Saltmarsh-grass (*Puccinellia martima*) with Sea Aster (*Aster tripolium*), Lax-flowered Sea Lavender (*Limonium humile*), Sea Plantain (*Plantago maritima*), Sea Pink (*Armeria maritima*) and Annual Sea-blite (*Suaeda maritima*) also present. The sward height is relatively high. There is some zonation evident at the head of the inlet but it is mainly dominated by lower saltmarsh zone vegetation. A second ASM community dominated by Red Fescue (*Festuca rubra*) is also present at this site, but is less extensive.

The narrow bands of saltmarsh that line both sides of the inlet display typical saltmarsh plant zonation (bands of Sea Aster are evident), although the development of communities is poor due to the narrow nature of the marsh. Sea Purslane (*Atriplex portulacoides*) occurs sporadically along both sides of the inlet. There are also several patches of Sea Rush occurring within the ASM.

Generally the saltmarsh topography is poorly developed and affected by the creation of drains across the marsh in the past. The ASM at the head of the inlet is generally quite flat and there are some small pans present. There is some natural creek formation in the ASM at the northern end. Further south, the patch of ASM that is located on the cobble/shingle bar contains small mounds and hollows that probably relate to the topography of the underlying stony material.

3.4 Mediterranean salt meadows (H1410)

This habitat is located at the northern end of the saltmarsh. The vegetation is quite dense and dominated by Sea Rush (50-75% cover). Other species present within this vegetation type include Red Fescue, Creeping Bent (*Agrostis stolonifera*), Autumn Hawkbit (*Leontodon autumnalis*), Saltmarsh Rush (*Juncus gerardii*), Sea Arrowgrass (*Triglochin maritimum*), Common Scurvygrass (*Cochlearia officinalis*) and White Clover (*Trifolium repens*). Zonation

in this habitat is shown by the presence of several species indicating terrestrial transition. These species include Common Sow-thistle (*Sonchus oleraceus*), Sea Mayweed (*Tripleurospermum maritimum*), Spear-leaved Orache, Birds-foot Trefoil (*Lotus corniculatus*), Curled Dock (*Rumex crispus*), Silverweed (*Potentilla anserina*) and Perennial Rye-grass (*Lolium perenne*). Twitch and Sea Club-rush occur in the upper parts of this habitat. Patches of CM2 transitional vegetation dominated by Sea Club-rush extend down into this habitat.

The vegetation is quite tussocky in places. There is little development of saltmarsh topography within this habitat.

4 IMPACTS AND ACTIVITIES

There are no significant impacts or activities affecting the site. The site is not grazed (140) and the vegetation is rank in places. This may also reflect some eutrophication of the inlet (701) via drains that enter the site, although there is no other evidence for this. There is a narrow track (501) along the eastern side of the saltmarsh that is used by walkers (622) to access the tip of Seaweed Point. The track on the saltmarsh is probably used by users of the adjacent campsite.

The saltmarsh has been modified in the past with several drains there were dug across the marsh. These channels were probably dug to help drains from adjacent land flow into the sea. There has also been some infilling in the past, although this infilling pre-dates the OSI 1995 series aerial photos. A patch of scrub and rough grassland occurs at the northern end of the site that has colonised on possible fill and has been excluded from the SAC. A second small area of amenity grassland occurs to the north-east of the site that has also probably been developed on marsh that was infilled in the past.

Erosion (900) at the site is not significant. A small island located in the inlet and marked on the OSI 2nd edition 6 inch map is still present at the site. A comparison of the OSI 2nd 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 and no measurable erosion. The shingle/cobble bar along Seaweed Point has changed position in the past 100 years. This has affected the position (but not the extent) of some of the saltmarsh fragments that occur along the shingle/cobble bar, to the south of the main saltmarsh area.

There has been some construction along the western side of the inlet within the cSAC. The construction pre-dates the OSI 1995 series aerial photos. This construction includes some buildings that probably are related to water works or sewage treatment. Some rock armour has been developed along the lower shoreline adjacent to these buildings. Part of the shoreline may have been infilled to create the rock armour. This construction and associated impacts on this site are not assessed.

Impacts and activities adjacent to the site include urban land (401), Caravan and camping parks (608), golf course (601), grazing of livestock (140). These activities have little or no measurable impact on the saltmarsh habitat other than those already mentioned.

Table 4.1. Intensity of various activities on saltmarsh habitats at Seaweed Point.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	501	C	-1	0.05	Inside
1330	622	C	-1	0.05	Inside
1330	900	C	0	0.06	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

The overall conservation status of this site is assessed as *favourable* (Table 5.1). Seaweed Point is quite a small saltmarsh with few features of significant interest. There are no impacts or activities that are significantly affecting this site. No monitoring stops failed. A species of local distinctiveness (Sea Purslane) is present on the site. The main Annex I habitats transition to brackish habitats at the head of the inlet. However, there is little scope for further transition to drier habitats as the site is surrounded by built land. The site is protected from significant erosion by the pebble/cobble bar along Seaweed Point.

The site has been affected by infilling in the past. The infilling is likely to have mainly affected the brackish transitional habitats. The site has also been affected by drainage in the past. These impacts are not assessed, as they occurred outside the monitoring period.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are moderate. There is some brackish habitat at the head of the inlet to allow migration of saltmarsh habitats. The saltmarsh at this site is unlikely to significantly erode as it is protected by the pebble/cobble bar. However, these are very general predictions.

This site is located within the Galway Bay Complex cSAC. An old format NPWS management plan is available for the saltmarsh habitats at this cSAC but it is now out of date.

Table 5.1. Conservation status of Annex I saltmarsh habitats at Seaweed Point.

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

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

5.2.1 Extent

The extent of this habitat is assessed as *favourable*. There is only a very small area of this habitat located at this site, although this is quite typical of these small sites. The presence of a semi-permanent pool in the basin of the inlet prevents the extensive development of this habitat. There are no indications of any loss of habitat due to erosion or to land-use changes.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. No monitoring stops were carried out in this habitat due to the small extent present at the site. However, a visual assessment of the habitat indicated that it would probably pass for all attributes. Two ecotypes were present with Glasswort filling some of the small muddy pans on the saltmarsh and several patches also occurring adjacent to the seaward boundary 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, although a very small extent is present. This makes it vulnerable to small changes at the site.

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 erosion or to land-use changes within the current monitoring period. This

habitat may have been reduced in extent due to construction on the site prior to the current monitoring period.

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 required for the structure and functions of this habitat reached their targets. Several typical ASM communities were recorded on this site and some zonation was evident, although the main part of the habitat is dominated by one community (the lower zone). There is no pioneer zone present at this site and much of the lower ASM boundary is marked by a saltmarsh cliff. The saltmarsh topography was poorly developed but this is typical on a site of this small nature.

Sea Purslane (*Atriplex portulacoides*) is also present at this site and was recorded at two 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^2 squares along the west coast (Preston *et al.* 2002). 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.

The Atlantic salt meadows form part of a larger coastal ecosystem. There are natural transitions to other habitats at both the upper and lower saltmarsh boundaries. Mixed sediment, shingle and pebble deposits are frequently found in the intertidal area and the ASM transitions to these habitats. The upper landward boundary of the ASM also varies with transition to MSM in the main section at the head of the inlet and transition to CM2 vegetation along the narrow bands of ASM that occur along the edges of the inlet.

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 site. There are little prospects for the loss of habitat due to erosion in the future. The site is within a cSAC so the habitat should not be affected by land-use changes.

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 erosion or to land-use changes within the current monitoring period. This habitat may have been reduced in extent by infilling at the north of the site prior to the current monitoring period.

5.4.2 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 required for the structure and functions of this habitat reached their targets. The species composition of this habitat was typical of this habitat. Sea Rush was generally quite dense. Some zonation was noted

in the habitat and this was noted from other saltmarsh species, particularly species indicating terrestrial transition. The position and vegetation composition of this habitat indicates that much of the habitat is somewhat higher, or less affected by tidal inundation compared to other sites (appearance of species such as Birdsfoot and Perennial Rye-grass). The topography was poorly developed, but this is typical of a small patch of 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 few impacts or activities affecting this site. There are little prospects for the loss of habitat due to erosion in the future. The site is within a cSAC so the habitat should not be affected by land-use changes.

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for the Annex I saltmarsh habitats present 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.

Natura (2006). *Galway City habitat inventory*. A report for Galway City Development Board. Galway County Council.

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

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SMP Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats	0.003	0.003				
2	Spartina swards						
3	1330 Atlantic salt meadow	1.416		1.416			
4	1410 Mediterranean salt meadow	0.948			0.948		
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)	0.663					
10	*Spartina* clump/mudflat mosaic (50/50)						
11	Isolated *Spartina* clumps on mud (5%)						
12	pioneer 1330/1310/*Spartina* mosaic						
13	1410/other SM (CM2) mosaic						
14	*Spartina* sward dominated, with some ASM						
15	1310/*Spartina* mosaic						
16	ASM dominated with some Spartina						
17	1330/sand dune mosaic						
18	Other SM (CM2)	1.291					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**4.321**	**0.003**	**1.416**	**0.948**		

Legend

- SAC Boundary
- 1310 Salicornia flats
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stops
- 1410 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

Seaweed Point

SMP code: SMP0095

Galway Bay Complex SAC (000268)

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

0 40 80 120 160 200 Meters

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:3000

N

Tawin Island

1 SITE DETAILS

SMP site name: **Tawin Island**	SMP site code: **SMP0009**
Site name (Curtis list): **Tawin Island**	CMP site code:
	Site No: (Curtis list): **123**
NPWS Site Name: **Galway Bay complex**	Dates of site visit: **27-28/07/2006**
NPWS designation cSAC: **268**	MPSU Plan: **old format**
pNHA: **268**	
SPA: **268**	
County: **Galway**	Discovery Map: **46/52** Grid Ref: **131780, 219260**
6 inch Map No: **Ga094, Ga102**	Aerial photos (2000 series): **03470-c, 03470a-d, 03519-a, 03519-b, 03519-d, 03520-a, 03520-c**

Annex I habitats currently designated for Galway Bay complex cSAC:

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

Other SMP sites within this cSAC/pNHA: **none in 2006 (19 Curtis sites listed in Galway Bay)**

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

2 SITE DESCRIPTION

Tawin Island is located along the central-east side of Galway Bay in Co Galway, 8 km west of Clarinbridge. The island is part of a peninsula that juts into Galway Bay. The island is attached to the mainland via a bridge that crosses intertidal areas that divide the mainland from the island. Tawin Island is made up of glacial deposits and is low-lying. The higher parts of the island contain improved grassland in enclosures divided by stone-walls. The main part of the island contains a small village (Tawin) and there are further scattered dwellings along the minor road that accesses the island.

The island has a complex intricate coastal topography and there are barrier shingle/pebble bars on both sides of the island. These barriers partially enclose intertidal and subtidal areas between the island and the mainland and are possibly classified as lagoons. These barriers are broken in places towards the eastern side of the island and allow the tide to access the intertidal areas (lagoons). However, tide access is restricted so the tidal regime within the lagoons differs from that in Galway Bay. Behind the barriers there is a complex network of saltmarsh, intertidal and

grassland habitats that are dependant on elevation and topography. Saltmarsh is generally present along the internal shorelines but this habitat disappears in places and is replaced by rocky outcrops. There are numerous small islands and some larger islands in the intertidal area that also contain saltmarsh habitat, particularly on the north side of the bridge. Sheehy Skeffington and Wymer (1991) stated that the saltmarshes around Tawin Island formed mainly as a result of the sea following glacial till deposits, which were subsequently colonised by saltmarsh species with very little deposition of marine sediment.

Three Annex I habitats, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM) are found at this site. All three are listed as qualifying interests for Galway Bay complex cSAC. Tawin Island is one of 19 saltmarsh sites recorded by Curtis and Sheehy Skeffington (1998) in Galway Bay. Most of the saltmarsh habitat at Tawin Island is situated within the cSAC. Most of the terrestrial parts of the island have been excluded from the cSAC and the coastal and intertidal habitats are included. Small strips along the landward boundaries are excluded unintentionally, as the 6 inch map was used to draw the cSAC site boundary. This map is slightly inaccurate in places and there are small errors in rectification between the 6 inch map boundaries and the actual boundaries as indicated by the 2000 aerial photo.

Tawin Island was formerly recognised as an Area of Scientific Interest. Tawin Peninsula was also formerly an individual pNHA (1320) before it was amalgamated with several other NHAs to create the Galway Bay complex cSAC/pNHA. Galway Bay SPA also surrounds the island. Most of the terrestrial parts of the island are excluded but much of the intertidal areas are included within the SPA included some saltmarsh. The island is also important for some wintering waders and wildfowl and for some breeding seabirds such as Terns. Tawin Island also used as a haul out for Common Seal (which is an Annex II species).

Tawin Island can be accessed via minor roads leading from Clarinbridge. The coastline and the saltmarsh areas are easily accessed from the minor road that crosses the island. These coastal areas are grazed in commonage by local farmers and permission was sought for access.

The saltmarsh at Tawin Island has been studied in detail in the past (O' Connor 1992). This B.Sc. thesis studied the ecology and land uses of the saltmarsh at Tawin Island and provides valuable baseline information about the saltmarshes including a habitat map.

3 HABITATS

3.1 General description

The saltmarsh habitats are mainly located around the eastern side of the island. However, saltmarsh continues along the inside of the storm beach barrier on the north and south sides of the island extending close to the tip of the island. The saltmarsh habitat is spread over a wide area and is quite fragmented. This is due to the complex coastal topography around the island and peninsula. The saltmarsh is dominated by Atlantic salt meadows (ASM) (Table 3.1). The ASM is generally found as bands of vegetation in hollows following the intricate shoreline. The extent of the ASM varies in places with some wider flat plains with a better developed salt pan and creek morphology.

Mediterranean salt meadows (MSM) are only found at one location on Iniscorra Island, to the south-east of Tawin Island. This small island also contains improved grassland within enclosures marked by dry stone walls. The area outside the enclosures is dominated by saltmarsh and dry coastal grassland, with most of the saltmarsh along the northern side. MSM is mainly located in the north-east section. No Sea Rush (*Juncus maritimus*) was recorded on Tawin Island.

Saltmarsh extends outside the survey area. The survey area was confined to Tawin Island, Inishcorra, Goose Island and a small part of the mainland isolated from the peninsula where the road crosses on to the Tawin Island. Saltmarsh continues along the mainland shoreline and along Glasheen Island, which is part of the storm beach barrier that encloses the southern lagoon. Saltmarshes surveyed by Curtis and Sheehy Skeffington (1998) are also situated to the north and south of Tawin Island along the shoreline of Galway Bay. The survey area was limited due to time constraints affecting the whole survey.

The coastal commonage area along the northern side of the island has a very complex intricate topography with frequent rocky outcrops, exposed patches of glacial deposits and grassy mounds in the saltmarsh area. The grassy mounds that are situated above the high watermark contain dry coastal grassland with affinities to fixed dune grassland. This grassland has calcareous elements such as Ladies Bedstraw (*Galium verum*) and is dominated by Red Fescue *Festuca rubra*) and Sweet Vernal-grass (*Anthoxanthum odoratum*). The actual saltmarsh extent in this area is only 50% of the total area (Table 3.1).

The ASM and MSM generally transitions to dry coastal grassland along the upper boundaries. At other locations saltmarsh has developed along the storm beach barrier and transitions directly to a pebble or cobble beach at the upper boundary. Dry stone walls are situated along some of the high water mark in places and divide the coastal area from improved grassland within the fields. There is usually a band of terrestrial grassland between the saltmarsh and the dry stone wall, but not in all cases. In other situations the saltmarsh extends around hollows beyond the walls into the enclosures, depending on the elevation. Saltmarsh is also situated along the edge of rock armour where the road is close to the shoreline. The transition to terrestrial habitats is very distinctive at this site as there is abundant Sea Wormwood (*Seriphidium maritimum*) situated along the upper saltmarsh zone, on the strandline and above the high water mark.

The saltmarsh generally transitions to intertidal habitats at the lower seaward edge. These vary between rocky outcrops, stony sediment and mudflats. The seaward habitat may be a mixture of sediments and rocky deposits. These intertidal habitats follow channels and pools in places where they drain more enclosed areas. The edge of the saltmarsh is generally marked by a low saltmarsh cliff (0.2-0.4 m high). These saltmarsh cliffs show some signs of erosion.

There are small patches of *Salicornia* flats (1310) in some of the intertidal areas particularly in the southern lagoon. Patches of these habitats also occur within the ASM area. This habitat is not extensive.

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

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand (1310)	1.08
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	38.33
1410	Mediterranean salt meadows (Juncetalia maritimi)	1.53
	Total	**40.94**

*note that saltmarsh habitat continues outside the surveyed site.

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

There are several patches of this habitat situated in the southern lagoon. These patches are colonised by Glasswort (*Salicornia* sp.). There is occasionally frequent Lax-flowered Sea Lavender (*Limonium humile*) and Common Saltmarsh-grass (*Puccinellia maritima*) in these areas. These patches can be classified as pioneer saltmarsh and have colonised gravely sediment mounds at elevations that are somewhat lower than typical saltmarsh vegetation.

Some areas of shoreline along the edge of the saltmarsh are colonised chiefly by Annual Sea-blite (*Suaeda maritima*). This plant is sparse in places. The substrate is mainly muddy but there are occasionally frequent pebbles and gravel and occasional scattered rocks. This is a pioneer saltmarsh community. There are generally no other saltmarsh species present, although there may be rare Lax-flowered Sea Lavender, Glasswort and Common Saltmarsh-grass. This vegetation forms a zone about 5 m wide (sometimes up to 10 m) along the edge of the saltmarsh. This plant community is a common occurrence along the seaward edge of the saltmarsh at some locations and may only form a strip about 1-2 m wide. These small narrow strips are not mapped so the mapped area is an underestimate of the extent of the habitat.

Annual Sea-blite also colonises substrate dominated by pebbles and shingle. Brown algae (Fucoids) may be frequent. This plant community is not classified as *Salicornia* flats (1310) because the substrate is not sand or mud. The classification between these two communities is not distinct in some places so some patches may not have been mapped as they were considered too stony.

3.3 Atlantic salt meadows (H1330)

This is the most common saltmarsh habitat at Tawin Island. Its structure varies significantly depending on the local coastal topography. ASM occurs as a narrow band found along some shorelines, as wide flat plains with typical saltmarsh creek and pan formation and as complex networks of grassy mounds, rocky outcrops and saltmarsh in hollows of some coastal areas.

Saltmarsh plant zonation is distinctive at this site and several zones are evident in most of the ASM. The upper saltmarsh zone is generally dominated by Red Fescue, Creeping Bentgrass (*Agrostis stolonifera*) and Sea Wormwood with occasionally frequent Saltmarsh Rush (*Juncus gerardii*), Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*) and Buck's-horn Plantain (*Plantago coronopus*). Other species occasionally present include Spear-leaved Orache (*Atriplex prostrata*), Autumn Hawkbit (*Leontodon autumnalis*) and Long-Bracted Sedge (*Carex extensa*). This zone was frequently less grazed than the other vegetation. The Sea Wormwood shields the other vegetation somewhat and is unpalatable to livestock. Rocks are frequently scattered through this zone.

There is a distinctive mid-lower saltmarsh zone that is dominated by Sea Pink (*Armeria maritima*) and Sea Plantain (*Plantago maritima*) with frequent Common Saltmarsh-grass. Other species present include Greater Sea Spurrey (*Spergularia media*). Some of the larger flat saltmarsh plains contain this plant community.

The lower saltmarsh zones are dominated by Common Saltmarsh-grass with frequent Lax-flowered Sea Lavender, Glasswort and Annual Sea-blite. There are also small patches of lower saltmarsh vegetation with frequent Annual Sea-blite and Glasswort (*Salicornia* sp.) at the seaward edge, below the saltmarsh cliff. The lower-pioneer saltmarsh zone is not extensive at this site and only occurs in small patches. Some of these patches within the ASM can be classified as *Salicornia* flats when they are dominated by Glasswort and Common Saltmarsh-grass is not frequent. These patches are situated in some of the lower channels and hollows and are dependant on elevation. These patches are generally quite small and are therefore not mapped.

Much of the ASM does not have a typical salt pan or creek topography. The best developed area is located to the south of the island. Saltmarsh has developed along

the southern side of the island and along the northern side of the storm beach barrier. Intertidal mudflats are situated between these two sides and widen towards the east. Towards the west the storm beach barrier meets the shoreline of the island and saltmarsh has developed along a small valley or hollow. The intertidal flats narrow to form a channel and several small pools that drain this area towards the east.

Some wide plains have developed on the southern side. This plain does not have frequent salt pans throughout the saltmarsh and salt pans are better developed towards the seaward edge of this plain. This area also contains frequent low hummocks and hollows creating a variable topography and introducing internal plant zonation. The vegetation was dominated by Sea Pink, Sea Plantain and Common Saltmarsh-grass in a lower zone forming a low sward on the mounds. Other species in this plain include Glasswort, Greater Sea Spurrey, Sea Aster and Sea Milkwort. Some of the salt pans are disturbed by grazing and some contain pebbles. This area is drained by some minor creeks. Some of the channels and shallow hollows contain lower saltmarsh vegetation with Glasswort, Annual Sea-blite and Common Saltmarsh-grass. Towards the back of the saltmarsh (the storm beach barrier) Red Fescue dominates the vegetation and there are small amounts of Sea Plantain and Buck's-horn Plantain. The saltmarsh surface of this plain was cracked at the time of the survey and was drying out and possibly suffered from drought (neap tide period). At the back of the marsh there is a low vegetated ridge which contains Sea Wormwood in places and other upper saltmarsh vegetation and this eventually transitions to a cobble/pebble bank. Towards the west the plant zones compress as the slopes increase and the saltmarsh is confined to a narrower area.

ASM saltmarsh is also situated along the northern side of the island behind the storm beach barrier. No intertidal flats have developed in this area and the saltmarsh is confirmed to a narrow zone between the barrier and the terrestrial land. This area has a complex topography with intricate mounds and hollows. The mounds contain dry coastal grassland and saltmarsh develops in the hollows. Occasionally there are small pools and channels in the centre of the hollows that act as drainage channels. There is no obvious connection to the shoreline in this area as the storm beach barrier is intact so this saltmarsh is probably flooded from the east. Alternatively this area may not be flooded but the water table may be affected by salt water. The saltmarsh is quite

difficult to map in this area because of the intricate topography. The vegetation is dominated by mid and upper saltmarsh plant communities. The vegetation is moderate-heavily grazed and Sea Aster and Lax-flowered Sea Lavender are reduced to tiny leaves.

Continuing to the east along the northern side of the island, the ASM becomes less uniform and rock outcrops appear in the zone between the storm beach barrier and terrestrial grassland. The top of the storm barrier beach is vegetated with dry coastal grassland. The channels also contain exposed rock. The topography is very complex in this area with frequent low mounds with dry coastal grassland, exposed rock, channels and small pools. This area was mapped as a mosaic and the actual ASM area is 50% of the coastal mosaic. The saltmarsh is developed on muddy sediments and these are thin in places. There are some signs of erosion with exposed rock protruding from the sediments and this is likely to be exacerbated by the thinness of the saltmarsh in places overlaying the bedrock. Sea-purslane (*Atriplex portulacoides*) is present in this area growing over some exposed rock and this is a feature of local distinctiveness.

The northern-central section of the island contains a larger intertidal area (lagoon). ASM saltmarsh is mainly situated around the island shoreline and there is less saltmarsh along the back of the storm beach barrier. This area contains frequent small islands within the intertidal area that contain saltmarsh, exposed rock and dry grassland depending on the elevation of these small islands. The traditional saltmarsh topography with creeks, salt pans draining relatively flat plains is not present and this area is typical of much of the saltmarsh found on Tawin Island. Channels are present due to the underlying topography that has created frequent mounds and hollows and some eroded areas in the hollows contain exposed rock and act as pools. The vegetation in this area is similar to that described from the rest of the island. Lower saltmarsh plant communities develop in some of the channels or along the edges of the channels that drain these areas. Plant zonation is distinctive with the vegetation along the bottom of the channel dominated by Common-Saltmarsh-grass with frequent Glasswort. Along the edge of the channel there is a distinctive zone with frequent Lax-flowered Sea Lavender. Then the vegetation transitions to typical mid marsh vegetation dominated by Sea Pink and Sea Plantain. A channel connects the

northern side of the island to the southern side and saltmarsh is present on both sides of the channel. This channel divides the saltmarsh into an eastern and western half.

A narrow band ASM saltmarsh has developed around the southern side of Inishcorra Island. This is 5-10 m wide and some plant zonation has developed. The lower edge is dominated by Sea Pink, Sea Plantain and Common Saltmarsh-grass while the upper zone is dominated by Red Fescue and Saltmarsh Rush with a band of Sea Wormwood along the upper boundary next to the dry stone wall/embankment. The saltmarsh is situated along a rocky habitat at the lower edge.

ASM saltmarsh has also developed along the south-east side of the Tawin Island (north of Inishcorra). The landward boundary in this area is a stone wall/embankment along the edge of the road. Some large rocks have been placed along the edge of the road to act at coastal defence. This area is grazed lightly and there is some internal plant zonation along the edges of creeks and pans. The vegetation is dominated by the mid marsh Sea Pink/Sea Plantain dominated vegetation. The tops of some of the low mounds contain vegetation dominated by Red Fescue. A lower marsh zone dominated by Common Saltmarsh-grass and Sea Aster is frequent in some of the channels and hollows. The seaward edge of the saltmarsh is marked by a low saltmarsh cliff and there is a transition to a pioneer saltmarsh community dominated by Annual Sea-blite (mapped as 1310).

ASM saltmarsh is also situated around a small piece of land between the Tawin Island and the mainland. This area is divided by the road accessing Tawin Island and there is a mosaic of dry coastal grassland, exposed rock and saltmarsh on both sides of the island. The topography of the saltmarsh is quite intricate. Saltmarsh on both sides of the road is quite badly poached by cattle. Sea purslane is found on this area of saltmarsh towards the south-west corner. A stone wall/embankment is situated along part of the seaward side of the saltmarsh and some of the saltmarsh behind the wall has been eroded away.

The north-east part of Tawin Island has a complex coastal mosaic along the shoreline. This contains a mosaic of saltmarsh, dry coastal grassland on mounds and rocky outcrops. The topography is very intricate and the actual saltmarsh habitat covers about 75% of the total mosaic area. The saltmarsh in this area is difficult to map due

to the topography but some of the larger mounds with dry coastal grassland have been excluded (mapped out) from the saltmarsh area. This area is divided by several dry stone walls. The seaward edge along the northern side is marked by smaller storm beach barriers or rocky mounds inside the main barrier. Saltmarsh may be eroding away from these rocky mounds. Typical saltmarsh topography has not developed significantly in this section. There are some rocky channels that drain this area that act as creeks. However, there are very few pans. Sea Wormwood, indicating upper saltmarsh vegetation, is a predominate feature on this area on many of the mounds, particularly on the eastern side. There are larger areas of mid-zone saltmarsh vegetation dominated by Sea Pink and Sea Plantain towards the western side (northern-central section of Tawin Island).

3.4 Mediterranean salt meadows (H1410)

This habitat is located on Iniscorra Island, to the south-east of Tawin Island. No other Sea Rush was recorded on Tawin Island. The widest part of the saltmarsh is 60 m and this narrows to a 20 m zone. There are small fragments of ASM along the seaward side of the MSM. This vegetation community is dominated by Sea Rush with Red Fescue sometimes abundant. The Sea Rush does not form dense stands with 75-100% cover like those seen at other sites. Other species frequently found include Sea Aster, Creeping Bentgrass, Sea Milkwort and Sea Plantain. There are small amounts of Sea Pink, Common Scurvygrass (*Cochlearia officinalis*), Saltmarsh Rush, Lax-flowered Sea Lavender, Autumn Hawkbit, Common Saltmarsh-grass, Glasswort, Greater Sea Spurrey, Annual Sea-blite, Sea Arrowgrass (*Triglochin maritimum*), Sea Wormwood and Spear-leaved Orache (*Atriplex prostrata*). There are small areas that are mapped as an ASM/MSM mosaic. In these areas the Sea Rush cover decreases (10-20%) and Red Fescue is dominant.

The shoreline outside the enclosures is moderate-steeply sloped. This has allowed some plant zonation to develop, although this does not affect the Sea Rush. At the seaward edge Red Fescue is not present. Sea Aster and Sea Plantain are more common with occasional Common Saltmarsh-grass and Glasswort. Species such as Silverweed (*Potentilla anserina*), White Clover (*Trifolium repens*), Sea Beet (*Beta maritima*), Creeping Bentgrass, Sea Wormwood and Spear-leaved Orache are found around the upper boundary. Occasionally Sea Rush is distributed above the high

water mark and this is indicated by the presence of more terrestrial species such as Dandylion (*Taraxacum* sp.) and Birdsfoot (*Lotus corniculatus*). The MSM transitions into dry coastal grassland at the landward boundary in places. Occasionally the dry stonewall/embankment marks the upper edge of the saltmarsh.

Typical saltmarsh topography has not developed in this habitat. Salt pans are relatively rare, although some do occur. There are no creeks. At the lower boundary there is a low saltmarsh cliff (0.3-0.5 m high) that divides the saltmarsh from the adjacent gravely intertidal mudflats.

The vegetation in this habitat is quite lush and the grazing levels are low. This area was grazed by cattle at the time of the survey, although they are unlikely to have grazed this area for long. The sward structure and height is quite variable being mainly between 0.3-0.7 m. A small causeway connects the Inishcorra Island to Tawin Island and is exposed at low tide.

4 IMPACTS AND ACTIVITIES

4.1 Saltmarsh habitats

This site covers a large area and is quite fragmented. This means that impacts and activities on the saltmarsh generally affect parts of the saltmarsh and do not affect the whole site. The main activity is grazing (Table 4.1). Most of the saltmarsh is grazed by cattle and or sheep. The coastal area is held in commonage for farmers on the island but this seems to have been divided up as the grazing level varies in different sections. Some areas are grazed by cattle but sheep are the most common grazers. Overall, the grazing level is moderate and has created generally short swards in the ASM. One indication of the level of grazing is that the adjacent dry coastal grassland has a taller sward (5-20 cm). Livestock seem to prefer the saltmarsh vegetation compared to the adjacent terrestrial grassland in places. Much of the upper saltmarsh zone has a taller sward and this is because the Sea Wormwood shields the other vegetation somewhat. There are other patches of taller swards in the MSM area and around other parts of the ASM. Overgrazing was not a significant problem at the time of the survey. There are some areas with high levels of poaching, but this type of damage is not extensive. The lower saltmarsh zones are generally the most affected

by poaching. Poaching is being caused by cattle with areas grazed by sheep not poached significantly.

There are several other impacts and these generally affect small areas of saltmarsh habitat (Table 4.1). The activity codes used in Table 4.1 are given in brackets in the following text. There has been some old dumping on saltmarsh on Iniscorra Island (422) (MSM). There are frequent grazing tracks across the saltmarsh that are used by livestock (501). There are several tracks used by vehicles and that also act as rights of way to the shoreline to allow seaweed collection (501). Other tracks cross the saltmarsh to allow access to other parts of the shoreline and some of the smaller islands like Iniscorra. Vehicles have created wheel ruts at certain locations but any damage is not significant. The saltmarsh (and other coastal habitats) in the commonage area has been divided up in places and dry stone walls mark the boundaries. Several telegraph poles cross the saltmarsh (511).

The MPSU conservation plan noted that in Tawin West there had been some reclamation of the coastal grassland including parts of the saltmarsh and that some salt pans had been filled with limestone bounders. There were no signs of this reclamation during the survey.

There has been concern about coastal erosion at Tawin Island for the past 10 years. Due to changes in the storm beach barrier particularly along the northern side farmland has been flooded above what used to be the high water mark. Local residents have attempted to repair breaches in the storm beach barrier along the north of the island. The county council have carried out coastal protection works, including reforming part of the storm beach around the island and putting rock armour along the road that accesses the island. Some of the rock armour has been placed on saltmarsh.

A comparison of the 1920's 6 inch map to the 2000 aerial photo indicates that the shoreline around Tawin Island has not changed significantly. This includes the coastal areas within the storm beach barriers. There has been no significant erosion of saltmarsh (900) or loss of extent. There are signs of erosion present along some of the seaward edges with mud balls and frequent saltmarsh cliffs. It is difficult to interpret if this is related to grazing or is poaching induced. Other coastal areas, particularly in the mosaic areas also show signs of erosion with small patches of saltmarsh

vegetation on exposed mud overlying exposed bedrock. The mud layer that the saltmarsh vegetation has developed on seems to be eroding away and exposing the bedrock in places. Again it is difficult to interpret if this process is being exacerbated by grazing or if it is a recent natural phenomenon. Small islands present in the sheltered intertidal area to the north of the island where mapped on the 6 inch map and have not changed significantly so this may be an indication that erosion is not a significant process at present.

Recent reports that the tide is covering increasing amounts of coastal grassland and farmland in the past few years may actually be increasing the extent of saltmarsh. The increase in the tide height has been related to recent breaches in the storm beach barriers affecting (increasing) the volume of water that can enter the sheltered intertdal areas (lagoons) and the coastal areas. The tidal regime within these sheltered intertidal areas is different compared to the tidal regime in Galway Bay due to the fact that these areas are flooded by small gaps in the storm beach barriers.

There are few impacts on *Salicornia* flats habitat (1310). This habitat is generally affected by natural geo-morphological and tidal cycles. The mounds of muddy sediment that this habitat colonises are dependant on erosion and accretion cycles.

4.2 Adjacent to the saltmarsh habitats

The main activities that occur adjacent to the saltmarsh habitats are related to farming. These include grazing of cattle and sheep in the coastal commonage area (140). There has been some improvement of grassland within enclosures adjacent to the saltmarsh in places (120) (estimated that 50% of the saltmarsh is situated adjacent to improved fields). Some of the intertidal zone is used for aquaculture with oyster trestles present (200). However, this is not extensive. There are several dwellings scattered over the island (403) and Tawin Village is situated close to the saltmarsh (401). The island is serviced by a single minor road and this is situated close to the saltmarsh in places (502) (estimated to affect 10% of the ASM).

There has been some dumping of gravel and stones in the north-west part of the island. This is presumably being used to repair gaps in the storm beach barrier. The local council have also carried out coastal protection works on habitats adjacent to saltmarsh (871) along the road. Coastal protection works may impact on the

saltmarsh by increasing erosion. The MPSU conservation plan noted that some of the storm beach barrier has been excavated (302) to extract gravel and aggregate (estimated to be a minor area < 0.01 ha).

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

EU Habitat Code[1]	Activity code[2]	Intensity[3]	Impact[4]	Area affected (ha)	Location of activity[5]
1310	140	C	0	1.08	Inside
1330	140	B	-1	38.33	Inside
1330	143	A	-1	5.4	Inside
13s	422	C	-1	< 0.001	Inside
1330	501	C	-1	< 0.1	Inside
1330	511	C	-2	< 0.01	Inside
1330	900	C	0	38.33	Inside
1410	140	C	-1	1.53	Inside
13s	120	C	0	17	Outside
13s	140	C	0	40.94	Outside
13s	302	C	0	< 0.01	Outside
13s	401	C	0	40.94	Outside
13s	403	C	0	40.94	Outside
1330	502	C	0	3.8	Outside
1330	871	C	-1	< 0.01	Outside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

Overall this site has a moderate or *unfavourable-inadequate* conservation status (Table 5.1). Four stops failed out of twenty-three monitoring stops divided between the three habitats. The most significant activity on this site is sheep grazing. The overall grazing pressure on this site is moderate but the intensity of the grazing pressure varies as the saltmarsh is quite fragmented and is spread over a larger area. This has created a typical close-cropped sward over much of the saltmarsh. In most of the site the grazing intensity is not negatively affecting the saltmarsh. Some local areas are heavily grazed by sheep and some areas are also heavily poached by cattle, particularly the lower saltmarsh zones.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are moderate. However, these are very general predictions.

Much of the saltmarsh on Tawin Island has a complex topography with frequent small mounds. There are significant amounts of low-lying land in the coastal areas to allow migration of saltmarsh habitats up slope. The tidal regime within the intertidal areas behind the storm beach barriers further complicates any predications. There are already some reports that the high tide level within the storm beach barriers has increased in the recent past (since 1990) and that coastal land and farmland that previously was never inundated had been inundated by the tide for increasing amounts of time. However, rises in sea level are likely to erode some of the saltmarsh at the seaward side. The creation of new saltmarsh habitat may compensate for the loss of eroded saltmarsh. This site would probably benefit from a more detailed study of the relationship of the saltmarsh to the tidal regime within the storm beach barriers and the impact of the erosion of these barriers on this tidal regime.

A MPSU conservation plan is available for the saltmarsh habitats at this cSAC.

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

Habitat	**EU Conservation Status Assessment**			
	Favourable	**Unfavourable - inadequate**	**Unfavourable - Bad**	**Overall EU conservation status assessment**
Salicornia flats (1310)	Extent, Structure and functions, Future prospects			Favourable
Atlantic salt meadows (1330)	Extent,	Structure and functions, Future prospects,		Unfavourable - inadequate
Mediterranean salt meadows (1410)	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 this habitat is assessed as *favourable*, in the absence of no information on the previous extent of this habitat at this site. This habitat was added as a qualifying interest to the cSAC because previous surveys had recorded Glasswort and

Annual Sea-blite on saltmarshes in Galway Bay and it was assumed that this habitat was present.

5.2.2 Habitat structure and functions

The structure and functions of this habitat is assessed as *favourable*. Three monitoring stops were carried out in this habitat and they all passed. All the attributes required for the structure and functions of this habitat reached their targets. This habitat generally is located on intertidal substrates along the edge of ASM saltmarsh or on isolated mounds of sediment along mounds. The substrate this habitat has colonised is much more stony compared to other sites. The stonier substrates were dominated by Annual Sea Blite and muddier substrates were dominated by Glasswort. Some plant communities dominated by Annual Sea-blite were not classified as this habitat as the substrate was too stony and dominated by pebbles.

There are no signs that this habitat is being affected by erosion or accretion. There are no accretional ramps leading from the ASM to this habitat and the two habitats are generally separated by a saltmarsh cliff.

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 major impacts or activities affecting this habitat. The sediment banks that this habitat colonises are however prone to sudden erosion or accretion in response to geomorphological cycles or storm events.

5.3 Atlantic salt meadows (H1330)

5.3.1 Extent

The extent of this habitat is assessed as *favourable.* There is no evidence to suggest that there has been any recent loss of extent due to erosion or other impacts. The MPSU conservation plan noted that there had been some reclamation of coastal grassland including saltmarsh in Tawin West (pre-1992). However, there were no signs of this reclamation work during the survey. The extent of any habitat lost must be quite small otherwise the reclamation would have been noted. A comparison of the 2000 aerial photo to the 1920s 6 inch map indicates that there has been no

significant loss of extent of saltmarsh during this period. Even though there are signs of erosion along the seaward edge of much of the ASM there have been no significant areas of saltmarsh that have been eroded away. Reports of increased tidal inundation over farmland and coastal land that previously was never affected by the tide may actually have increased the extent of saltmarsh in recent times.

A more detailed study is required to accurately assess the amount of coastal grassland and farmland that has been recently affected by the changing tidal levels. This study should be carried out in conjunction with the local landowners. It is difficult to assess accurately the amount of land that has been possibly converted to saltmarsh in the recent past without more accurate baseline data.

5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Nineteen monitoring stops were carried out around the island and fifteen stops passed (78%). The other four stops did not reach targets for levels of grazing and poaching, and bare substrate cover. These four stops are located in areas that have been either grazed very heavily by sheep or have been poached and grazed heavily by cattle. The damaged sections cover an area of 5.2 ha (15% of the total ASM). The sward height is generally quite low in the lower and mid marsh zones. However, the upper marsh frequently has a taller sward due to the presence of Sea Wormwood. O'Connor (1992) stated that the grazing levels were not excessive and grazing is likely to increase the species diversity of the saltmarsh communities.

The extent of the saltmarsh and the fact that it is spread over a relatively large area around the island adds to the diversity of the site. This factor means that some of the impacts such as grazing vary in intensity. Many of the other sites surveyed are situated in one management unit and therefore the grazing level is uniform. There are several other activities on the ASM at this site such as coastal protection works, tracks and wheel rut damage but these activities are not having a significant impact.

Other attributes such as plant zonation and plant diversity reached their targets. This site has a typical species diversity. Plant zonation was particularly well-developed and was dependant on elevation. The saltmarsh, particularly along the northern side of the island has a very complex topography and forms a mosaic with coastal

grassland on the tops of mounds, exposed rock outcrops and patches of pebbles and cobbles. Internal zonation is particularly well-developed along the sides of these mounds. The mid marsh and upper marsh communities are the most abundant. The lower and pioneer saltmarsh communities are less frequent and this is related to the topography of the site. There are no accreting ramps for a pioneer zone to develop. The lower and pioneer zones are best developed along some of the shallow channels and hollows that drain the various saltmarsh sections but their extent is quite small. Occasionally there are patches of Glasswort and Annual Sea-Blite that are situated on stony substrates at the seaward edge of the saltmarsh.

O'Connor (1992) recorded that vegetation of the saltmarsh communities in considerable detail. A comparison of these descriptions to this survey indicates that the species assemblages have remained the same. The reduced extent of the lower saltmarsh community dominated by Common Saltmarsh-grass was also noted by O'Connor (1992). One important feature, Turf fucoids, was recorded by O'Connor (1992). This feature was not recorded during this survey but was likely to have been missed rather than not been present.

The saltmarsh habitats form part of a larger coastal ecosystem. There are natural transitions to other habitats at both the upper and lower saltmarsh boundaries. At the lower boundary there are extensive intertidal mudflats that are frequently quite stony. Exposed rock, shingle and pebble deposits are also frequently found in the intertidal area and the saltmarsh transitions to these habitats. The upper landward boundary of the saltmarsh was dominated by dry coastal grassland. This habitat frequently formed small patches on the tops of mounds that were surrounded by saltmarsh in the lower hollows. Some of the saltmarsh situated along the stone beach barriers transitions directly to stony banks.

This site has several features of local distinctiveness. The site is notable for the abundance of Sea Wormwood along the upper boundary. This species has a scattered distribution in Ireland and was only found recently in eight 10 km^2 squares around the coast of Ireland (Preston *et al.* 2002). Webb *et al.* (1996) described its distribution as rare and very local although it is not recorded as a rare species in The Red Data Book (Curtis & McGough 1988).

Sea-purslane (*Atriplex portulacoides*) is also present at this site and was recorded at two 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^2 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. O'Connor (1992) noted that the western location was ungrazed during that survey and that grazing can deplete this species. This area is currently being grazed and there is some heavy poaching by cattle in parts. Long-term grazing is likely to affect the abundance of this species. Sea-purslane is distributed on exposed rock at the western location and this may shield it somewhat from heavy grazing. This species was also noted during the survey outside the survey area along the shoreline at Lacanaloy Creek in Mweeloon.

The typical creek and salt pan topography found on saltmarshes is not well represented at this site. This is related to the complex underlying topography as the saltmarsh overlies glacial deposits that form numerous mounds. The distinctive coastal geomorphology with the high storm beach barriers that shelter the island, the saltmarsh habitats and isolate large intertidal areas within the barriers is also very important. However, this adds to the diversity of the site. Typical saltmarsh topography with creeks and salt pans is present along the southern storm beach barrier where the widest flat plains have developed. Some of the saltmarsh along the north-western side of the island has a complex drainage system as it is isolated from the shoreline by a high storm beach barrier. This saltmarsh is likely to flood from the east, where breaks in the barrier flood a larger intertidal area. The lowest part of these coastal systems has pools and channels, which act to drain the saltmarsh and surrounding coastal grassland.

No Common Cordgrass (*Spartina anglica*) was recorded in this habitat.

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. Grazing is the main impact on this site but the intensity varies. Most of the site has moderate grazing levels and they are not affecting the

saltmarsh significantly. There are some localised areas that have been damaged by heavy grazing by sheep or cattle. Some reduction in grazing is required in these localised areas to allow these areas to recover.

There is no evidence that the habitat extent will be significantly reduced in the near future.

5.4 Mediterranean salt meadows (H1410)

5.4.1 Extent

The extent of this habitat is assessed as *favourable.* This habitat is only found on Iniscorra Island located to the south-east of Tawin Island. A Sea Rush-dominated saltmarsh community was noted by O'Connor (1992) at this location. A saltmarsh cliff marks the seaward boundary but there is no evidence that there has been any loss of extent from a comparison of the 1920's 6 inch map to the 2000 aerial photo.

5.4.2 Habitat structure and functions

The structure and functions of this habitat is 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 assemblage. One distinctive feature is that Sea Rush is not as abundant compared to other sites and Red Fescue and other salt marsh species are prominent parts of the vegetation. Plant zonation is a notable feature in this habitat and zonation is not always seen because the habitat is generally quite uniform and dominated by Sea Rush. This habitat is grazed by cattle but the grazing intensity was low and there were no signs of poaching. There are few other impacts on this habitat.

The MSM is situated on a relatively steep slope. Typical saltmarsh topography is not well-developed and only a few salt pans are present, but this is due to its situation on a relatively steep slope. There is a natural transition to dry coastal grassland at the landward boundary. No Common Cordgrass (*Spartina anglica*) was recorded in 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. Grazing is the main impact on this site but its current intensity is low. There is no evidence that the habitat extent will be significantly reduced in the near future.

6 MANAGEMENT RECOMMENDATIONS

Grazing is the main activity on this site and overall is at a moderate level. Most of the saltmarsh is grazed to some extent. In some specific areas the grazing intensity should be reduced but this is not required for the whole site. Removing grazing as an impact from a small part of the site (set-a-side) would also be beneficial as this would increase the sward diversity particularly in the middle and lower marsh areas, which are generally preferentially grazed and so are even affected at low stocking levels. Any exclosures would be likely to be grazed by wild animals and wintering waders and wildfowl.

Coastal protection is ongoing on Tawin Island. The impact of any future coastal protection works on the saltmarsh habitat should be assessed.

7 REFERENCES

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

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.

O'Connor, M.J. (1992). The ecology and land use of the salt marshes of Tawin Island, Galway Bay. Unpublished B.Sc. Thesis, National University of Ireland, Galway.

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

Sheehy Skeffington, M.J. & Wymer, E.D. (1991). Irish salt marshes - an outline view. In: A guide to the sand dunes of Ireland, (ed. E.D. Quigley), pp 77-91. EUDC Ireland, Dublin.

Webb, D.A., Parnell, J. & Doogue, D. (1996). An Irish Flora (7th revised Ed.). Dundalgan Press, Dundalk.

Tawin Island

Goose Island

Iniscorra Island

Glasheen Island

Legend

- SAC boundary
- 1310 Monitoring stops
- 1330 Monitoring stops
- 1410 Monitoring stops

Habitats

- 1310 Salicornia flats
- Spartina swards
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- 1330/1410 mosaic
- 1330/coastal grassland mosaic
- Other

Saltmarsh Monitoring Project

Tawin Island

SMP Code: **SMP0009**

Map produced by: **SMP 2006**

Map Version: **1**

Galway Bay Complex cSAC (000268)

0 0.2 0.4 0.6 0.8 Kilometers

N

Scale: **1:9548**

Teeranea

1 SITE DETAILS

SMP site name: **Teeranea**		SMP site code: **0098**
Dates of site visit: **30/10/2007**		CMP site code: **N/A**
SM inventory site name: **Teeranea**		SM inventory site code: **107**
NPWS Site Name: **Kilkieran Bay and Islands**		
NPWS designation	cSAC: **2111**	MPSU Plan: **Old format plan**
	pNHA: **N/A**	SPA: **N/A**
County: **Galway**		Discovery Map: **44** Grid Ref: **89400, 226400**
Aerial photos (2000 series): **O 3335-C; O 3398-A**		6 inch Map No: **Ga 090**

Annex I habitats currently listed as qualifying interests for Kilkieran Bay and Islands cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **Lettermullan West, Lettermore South, Bealadangain, Kinavarra, Turloughbeg**

Saltmarsh type: **Fringe** Substrate type: **Peat/Stumps**

2 SITE DESCRIPTION

Teeranea is located in west county Galway in Kilkieran Bay. The site is located on Gorumna Island, which is a one of a series of islands located in the central part of Kilkieran Bay that are connected to the mainland via a series of bridges and causeways across narrow intertidal channels. Teeranea is located at the north-east corner of the island in a small islet near the bridge to Lettermore Island. This small inlet outflows to Carraveg Bay. A small group of buildings is located at the head of the inlet on the western side. A school and fish processing factory is located at this site. The main road through the island passes the head of the inlet and there is scattered habitation around the site along this road and along adjacent minor roads on the east side of the inlet.

The landscape of Gorumna Island is quite rural and low-lying and is dominated by small fields that contain exposed rock, heath, wet grassland and some scrub. There are also some patches of blanket bog. Some of these fields were improved in the past and have various levels of management, with some reverting back to wet grassland. A small stream flows into the head of the inlet. The shoreline of the island is generally quite exposed due to its location but there are some sheltered channels and inlets where there is some saltmarsh development like at Teeranea. Poorly developed saltmarsh is found around the edges of this sheltered inlet and forms a mosaic with scattered loose rock and rocky outcrops. These outcrops may

be covered with Wrack or with patches of terrestrial habitats depending on their height. The shoreline at the mouth of the inlet is more exposed and dominated by rocky shoreline. The inlet empties at low tide to expose mixed substrates and soft mud in places.

The site is located within the Kilkieran Bay and Islands candidate Special Area of Conservation (cSAC 2111). Three Annex I habitats are present at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All of these habitats are listed as qualifying interests for the cSAC.

Access to the marsh is possible from the upper end of the site from the public road.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh at this site is dominated by Atlantic salt meadows (ASM) (Table 3.1). Most of the saltmarsh development is located at the head of the inlet and in the north-east corner. There is less development of MSM in pockets around the site. Some of the saltmarsh is a mosaic of ASM and MSM and small patches of Sea Rush (*Juncus maritimus*) may be present within the ASM. There are also several very small fragments of *Salicornia* flats recorded at this site adjacent to ASM.

The saltmarsh around the remaining inlet is quite fragmented and poorly developed. Narrow bands of saltmarsh are found in sheltered pockets on thin substrate along the shoreline. The upper boundary of these small fragments is generally marked by dry stone walls along field boundaries but occasionally the saltmarsh encroaches into the adjacent fields. There is some development of transitional Twitch (*Elymus repens*)-dominated vegetation along the upper ASM boundary adjacent to these stone walls. This vegetation has been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. This saltmarsh has developed in association with exposed rocky outcrops and rocky shoreline. Some of the outcrops along the shoreline and covered with patches of heath, scrub and grassland.

Mixed sediment and some soft mud are found at the head of the inlet. The best developed saltmarsh is found at this location and has developed on peat. There is a low saltmarsh cliff marking the lower boundary of this area. However, the upper boundary is situated adjacent to a seawall along the road embankment and there is no transition to other semi-natural habitats. Saltmarsh is also present north of the road where the tidal influence extends along the stream channel.

The eastern shoreline was quite difficult to map as it is a mosaic of habitats including saltmarsh, exposed rock, scrub and wet grassland. The structure of this area has also been

modified in places by peat-cutting in the past. There are several larger patches of saltmarsh where the tidal influence extends across low-lying bog. This has created some transitional vegetation with a mixture of MSM vegetation and other species such as Purple Moor-grass and Carnation Sedge. There is some saltmarsh influence along drains that extend into wet grassland adjacent to the saltmarsh.

Table 3.1. Area of saltmarsh habitats mapped at Teeranea.

EU Code	Habitat	Area (ha)
H1310	*Salicornia* and other annuals colonizing mud and sand	0.001
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	2.024
H1410	Mediterranean salt meadows (Juncetalia maritimi)	0.653
	Total	**2.678**

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

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

There are only two small patches of this habitat recorded at this site. These consist of scattered patches of Glasswort (*Salicornia* sp.) on soft mud that also contains some gravel. Both of these patches are found adjacent to ASM and there is a distinct boundary, a low saltmarsh cliff, between these two habitats.

3.3 Atlantic salt meadows (H1330)

The ASM found at this site is generally poorly developed. Small fragments and strips of habitat are scattered around the shoreline in suitable low-lying topological situations in association with exposed rock and rocky shoreline. Some of these sections are mapped as a Rocky shore/ASM mosaic. These patches of habitat have developed on thin substrate and some zonation is evident in some of this vegetation where there are moderate slopes. Flatter sections may display no discernable zonation. These sections contain frequent exposed rock scattered over the saltmarsh. The saltmarsh topography is generally poorly developed although there are some typical saltmarsh features such as salt pans and low saltmarsh cliffs along the seaward boundary of the habitat. The sward surface along much of the ASM along the eastern side of the inlet is damaged in places and is poached with small amounts of bare substrate. Turf fucoids are present on some of the small patches of bare substrate close to the seaward boundary.

The most notable saltmarsh zone is the mid-marsh zone with species like Sea Plantain (*Plantago maritima*), Sea Pink (*Armeria maritima*), Red Fescue (*Festuca rubra*) and Common Saltmarsh-grass (*Puccinellia martima*) prominent. The cover of Common Saltmarsh-grass increases towards a seaward gradient in a low-mid zone and the cover of Red Fescue increases towards a landward gradient. Other species present includes Sea Aster (*Aster tripolium*), Common Scurvy-grass (*Cochlearia officinalis*), Sea Milkwort (*Glaux maritima*), Lax-flowered Sea Lavender (*Limonium humile*), Sea Arrowgrass (*Triglochin maritimum*), Buck's-

horn Plantain (*Plantago coronopus*) and Saltmarsh Rush (*Juncus gerardii*). The smaller fragments of ASM also contain small tussocks of Sea Rush.

A larger section of ASM is found at the northern end of the inlet. Much of this ASM is dominated by a low-mid zone with Sea Plantain and Common-grass prominent. This section contains some typical small salt pans.

3.4 Mediterranean salt meadows (H1410)

The MSM at this site is poorly developed and quite fragmented. The habitat is generally dominated by a sward of Sea Rush or by scattered clumps of Sea Rush. Some of the MSM is in mosaic with patches of ASM habitat. Other species present in these patches include abundant Red Fescue in places and smaller amounts of Creeping Bent-grass, Sea Plantain, Sea Aster, Sea Arrowgrass, Autumn Hawkbit and Common Scurvy-grass. There is very little indication of zonation within this habitat at this site. However some patches do show some freshwater influence with Common Reed spreading into the MSM. The larger patches of this MSM sward also contain some salt pans within the peat and there are natural drainage channels present. The sward is higher compared to the surrounding ASM and the grazing intensity is much lower.

4 IMPACTS AND ACTIVITIES

This site is affected by a series of impacts and activities (Table 4.1). The saltmarsh along the eastern side is grazed in places by cattle and some sheep where the shoreline is accessible from adjacent fields (143). The shoreline is split up into different management unit by fences or stone walls extending out onto the intertidal zone. There is some localised damage from heavy grazing levels and poaching in places (143). The saltmarsh at the head of the inlet and along the west side of the inlet is not grazed.

There has been some infilling and modifications to the shoreline at the north-western corner of the inlet. A new seawall (870) with large limestone boulders has been built along the edge of the school/crèche that has been developed along the shoreline. The conservation of this seawall and subsequent infilling of the land behind the seawall has destroyed some saltmarsh habitat, probably about 0.05 ha, during the current monitoring period. This infilling is situated within the SAC boundary. The position of the road at the head of the inlet has also constrained the saltmarsh and there is no transition of saltmarsh to other semi-natural habitats.

There is some discharge from the fish processing factory (422) adjacent to the site that is causing some eutrophication to a small area of saltmarsh.

There are indicators of erosion (900) along this site. These are to be expected along a moderately exposed shoreline. Some of the saltmarsh is quite patchy where the thin substrate is eroding away. However, much of this erosion is due to natural processes and the saltmarsh was likely to be in a similar condition for a relatively long time. A comparison of the OSI 2nd edition 6 inch map to the current OSI aerial photos does not show any significant loss of saltmarsh habitat due to erosion. There has been no significant erosion during the current monitoring period. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh.

Impacts and activities adjacent to the site include grazing (140), discontinuous urbanisation in the industrial park (402), dispersed habitation (403), tracks (501) and a minor road (502). The construction in the industrial park and the impact of the fish processing plant has already been assessed. The other activities have little or no measurable impact on the saltmarsh habitats.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	C	0	1.5	Inside
H1330	143	B	-1	0.5	Inside
H1330	501	C	-2	0.05	Inside
H1330	803	A	-2	0.05	Inside
H1330	900	C	0	0.01	Inside
H1410	140	C	0	0.5	Inside
H1410	900	C	0	0.003	Inside
H1330	422	B	-1	0.2	Outside
H1410	422	B	-1	0.2	Outside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

the NHA files indicate that the vegetation of this site has not significantly changed since this survey.

Teeranea is a saltmarsh with no features of particular conservation interest. The saltmarsh is poorly developed and quite patchy along the shoreline. The overall conservation status is *unfavourable-inadequate* due to localised damage from overgrazing and poaching. There has also been some infilling during the current monitoring period that has destroyed a small part of the intertidal zone and there is also some discharge from the fish processing plant located adjacent to the inlet that is causing some pollution.

This site is located within the Kilkieran Bay and Islands cSAC. An old format NPWS Conservation management plan is available for this cSAC but it is now out of date.

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

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

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 patch of this habitat was present at this site. There are no indications that this habitat was more extensive in the past. 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 due to the small habitat extent. However, a visual assessment

indicated that this habitat was in a favourable condition. This habitat is not affected by any negative 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 such as grazing continue in the near future.

5.3 Atlantic salt meadows (H1330)

5.3.1 Extent

The extent of this habitat is assessed as *unfavourable-inadequate*. There has been a small loss of habitat at the north-west corner of the inlet due to infilling of part of the intertidal zone. This has destroyed about 2.5% of the original saltmarsh habitat present at this site.

5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Five monitoring stops were carried out in this habitat and one stop failed. Most of the attributes required for the favourable conservation status of the structure and functions reached their targets. Most of the habitat is in good condition. There is some localised damage from overgrazing and this was the reason for the single failed stop. Runoff from the fish processing plant is causing some eutrophication to a small part of the saltmarsh. There are no other significantly damaging activities.

The ASM is poorly developed at this site. Several zones are present but none are well-developed. Some of the larger sections like near the bridge do contain typical features such as salt pans. However, this section is constrained by a seawall along the road embankment that marks the upper limit. Much of the ASM is mainly a mosaic with patchy saltmarsh developing on thin substrate around scattered and exposed rocks.

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. Grazing is causing some localised damage at present and is likely to continue to do so in the future. The fish processing plant is likely to continue to discharge into the inlet causing some eutrophication.

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.

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. All of the attributes required for favourable conservation status reached their targets. The MSM is generally in good condition and the grazing intensity in this habitat is lower compared to the surrounding ASM.

The MSM has a typical species assemblage. The structure of this habitat is poorly developed, which is to be expected in a relatively small area of habitat. There are some transitions to brackish situations with the appearance of Common Reed into Sea Rush-dominated vegetation. There is also some development of transitional vegetation in the north-east section where there has been peat-cutting in the past. This has created an area with Sea Rush-dominated vegetation interspersed with ridges that contain typical species of cutover bog grassland such as Carnation Sedge and Purple Moor-grass. Sea Rush also extends into the adjacent bogland and via drains.

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 such as grazing continue in the near future. There are no significantly damaging activities affecting this site.

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.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	*Spartina* swards
1	1310 *Salicornia* flats	0.001	0.001				
2	*Spartina* swards						
3	1330 Atlantic salt meadow	1.815		1.815			
4	1410 Mediterranean salt meadow	0.565			0.565		
5	ASM/MSM mosaic (50/50)	0.177		0.089	0.089		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic	0.102		0.051			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	3.029					
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)	0.034					
19	1330/rocky shore mosaic	0.140		0.070			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
Total		**5.862**	**0.001**	**2.024**	**0.653**		

Legend

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

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

Saltmarsh Monitoring Project 2007-2008

Teeranea

Kilkieran Bay and Islands SAC (002111)

SMP code: SMP0098

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

0 50 100 150 200 250 Meters

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:3500

N

Turloughbeg

1 SITE DETAILS

SMP site name: **Turloughbeg**		SMP site code: **0103**
Dates of site visit: **01/11/2007**		CMP site code: **N/A**
SM inventory site name: **Turloughbeg**		SM inventory site code: **98**
NPWS Site Name: **Kilkieran Bay and Islands**		
NPWS designation	cSAC: **2111**	MPSU Plan: **Old format plan**
	pNHA: **N/A**	SPA: **N/A**
County: **Galway**		Discovery Map: **44** Grid Ref: **91599, 233900**
Aerial photos (2000 series): **O 3207-B,D**		6 inch Map No: **Ga 065**

Annex I habitats currently listed as qualifying interests for Kilkieran Bay and Islands cSAC:

H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

H1410 Mediterranean salt meadows (Juncetalia maritimi)

Other SMP sites within this SAC/NHA: **Teeranea, Lettermullan West, Lettermore South, Bealadangain, Kinavarra**

Saltmarsh type: **Fringe** Substrate type: **Peat**

2 SITE DESCRIPTION

Turloughbeg saltmarsh is located in wet Co. Galway in the northern part of Kilkieran Bay. This part of Kilkieran Bay is quite undulating and intricate with many inlets, bays and channels between the numerous islands and peninsulas in the bay. Much of this shoreline is quite exposed and dominated by rocky shoreline. The site is located 10 km north of Carraroe Village on a small peninsula that extends down into Kilkieran Bay. Turloughbeg is one a series of Townlands on this peninsula. Turloughbeg is situated around the shoreline of a small bay called Carricknahalliaboy. There are scattered dwellings and a school located at a crossroads along minor roads adjacent to this bay. The survey site covers the northern side of this bay and the saltmarsh found at the north-eastern section. There is very limited saltmarsh development along the southern shoreline of this bay.

The landscape of this area is quite rural and low-lying and is dominated by small fields that contain exposed rock, heath, wet grassland and some scrub. There are also some areas of blanket bog on higher ground. Some of these fields were improved in the past and have various levels of management, with many reverting back to wet grassland.

The shoreline of Carricknahalliaboy Bay is moderately exposed with very limited saltmarsh development. Parts of the northern shoreline are quite steep and there is some development of low cliffs topped with heath in places. Poorly developed saltmarsh is found along the shoreline in low-lying areas in suitable conditions, and forms a mosaic with scattered loose

rock and rocky outcrops. The lower intertidal zone is dominated by a rocky shoreline with frequent Wrack-covered rocks and patches of mixed sediment in places. There are some streams flowing into the head of this bay with patchy saltmarsh development around the head of the streams. This area is lower-lying and there is some development of blanket bog adjacent to the shoreline.

This site is part of Kilkieran Bay and Islands candidate Special Area of Conservation (cSAC 2111). This large coastal cSAC contains a wide range of habitats of notable conservation interest, including open marine water, sub-tidal habitats, coastal habitats such as machair and lagoons. Two Annex I saltmarsh habitats are present at this site. Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Both of these two habitats are listed as qualifying interests for this cSAC. Saltmarsh has also developed at several other locations around this bay in this cSAC. Several of these sites are listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and were also surveyed during the Saltmarsh Monitoring Project (see the above table). There are also numerous smaller fragments of saltmarsh habitat around the bay where the shoreline topography allows some saltmarsh development.

Most of the saltmarsh habitat mapped at this site is located inside the cSAC boundary. This is mainly due to the fact that the upper shoreline on the OSI 6 inch map was used to draw the SAC boundaries and this enclosed most of the land covered by spring tides. There are some patches of saltmarsh habitat extending beyond this boundary in places.

Turf fucoids are the only species of local distinctiveness recorded at this site and these are typical of saltmarsh found on peat along the western coast of Ireland.

The shoreline was accessed from a small quay located at the west side of the bay.

3 SALTMARSH HABITATS

3.1 General description

The development of saltmarsh at this site is very poor. Most of the saltmarsh habitat recorded was Atlantic salt meadows (Table 3.1). The ASM generally forms a mosaic with small patches of MSM and also with exposed rock and rocky shore along the shore. There is some saltmarsh development at the west side of the site adjacent to the small pier. This area is dominated by ASM. There is a large section of low cliffs between this area and more saltmarsh development towards the north-east part of the bay. Much of this saltmarsh is fragmented and patchy, with few patches of habitat greater than 10 m wide. The shoreline has a moderate slope so the saltmarsh development is quite limited. It has developed on thin substrate and there is frequent scattered rock over the saltmarsh. There is some freshwater influence on the saltmarsh vegetation in places where drains runoff the adjoining land and patches of Common Reed (*Phragmites australis*) develop along the upper saltmarsh

boundary. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification.

Further east there is some saltmarsh development along the edges of blanket bog. The blanket bog development is not extensive and there are still frequent rocky outcrops with exposed rock, wet grassland and scrub interspersed with the boggier sections. The topography of this shoreline is quite varied. There are no signs of any peat-cutting in the past this close to the shoreline. This saltmarsh has developed on thicker peat and there are some taller saltmarsh cliffs along the seaward boundary and along channels that extend into the saltmarsh. There are a range of transitions along the upper saltmarsh boundary to exposed rock, blanket bog and wet grassland.

Table 3.1. Area of saltmarsh habitats mapped at Turloughbeg.

EU Code	Habitat	Area (ha)
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.624
H1410	Mediterranean salt meadows (Juncetalia maritimi)	0.413
	Total	**1.037**

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

3.2 Atlantic salt meadows (H1330)

The ASM is poorly developed at this site and most of the saltmarsh patches are less than 10m wide with many less than 5m wide on a moderate slope. Some zonation of species is still evident in these small patches. Common Saltmarsh-grass dominated the lower saltmarsh zone with species such as Sea Plantain (*Plantago maritima*) and Sea Pink (*Armeria maritima*) also locally frequent. Other species present include Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*), Sea Arrow-grass (*Triglochin maritimum*), Greater Sea-spurrey (*Spergularia media*) and Common Scurvy-grass (*Cochlearia officinalis*). There are also sections along the lower shore where Saltmarsh Rush (*Juncus gerardii*) is colonising mixed substrate in eroding sections and there is frequent bare substrate cover.

The upper zone is dominated by Red Fescue. This zone also contains some Buck's-horn Plantain (*Plantago coronopus*), Long-bracted Sedge (*Carex extensa*) and Creeping Bent-grass (*Agrostis stolonifera*). This latter species becomes more prominent towards the upper boundary. The sward height is generally closely cropped. Tussocks of Sea Rush are scattered through both zones and form some patches of ASM/MSM mosaic in places.

Much of the saltmarsh sward also contains small amounts of bare substrate, mainly due to poaching and erosion of small patches of vegetation overlaying thin substrate. The saltmarsh topography is generally poorly developed although there are still some small salt pans

present in places. ASM vegetation has also developed on deeper peat and extends up some drainage channels that extent into the blanket bog adjacent to the north-east section.

3.3 Mediterranean salt meadows (H1410)

The MSM is poorly developed at this site. It is generally represented by dense patches of Sea Rush or pockets of habitat where frequent clumps of Sea Rush are scattered through ASM type vegetation. Sea Rush is also colonising mixed substrate with frequent cover of cobbles and stone in places. The MSM may be found on thin substrate and on some of the deeper peat in the north-eastern section. Other species present include Red Fescue, Sea Aster, Creeping Bent, Common Scurvy-grass, Saltmarsh Rush, Sea Milkwort, Sea Plantain and Greater Sea-spurrey. The MSM may also contain small amounts of Common Reed in places, particularly where there is freshwater influence. Turf fucoids were recorded in this habitat. There are small amounts of bare substrate in this habitat, particularly at the base of the dense Sea Rush clumps. The saltmarsh topography is poorly developed, which is to be expected in a relatively small site with limited saltmarsh development.

4 IMPACTS AND ACTIVITIES

This site is not affected by many impacts and activities, mainly because it is quite small and isolated (Table 4.1). Grazing is the most significant impact. Sheep access saltmarsh from adjacent fields (140). The field boundaries generally extend into the intertidal zone to include the saltmarsh zone and stop sheep wondering along the shoreline. Dry stone walls extend deep into the intertidal zone in places. Signs of damage from grazing are frequent, mainly from poaching in vulnerable areas that were quite soft or had impeded drainage (142). Overall the grazing level is moderate. There are no other significant impacts or activities affecting the site.

There are indicators of erosion (900) along this site. These are to be expected along a moderately exposed shoreline. Some of the saltmarsh is quite patchy where the thin substrate is eroding away. However, much of this erosion is due to natural processes and the saltmarsh was likely to be in a similar condition for a relatively long time. A comparison of the OSI 2nd edition 6 inch map to the current OSI aerial photos does not show any significant loss of saltmarsh habitat due to erosion. There has been no significant erosion during the current monitoring period. Erosion is assessed as having a neutral impact on a small portion of the saltmarsh.

Impacts and activities adjacent to the site include grazing (140) (of bog and wet grassland), dispersed habitation (403) and minor roads (502). A small pier is located at the west end of the site. These activities have little or no measurable impact on the saltmarsh habitats.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	C	0	0.2	Inside
H1330	142	B	-1	0.424	Inside
H1330	900	C	0	0.03	Inside
H1410	140	C	0	0.313	Inside
H1410	142	C	-1	0.1	Inside
H1410	900	C	0	0.02	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

Turloughbeg is a saltmarsh with no features of particular conservation interest. The saltmarsh is very poorly developed and quite patchy along the shoreline. The overall conservation status is *unfavourable-bad* due to frequent damage from overgrazing and poaching. Carricknahalliaboy Bay is quite exposed so there is limited saltmarsh development on this area.

This site is located within the Kilkieran Bay and Islands cSAC. An old format NPWS Conservation management plan is available for this cSAC but it is now out of date.

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

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

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any significant 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-bad*. Three monitoring stops were carried out in this habitat and one stop failed. A significant portion of the ASM habitat is in poor condition and is moderately damaged from excessive poaching. The ASM is poorly developed and is quite fragmented and patchy. There are few examples of well-developed saltmarsh zones with typical saltmarsh features such as pans. Some of the fringing habitat does display some zonation as the shoreline is on a generally moderate slope. There are transitions from ASM to other semi-natural habitats at its upper and lower boundaries.

5.2.3 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 such as grazing continue in the near future. Heavy grazing levels are damaging the saltmarsh at present and are likely to continue to do so in the future.

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 significant 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 *unfavourable-bad*. Three monitoring stops were carried out in this habitat and one stop failed. The main reason for the failed stop is poaching damage. Most of the habitat is in fair condition and the MSM is less vulnerable to damage compared to the ASM. The MSM is poorly developed and is quite fragmented and patchy along the shoreline. The saltmarsh structure within this habitat is poorly developed and there are few signs of typical saltmarsh zonation. However there is some development of stands of Common Reed along the upper habitat boundary where there freshwater runoff.

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 such as grazing continue in the near future. Heavy grazing levels are damaging the saltmarsh at present and are likely to continue to do so in the future.

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.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	*Spartina* swards
1	1310 *Salicornia* flats						
2	*Spartina* swards						
3	1330 Atlantic salt meadow	0.278		0.278			
		0.289		0.289			
4	1410 Mediterranean salt meadow	0.139			0.139		
		0.259			0.259		
5	ASM/MSM mosaic (50/50)	0.008		0.004	0.004		
		0.021		0.0105	0.0105		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic	0.021		0.0105			
		0.064		0.032			
9	Other (non saltmarsh)	0.033					
		0.174					
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)	0.003					
		0.027					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**1.274**		**0.624**	**0.413**		

Legend

- SAC Boundary
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- 1330/1410 mosaic
- 1330/coastal gsld mosaic
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stops
- 1410 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

Turloughbeg

Kilkieran Bay and Islands SAC (002111)

SMP code: SMP0103

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

0 40 80 120 160 200 Meters

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:3000

N

Tyrone House- Dunbulcaun Bay

1 SITE DETAILS

SMP site name: **Tyrone House-Dunbulcaun Bay** SMP site code: **SMP0091**

Dates of site visit **11&12/10/2007** CMP site code: **N/A**

SM inventory site name: **Tyrone House-Dunbulcan Bay** SM inventory site code: **124**

NPWS Site Name: **Galway Bay Complex**

NPWS designation cSAC: **000208** MPSU Plan: **old format plan available**

pNHA: **000208** SPA: **004031**

County: **Galway** Discovery Map: **52** Grid Ref: **138970, 218400**

Aerial photos (2000 series): **O 3471-D; O 3472-C; O 3521-B,D; O 3522-A,C,D** 6 inch Map No: **Ga103**

Annex I habitats currently listed as qualifying interests for Galway Bay Complex cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **Scanlan's Island, Kinavarra West, Kileenaran, Kilcaimin, Oranmore North, Roscom West & South, Seaweed Point, Barna,**

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

2 SITE DESCRIPTION

Tyrone House-Dunbulcaun Bay saltmarsh is located at the eastern side of Galway bay in Co. Galway. This saltmarsh site is one of the several saltmarshes that have developed in the long narrow inlets found on this part of Galway Bay. It is one of 19 Saltmarsh Inventory sites listed in Galway Bay and the only estuary type saltmarsh (Curtis & Sheehy-Skeffington 1998). Dunbulcaun Bay divides into two narrow inlets with Clarinbridge River in the north and the Kilcolgan River estuary to the south. This site covers a significantly long shoreline, even though the total area of saltmarsh habitat is relatively low to moderate compared to other habitats. The survey site extends from Clarinbridge in the north to Kilcolgan Bridge in the south. Much of the shoreline within the survey site does not contain any saltmarsh, or only a minor narrow band of saltmarsh on steep-sided cobbles or rocky deposits. Both inlets contain estuary type saltmarsh. Saltmarsh is best developed at Tyrone House and along both sides of the Kilcolgan River estuary. Tyrone House is an old abandoned estate house located in the south-west section of the survey site.

Most of the area around the site is quite rural although there is some ribbon development in places along minor roads in the area and frequent dispersed habitation. The Clarinbridge River inlet extends to the town of Clarinbridge. The area is relatively low-lying and dominated by agricultural grassland although there are also some patches of semi-natural vegetation, with scrub and dry grassland related to rocky outcrops. There is also some transition to wet grassland and tall Reedbeds along the two rivers and inlets.

The site is located within the Galway Bay Complex candidate Special Area of Conservation (cSAC 208). Two Annex I habitats are present at this site, Atlantic salt meadows (ASM) and

Mediterranean salt meadows (MSM). Both of these habitats are listed as qualifying interests for the Galway Bay Complex cSAC. Two species of local distinctiveness, Sea Purslane (*Atriplex portulacoides*) and Sea Wormwood (*Seriphidium maritimum*), are found at the site. Most of the saltmarsh habitats mapped at this site is located within the cSAC boundary. However, there is a substantial amount of saltmarsh Annex I habitats 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. There have been some changes in the intertidal zone since the OSI 6 inch map was drawn. However, in other cases the wrong shoreline boundary was used and this has excluded saltmarsh and in other cases the saltmarsh is not indicated on the OSI 6 inch map.

A new quay and holding pond for shellfish fisherman is being constructed along the shoreline adjacent to Tyrone House. This quay was being inspected by an official from the Department of the Marine at the time of the survey to see if it was complying with planning regulations.

The site was accessed via several points along the shoreline. Some private land was crossed to the survey the saltmarsh habitats. Permission was sought to cross the private land. A large section of the site along the southern side of the Kilcolgan River inlet was not surveyed in detail as permission to access the land was denied.

3 SALTMARSH HABITATS

3.1 General description

The main Annex I saltmarsh habitat found on this site is Atlantic salt meadow (ASM) (Table 3.1). However, this is one of the few sites surveyed in Galway Bay that has a significant amount of Mediterranean salt meadow habitat. The MSM habitat is only found along the Kilcolgan River inlet whereas the ASM is found in both inlets. Saltmarsh habitat is best developed in the more sheltered inner section of the inlets. There is less saltmarsh development along the more exposed and steeper shorelines around the outer parts of the inlets. The various saltmarsh communities also form complex mosaics at some locations on the site that were difficult to map and were therefore mapped as mosaics.

The shoreline varies significantly within the survey site, as the survey site covers a relatively long section of shoreline. This affects the saltmarsh diversity and increases the diversity of the topography and seaward and terrestrial transitions from the saltmarsh to the various other habitats.

Atlantic salt meadow habitat is distributed along the shorelines of the Clarinbridge River inlet. The saltmarsh development is generally poor and there is a narrow band of saltmarsh vegetation (about 5 m wide) stretching along the shoreline in the intertidal zone. There are some low-lying flatter sections of the shore where the intertidal zone is wider and there is increased saltmarsh extent over a zone up to 50 m wide that is enclosed in pasture grazed by livestock. The seaward boundary has been modified in places and dry stone walls have been built along the shoreline. Some of these large limestone boulders may have been placed along the shoreline after land improvement in adjacent areas. These boulders have been used to create dry stone walls along the shoreline to protect livestock from the rocky intertidal zone.

The inner part of the Clarinbridge River inlet contains frequent large scattered rocks in the intertidal zone, creating an extensive boulder field covered with brown Wrack. The saltmarsh transitions to semi-improved agricultural grassland along its upper boundary, where the saltmarsh is enclosed within pasture. Further west towards the outer part of the inlet the saltmarsh is situated along a narrow strip that is confined bay an earth bank/dry stone wall or hedge marking the terrestrial boundary.

The outer part of the peninsula between the Clarinbridge River and the Kilcolgan River inlets is much more remote. The shoreline is generally quite steep and this does not allow significant development of saltmarsh habitat. The saltmarsh habitat is confined to a narrow strip of vegetation that has developed on a thin band of sediment and may be eroding in places, exposing the under-lying cobbles that dominate this shoreline. There are frequent scattered rock and cobbles on the saltmarsh vegetation and a rocky/ASM mosaic is present at various locations. There is a transition to terrestrial band of vegetation containing Sea Beet (*Beta maritima*), Spear-leaved Orache (*Atriplex prostrata*), Sea Mayweed (*Tripleurospermum maritimum*), Sea Radish (*Raphanus* sp.) and Twitch.

Both ASM and MSM become somewhat better developed along the inner more sheltered parts of the Kilcolgan River inlet and at Tyrone House in low-lying intertidal areas. The saltmarsh habitat may cover a zone up to 100 m wide. There are transitions to mixed muddy sediment along the seaward boundary and a saltmarsh cliff has developed along much of this saltmarsh. There are transitions to agricultural grassland along the landward boundary of some of the larger saltmarsh sections, as well as transitions to earth banks/ditches that mark the terrestrial boundaries of the shoreline. At some locations there may be a narrow zone of Twitch (*Elytrigia repens*)-dominated upper saltmarsh vegetation on the landward side of the saltmarsh strip on these steeper banks. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. Muddy intertidal sediments have developed along the sheltered section of saltmarsh at Tyrone House.

The saltmarsh vegetation becomes more brackish towards the head of the inlets and this is more pronounced in the Kilcolgan River inlet. The vegetation communities are quite complex with mosaics of ASM vegetation, MSM vegetation, Twitch-dominated vegetation and stands of Sea Club-rush (*Bolboschoenus maritimus*) and Common Reed (*Phragmites australis*) in close association with each other. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. These different communities have developed along modified shoreline near Kilcolgan Bridge where there are a series of drainage channels, old embankments and mounds close to the main river channel creating different elevations. The edge of the main river channel has been modified in the past and has been strengthened in places.

Atlantic saltmarsh vegetation develops along the edges of the channels and the higher mounds contain Twitch-dominated grassland or dry grassland (GS1) where it is higher. Stands of Sea Club-rush and Common Reed develop on flatter areas along side the main channel. This area has been modified in the past and there are also some ruined buildings on both sides of the estuary on low mounds. Several mosaics were used to map some of this complex vegetation found at the head of Kilcolgan River inlet.

The saltmarsh cliff varies with low boundaries (0.1-0.2 m high) along the narrow bands of saltmarsh located at the western end around the outer ends of the inlets. There are taller saltmarsh cliffs (0.5-1 m high) further east along the inlets, where it is more sheltered and

more sediment has built up or has not eroded, particularly along the seaward edge of the MSM.

Table 3.1. Area of saltmarsh habitats mapped at Tyrone House- Dunbulcaun Bay.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	9.933
1410	Mediterranean salt meadows (Juncetalia maritimi)	8.409
	Total*	**18.342**

*note that saltmarsh habitat continues outside the mapped area.

3.2 Atlantic salt meadows (H1330)

The vegetation communities found in this habitat are similar to other saltmarsh sites around Galway Bay. The relatively long shoreline within the survey area increases the diversity of the saltmarsh zone by including several different saltmarsh types. There are no large areas of extensive ASM development at this site and the widest zone is 30-40 m wide. This means the saltmarsh topography is poorly developed. Only some sections have small creeks or channels that drain various sections of saltmarsh.

Zonation is evident even in the narrower sections of saltmarsh. The lower zone contains Common Saltmarsh-grass (*Puccinellia martima*) and Lax-flowered Sea Lavender (*Limonium humile*) with Annual Sea-blite (*Suaeda maritima*), Sea Aster (*Aster tripolium*) and Sea Plantain (*Plantago maritima*). There are occasional Sea Aster, Sea Plantain, Common Saltmarsh-grass and Lax-flowered Sea Lavender colonising muddy cobbles along the seaward edge of the narrower saltmarsh sections. Sea Rush (*Juncus maritimus*) is also present in this habitat at low cover values around the areas containing MSM.

The upper saltmarsh zone is dominated by Red Fescue (*Festuca rubra*). Other species present include Creeping Bent-grass (*Agrostis stolonifera*), Long-bracted Sedge (*Carex extensa*), Common Scurvygrass (*Cochlearia officinalis*), Curled Dock (*Rumex crispus*) and Autumn Hawkbit (*Leontodon autumnalis*). The habitat zone is found near the Kilcolgan Bridge and forms a complex mosaic with upper saltmarsh vegetation (CM2) dominated by Twitch and containing transitional terrestrial species like Smooth Sow-thistle (*Sonchus oleraceus*) and Curled Dock. Some of this area is not grazed and the vegetation is rank. The ASM saltmarsh zone also forms mosaics with stands of Common Reed.

Atlantic salt meadow habitat is also moderately well-developed around Tyrone House shoreline. Several zones are present at this location and zonation is evident. Some pioneer vegetation dominated by Lax-flowered Sea Lavender is colonising along the lower seaward boundary of the ASM. The lower zone is dominated by Common Saltmarsh-grass and the upper zone is dominated by Red Fescue. Glasswort (*Salicornia* sp.), Annual Sea-blite and Sea Arrowgrass (*Triglochin maritimum*) are present in the lower zone. A mid zone *Armeria-Plantago* sward has also developed in this section and there are several small pans present. This saltmarsh is not grazed but is tussocky, indicating older grazing damage. A saltmarsh cliff develops along part of the seaward boundary in this section. This habitat is also found on several small islands isolated from the main shoreline at this location.

ASM habitat is also found in a small sheltered inlet to the east of the new quay. This inlet has been cut off from the sea by the construction of a new seawall to create a holding pond for shellfish. ASM habitat is located at the eastern landward end of the small lagoon. This area

contains mainly lower zone ASM dominated by Common Saltmarsh-grass and is heavily poached.

This habitat is also found in the Clarinbridge River inlet. Some of the saltmarsh is included within pastures and is grazed moderately by cattle. There are occasional small pans in this saltmarsh and some sections are drained by a single creek or channel. The ASM vegetation is similar to other parts of this site. However, Bucks-horn Plantain (*Plantago coronopus*) forms a prominent part of the upper zone along with Red Fescue in this section. Other species present include Sea Milkwort (*Glaux maritima*), Autumn Hawkbit, Sea Pink (*Armeria maritima*), Creeping Bentgrass, Broad-leaved Plantain (*Plantago media*), White Clover (*Trifolium repens*) and Saltmarsh Rush (*Juncus gerardii*). This ASM contains frequent scattered rock in places.

Some of the ASM further north towards Clarinbridge is not grazed and a rarer transitional terrestrial vegetation type is present containing rougher grasses including Tufted Hair-grass (*Deschampsia caespitosia*), Silverweed (*Potentilla anserina*), False Oat-grass (*Arrhenatherum elatius*) and False Fox Sedge (*Carex otrubae*).

Much of the narrow saltmarsh strip along the outer part of the Clarinbridge River estuary is moderately poached and tussocky. There are also occasionally frequent loose rocks scattered over this saltmarsh and much of it is mapped as a mosaic. There are sections where Saltmarsh Rush and Red Fescue are co-dominant in the upper zone. The topography of this narrow saltmarsh strip is poorly developed with no pans. The northern shoreline is also quite rocky and some sections do not contain any saltmarsh.

Sea Wormwood and Sea Purslane were recorded at this site but are quite rare in frequency. Both these species were recorded on the narrow saltmarsh strips towards the outer sections of the inlets. Sea Wormwood is growing amongst rocks on the shoreline.

3.3 Mediterranean salt meadows (H1410)

This habitat is situated in the Kilcolgan River estuary and forms some of the largest sections of saltmarsh on this site. Several extensive stands dominated by Sea Rush (*Juncus maritimus*) have developed. There are also several areas with a mixture of patches dominated by Sea Rush and patches dominated by ASM. The density of Sea Rush varies between 20% to 75% cover. Red Fescue and Creeping Bentgrass are both frequent or abundant within this habitat. Other species present include Autumn Hawkbit (*Leontodon autumnalis*), Sea Aster, Common Scurvygrass, White Clover, Sea Arrowgrass, Long-bracted Sedge and Bucks-horn Plantain. Some zonation is evident within this habitat and Sea Rush is found in both an upper zone with co-dominance of grasses and a lower zone with more frequent Sea Plantain.

There are few signs of saltmarsh topography in this habitat, although some of the sections are drained by single creeks or channels. A relatively tall saltmarsh cliff has developed along the seaward edge of this habitat. The lower zone of this habitat is somewhat heavily poached and quite tussocky in places.

4 IMPACTS AND ACTIVITIES

There are several impacts and activities that affect this site (Table 4.1). The main impact is cattle grazing (140) and different sections have different grazing intensities related to different land-holdings and different management regimes. Several areas have moderate-high grazing intensities and there is some poaching damage in both the ASM and MSM (143). Other sections are not grazed at all and contain rank grassland.

A new quay and holding pond is being constructed at Tyrone House. A seawall was being constructed across a small inlet to dam it and create a lagoon. The development of the new pond and seawall (871) will probably affect tidal inundation behind the seawall and therefore affect the extent and structure and function of the saltmarsh behind this area. This development was being inspected during the field survey by an official from the Department of the Marine to see if it complied with planning regulations.

There are several tracks that cross the saltmarsh in places (501). The upper shoreline (and saltmarsh zone) is also used as a track at one location and this has eroded the narrow strip of saltmarsh found in this zone somewhat. There are also wheel ruts in some areas where vehicles are accessing adjacent pastures via the shoreline (ASM).

Erosion (900) at the site is not significant. A comparison of the OSI 2nd edition 6 inch map to the OSI 2000 series aerial photos shows that there have been no significant losses of saltmarsh and no measurable erosion in the past 100 years. There are some signs of erosion along the seaward boundary of the saltmarsh at various locations with tussocks along the saltmarsh cliff. However, there was no measurable erosion of saltmarsh during the current monitoring period. Erosion is assessed as having a negative impact on a small portion of the saltmarsh face.

Limestone boulders line to the lower saltmarsh boundary at one location in Clarinbridge River inlet. These large boulders are likely to have been placed along the seaward boundary during land improvement, after being cleared from adjacent agricultural land. There may be some element of coastal protection from these walls (871). The impacts of these walls are not assessed as they occurred outside the current monitoring period. Older dry stone walls with smaller sized rocks are also present. These stone walls have been built to enclose pasture and protect livestock from extensive boulder fields in the intertidal zone.

There has been some dumping of stone and spoil on saltmarsh at one location on this site adjacent to a minor road/track along the shoreline (421).

The Kilcolgan River channel has been modified in the past and these modifications are related to drainage of the surrounding area. The brackish habitats are likely to have extended further than the Kilcolgan Bridge in the past. Some of these drainage works date back to the 19th century.

Impacts and activities adjacent to the site include urbanised areas (400), discontinuous urbanisation (402), dispersed habitation (403), forestry (160), amenity use of the Kilcolgan River estuary by canoeists (620), fishing/aquaculture (200) and fertilization (120) and the grazing of livestock (140) related to farming practises.

Table 4.1. Intensity of various activities on saltmarsh habitats at Tyrone House- Dunbulcaun Bay.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	C	-1	5.933	Inside
1330	143	B	-1	4.000	Inside
1330	421	C	-1	0.001	Inside
1330	501	C	-1	0.500	Inside
1330	871	A	-1	0.700	Inside
1330	900	C	0	0.5	Inside
1410	140	C	-1	5.409	Inside
1410	143	B	-1	3.000	Inside
1410	900	C	0	0.4	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

The overall conservation status of this site is assessed as *unfavourable-bad* (Table 5.1). Tyrone House-Dunbulcaun Bay covers a large area but only has a moderate extent of saltmarsh habitat. There are several features of interest. This site is the only Estuary type saltmarsh present in Galway Bay and there are complex transitions to brackish and freshwater habitats, particularly near the head of the Kilcolgan River estuary. There are also several species of local distinctiveness (Sea Purslane and Sea Wormwood) present on the site, but both are quite rare. There are few impacts or activities affecting this site apart from grazing and poaching damage by cattle. A small area of saltmarsh is possibly at risk from the construction of a new seawall and holding pond for shellfish at Tyrone House. Erosion at this site is not significant.

The medium-term future prospects of natural landward saltmarsh migration in response to sea level rise are good. There is some scope for landward transition of saltmarsh vegetation up the estuary into low-lying fields containing wet grassland. However, these are very general predictions.

This site is located within the Galway Bay Complex cSAC. An old format NPWS management plan is available for the saltmarsh habitats at this cSAC but it is now out of date.

A small amount of saltmarsh habitat at this site is situated outside the cSAC boundary (1.62 ha or 9%).

Table 5.1. Conservation status of Annex I saltmarsh habitats at Tyrone House-Dunbulcaun Bay.

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

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

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

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Nineteen monitoring stops were carried out in this habitat and three failed (15%). Most of the attributes required for the structure and functions of this habitat reached their targets. The saltmarsh is generally in good condition apart from poaching damage caused by moderate levels of cattle grazing at several locations. Poaching exposes bare mud and sediment and damages the sward structure, particularly in the lower saltmarsh zone. There are also signs of poaching-induced erosion along the narrow saltmarsh strips. The saltmarsh has typical vegetation communities and zonation of vegetation is evident and well-developed in places. A narrow pioneer community is present at several locations with Lax-flowered Sea Lavender colonising on muddy mixed sediment along the edge of the saltmarsh. There are natural transitions to other coastal habitats at both the lower and upper saltmarsh boundaries. This saltmarsh is notable for the presence of complex mosaics with brackish habitats near the head of the Kilcolgan River estuary. The Atlantic salt meadows form part of a larger coastal ecosystem.

A species of local significance, Sea Wormwood, which is found frequently on saltmarshes around Galway Bay, is present at this site. This species has a scattered distribution in Ireland and is only found recently in eight 10 km^2 squares around the coast of Ireland (Preston *et al.* 2002). Webb *et al.* (1996) described its distribution as rare and very local although it is not recorded as a rare species in The Red Data Book (Curtis & McGough 1988).

Sea Purslane (*Atriplex portulacoides*) is also present at this site and was recorded at two 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^2 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.

5.2.3 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 main impact affecting this site is grazing, which is having some negative impact in places, mainly by causing poaching damage. A small reduction in grazing intensity may be beneficial for this site. Most of the saltmarsh habitats are within a cSAC, so the habitat should not be affected by other land-use changes.

A small area of saltmarsh is possibly at risk from the construction of a new seawall and holding pond for shellfish at Tyrone House. The saltmarsh habitat is still present at the time of the survey but if tidal inundation is affected in the future, there is likely to be changes in habitat extent and structure and function. This may affect about 0.7 ha of habitat (about 7% of the total ASM area). About half of this area is situated outside the cSAC boundary.

5.3 Mediterranean salt meadows (H1410)

5.3.1 Extent

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

5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Two monitoring stops were carried out in this habitat and one failed. Most of the attributes required for the structure and functions of this habitat reached their targets. The main reason for the failed stop was overgrazing and poaching damage. A significant area of this habitat along the southern side of the Kilcolgan River estuary was not assessed in detail as access was denied to this area. However, a visual assessment indicated that this area was being grazed and there is likely to be some minor poaching. The extent of the damaged habitat is not likely to be greater than 25% meaning the assessment is *unfavourable-inadequate*. The species composition of this habitat was typical of this habitat. Some zonation was noted in the habitat and this was noted from other saltmarsh species. There are also mosaics present with ASM and diverse transitional communities with brackish habitats. The topography was poorly developed, but this is typical of a small patch of habitat. The saltmarsh development is typical of a small estuary.

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 is the man activity affecting part of the MSM at this site. There are few other impacts or activities significantly affecting

this site. There are few prospects for the loss of habitat due to erosion in the future. The site is within a cSAC so most of the habitat should not be affected by land-use changes such as development.

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for the Annex I habitats at this site. This site would benefit from a revising of the cSAC boundary to include the entire Annex I habitat.

7 REFERENCES

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

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.

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

Webb, D.A., Parnell, J. & Doogue, D. (1996). *An Irish flora.* Dundalgan Press, Dundalk.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	8.771		8.771			
4	1410 Mediterranean salt meadow	8.260			8.260		
5	ASM/MSM mosaic (50/50)	0.297		0.149	0.149		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic	0.733		0.367			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	39.077					
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)	2.898					
19	1330/rocky shore mosaic	1.293		0.647			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**61.329**		**9.933**	**8.409**		

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

Saltmarsh Monitoring Project 2007-2008

Tyrone House - Dunbulcaun Bay (Map 1 of 2)

SMP code: SMP0091

0 100 200 300 400 500 Meters

N

Galway Bay Complex SAC (000268)

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

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:8500

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

Saltmarsh Monitoring Project 2007-2008

Tyrone House - Dunbulcaun Bay (Map 2 of 2)

SMP code: SMP0091

0 100 200 300 400 500 Meters

N

Galway Bay Complex SAC (000268)

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

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:8500

Ballyheige

1 SITE DETAILS

SMP site name: **Ballyheige**		SMP site code: **SMP0077**
Date of site visit **10/05/2008**		CMP site code: **78**
SM inventory site name: **Ballyheige**		SM inventory site code: **154**
NPWS Site Name: **Akeragh, Banna and Barrow Harbour**		
NPWS designation	cSAC: **332**	MPSU Plan: **draft 2 old format**
	pNHA: **332**	SPA: **4079**
County: **Kerry**		Discovery Map: **71** Grid Ref: **075210, 125020**
Aerial photos (2000 series): **O 5332-B,D**		6 inch Map No: **Ke 014, 020**

Annex I habitats currently listed as qualifying interests for Akeragh, Banna and Barrow Harbour cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **none**

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

2 SITE DESCRIPTION

Ballyheige saltmarsh is located in north Co. Kerry, 3.5 km south of Ballyheige Town. This site adjoins Ballyheige Bay and the shoreline of this bay is dominated by a large sand dune system and sandy beach that extends from Ballyheige Town south along Banna Strand to Currahane Bay. This system was surveyed by the CMP survey in 2005 (Ryle *et al.* 2009). This SMP survey site is much smaller and covers a small area opposite Blackrock located about midway along the sand dune system in Ballinprior Townland. The landscape of this area is dominated by low-lying flat farmland. There are frequent scattered dwellings and farm houses along the main road between Ardfert and Ballyheige Town and along minor access roads connected to this road (R551). Ballyheige/Banna Strand is also a popular amenity beach and there are several caravan parks located along this sand dune system (although there are none adjacent to this survey site).

The saltmarsh has developed along a drainage channel in a small area behind the sand dunes. The drainage channel drains the Lough Akeragh area to the north of the site and flows into the bay via a small break in the sand dunes at Blackrock. Lough Akeragh is a shallow lough where the water level has dropped and now contains extensive freshwater and brackish marsh. There is also extensive development of wet grassland and brackish habitats along the outflow behind the sand dune system, north of the site. Drainage channels to the north and the south of this site have been significantly modified by the office of Public Works in the past for the purposes of controlling water levels and drainage in the adjacent low-lying farmland, much of which has been reclaimed and improved in the past, and preventing significant tidal inundation. Most of the wet grassland south of the site and adjacent to the sand dunes has been improved in the past. Water levels and tidal inundation along the channels are controlled with sluices. There is also an embankment across the Akeragh

outflow. This means that the saltmarsh development along the channel is not extensive and there is no typical saltmarsh found north of the main sluice controlling the Lough Akeragh outflow. There is some development of brackish vegetation north of this sluice.

The site is located within the Akeragh, Banna and Barrow Harbour cSAC (0000332). Only one Annex I saltmarsh habitat is present at this site, Atlantic salt meadows (ASM). This habitat is listed as a qualifying interest for this cSAC in addition to *Salicornia* flats and Mediterranean salt meadows. However these two latter habitats are not present at the survey site. Two other sites listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) are located within this cSAC, Currahane/Banna and Barrow Harbour. Both these sites are located south of Ballyheige and contain more extensive saltmarsh habitat.

Most of the saltmarsh habitat is located within the cSAC boundary. However, most of the saltmarsh habitat on the east side of the outflow channel is located outside the boundary and is excluded from the cSAC. This is because the edge of the outflow channel marked on the OSI 6 inch map was used to draw the cSAC boundary.

The site was easily accessed via tracks leading to the sluices on the Akeragh outflow.

3 SALTMARSH HABITATS

3.1 General description

The only Annex I habitat found at this site was ASM (Table 3.1). This does not cover an extensive area. Common Cordgrass is also found at the site but it has not formed extensive swards at the site and only a few clumps were noted in the saltmarsh and adjacent sandflats. There is much more extensive development of brackish vegetation with stands of Sea Club-rush along the outflow channel, particularly north of the embankment. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. This area was not examined in detail.

ASM is found on both sides of the outflow channel on low-lying land that is still flooded by high tides. This channel is quite deep and between 10-20 m wide. The banks of the channel have been modified by drainage works and some spoil taken from the channel has been deposited on the adjacent saltmarsh to create some raised mounds with disturbed vegetation.

The saltmarsh is divided into two main sections by an access road leading to the adjacent dunes that crosses the outflow channel over a bridge, and to the beach. The largest area of saltmarsh is located between this access road and the sluice and embankment across the Akeragh outflow located 200 m further north. The ASM on the western side of the outflow channel is situated adjacent to fixed dunes and there are some natural unmodified transitions between the saltmarsh and the fixed dune vegetation. ASM along the eastern side is situated on low-lying land adjacent to the channel and there is a natural unmodified succession to a transitional type brackish/wet grassland vegetation community.

The saltmarsh south of the access road is positioned on a narrow strip of land between the channel and an adjacent farmyard. A track along the edge of the farmyard that connects to the beach marks the upper boundary of the ASM. This strip of saltmarsh follows the channel as it bends and extends onto an area of bare sandflats where the channel flows out to the sea. A smaller channel draining the area to the south meets the main outflow at this location.

This channel is also quite deep and there is no low-lying land situated adjacent to it. There is very minor saltmarsh development along the steep banks of this channel. Drainage through this channel is also controlled by a sluice near the outflow.

Table 3.1. Area of saltmarsh habitats mapped at Ballyheige.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	1.309
non-Annex	*Spartina* swards	0.001
	Total	**1.310**

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

3.2 Atlantic salt meadows (H1330)

There are several ASM communities present at this site that have developed on quite sandy substrate. Most of the saltmarsh contains mid-marsh and mid-upper marsh communities. Some zonation is present with the lower zone communities found along the edge of the channel. The thin strip of saltmarsh on the east side of the site is dominated by Red Fescue (*Festuca rubra*) and frequent Common Scurvy-grass (*Cochlearia officinalis*). The abundance of Common Scurvy-grass in this area is notable. Other species present include Sea Milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Greater Sea-spurrey (*Spergularia media*), Sea Beet (*Beta maritima*) and Orache (*Atriplex lacinata*). This saltmarsh transitions to disturbed coastal grassland towards the north-east corner with species such as Sea Mayweed (*Tripleurospermum maritimum*) and Sand Couch appearing in the vegetation. Towards the channel side there is some transition with Sea Plantain becoming more predominant and other species such as Sea Aster (*Aster tripolium*) appearing. The saltmarsh is dominated by a lower marsh community towards the mouth of the outflow and the saltmarsh vegetation is somewhat fragmented with Sea Plantain and Common Saltmarsh-grass (*Puccinellia martima*) predominant. Common Cordgrass (*Spartina anglica*) is present in this section and has colonised a small channel through the ASM. There are also several small clumps of Common Cordgrass isolated on the sand adjacent to the saltmarsh. There are few signs of typical saltmarsh topography in this area, although there are several small pans present.

The lower sections along the southern channel are vegetated by a sward of Common Saltmarsh-grass. This vegetation is zoned and transitions to a band dominated by Common Scurvy-grass and Sea Plantain.

The saltmarsh north of the bridge is better developed. There is some low-mid vegetation in this area as the adjacent land is quite low-lying. This is dominated by Sea Plantain and Common Saltmarsh-grass. Sea Club-rush (*Bolboschoenus maritimus*) is also spreading into the saltmarsh vegetation in places. An upper saltmarsh community is found on the eastern side of the channel that is dominated by Creeping Bent (*Agrostis stolonifera*) and Saltmarsh Rush (*Juncus gerardii*). Other species present include Sea Arrowgrass (*Triglochin maritimum*), Sea Milkwort, Sea Plantain, and Common Scurvy-grass. The saltmarsh topography is poorly developed on both sides of the outflow channel.

There are some signs of disturbance to the saltmarsh vegetation with species such as Sea Beet on the site. There are also scattered rocks over the saltmarsh in places.

4 IMPACTS AND ACTIVITIES

There is some grazing of cattle (140) on the western side of the channel. The fixed dunes and adjacent saltmarsh are grazed as commonage although the intensity was low and there was no damage. The saltmarsh on the east side of the channel was not grazed.

Some spoil dredged from the outflow channel has been dumped on the saltmarsh recently creating mounds with disturbed vegetation (860). These mounds are unlikely to develop saltmarsh vegetation due to their height. This activity has permanently reduced the extent of saltmarsh as these piles of spoil are unlikely to be removed and there are indications that this practise has occurred before along the banks of the outflow. There are signs from the 1995 and 200 series aerial photos that there was regular disturbance to the saltmarsh habitat along the edges of the channel.

Several tracks spilt the saltmarsh into several sections (501). These tracks allow vehicular access to the sand dune system and the beach south of the outflow. The tracks are sandy with saltmarsh along the edges being eroded away in places. These tracks also allow vehicles to park on part of the saltmarsh adjacent to the farmyard and there are signs of damage from wheel ruts in places. There is also some dumping of sand/rubble (422), possibly from construction waste, on to coastal grassland adjacent to the saltmarsh and these tracks. The NPWS Conservation management plan noted that there has been significant sand removal from the dunes at this location in the past and this would account for heavy traffic and disturbance along the tracks.

The construction of the sluice to control water levels in the Lough Akeragh area has prevented tidal inundation into this area. This has significantly reduced the former extent of saltmarsh that had developed along this outflow behind the dunes. The 2nd edition 6 inch map indicates that the extent of tidal inundation was quite far (0.7 km) up this outflow so only a small portion of the former saltmarsh is still present. The impacts of drainage modifications on the saltmarsh are not assessed as they occurred prior to the current monitoring period. The drainage works in this area are quite old.

There are no indications of erosion (900) at this site. The saltmarsh along the channel is quite sheltered and is not subject to significant erosional pressure. An examination of the aerial photo series shows that there have been no measurable loss or growth of saltmarsh during the current monitoring period. The position of the outflow channel restricts any growth of saltmarsh further seaward.

The main Impacts and activities around the site are related to farming such as mowing/cutting (102), fertilization (120) and grazing (140). Other impacts include dispersed habitation (403), minor roads (502) and amenity use of the beach (622). These activities have little or no measurable impact on the saltmarsh habitats.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	C	0	0.8	Inside
1330	501	C	-1	0.05	Inside
1330	860	C	-2	0.05	Inside

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

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.

Ballyheige is a relatively small saltmarsh with few features of conservation interest. The overall conservation status is assessed as *unfavourable-inadequate*. The habitat is in relatively good condition. However there has been some damage from dumping of spoil dreaded from the channel and from continual vehicle use of tracks that dissect the saltmarsh. Saltmarsh was likely to have been more extensive in the past and was likely to have been distributed along the channel north of the sluice and embankment. However this area has been significantly modified by drainage works. Brackish habitats predominate north of the sluice and embankment.

This site is located within Akeragh, Banna and Barrow Harbour cSAC. An old format management plan is available for this cSAC but is now out of date.

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

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

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

The extent of this habitat is assessed as *unfavourable-inadequate*. A small amount of habitat has been destroyed with spoil dredged from the channel dumped on the saltmarsh. This spoil has created a low narrow ridges only several metres wide. However, as the site is relatively small this equates to a loss of about 3-4% of habitat. There are no indications of any other loss of habitat due to the spread of Common Cordgrass 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*. Four monitoring stops were carried out in this habitat and they all passed. Most attributes required for favourable conservation status reached their targets. The structure and functions of the ASM are in generally good condition. There are few negative indicators. Common Cordgrass is present in the ASM but is quite rare overall with less than 1% cover on the saltmarsh in total and is only found in one small area. The saltmarsh topography is poorly developed at this site and there is no development of typical drainage features. The saltmarsh topography has also been disturbed by several tracks that dissect the habitat. This is the main reason fro the assessment of habitat structure and functions as *unfavourable-inadequate*. The main drainage channel has also been artificially modified.

The species diversity in this habitat is typical of ASM and several different vegetation communities were recorded at this site. ASM zonation is also present. There is also natural unmodified succession of vegetation from saltmarsh habitat to fixed dune vegetation and to a brackish/wet grassland vegetation type.

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. The habitat is not affected by any significantly damaging impacts or activities. However, the saltmarsh is likely to be continually disturbed by drainage works along the channel. It is also negatively affected by vehicle use which has created tracks that have dissected the habitat.

The saltmarsh is not likely to be vulnerable to the spread of Common Cordgrass in the future as this habitat is well-established on sandy substrate and is dominated by mid and mid-upper saltmarsh communities. Common Cordgrass is not suited to colonising these communities and Ballyheige slatmarsh consists of an extremely sandy substrate.

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.

Ryle, T., Connolly, K., Murray, A. & Swann, M. (2009). *Coastal Monitoring Project. 2004-2006*. Report to the 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)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	1.293		1.293			
4	1410 Mediterranean salt meadow						
5	ASM/MSM mosaic (50/50)						
6	ASM/*Spartina* mosaic	0.003		0.002			0.001
7	1330/other SM (CM2) mosaic	0.028		0.014			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	2.310					
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)	0.66					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**4.3**		**1.309**			**0.001**

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

Saltmarsh Monitoring Project 2007-2008

Ballyheige

Akeragh, Banna and Barrow Harbour SAC (000332)

SMP code: SMP0077

0 50 100 150 200 250 Meters

N

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

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:3250

Carrigafoyle

1 SITE DETAILS

SMP site name: **Carrigafoyle**		SMP site code: **SMP0078**
Dates of site visit **08-09-08/2008**		CMP site code: **N/A**
SM inventory site name: **Carrigafoyle**		SM inventory site code: **152**
NPWS Site Name: **Lower River Shannon**		
NPWS designation	cSAC: **2167**	MPSU Plan: **Old Format – Draft 2: Consultation**
	pNHA: **1332**	SPA: **4077**
County: **Kerry**		Discovery Map: **63, 64** Grid Ref: **099444, 146516**
Aerial photos (2000 series): **Ke 002**		6 inch Map No: **O 4913-A,B,D; O 4914-A,C; O 4973-B; O 4851-C,D**

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 **Mediterranean salt meadows (Juncetalia maritimi)**

Other SMP sites within this SAC: **Barrigone, Aughinish, Beagh, Bunratty, Shepperton, Fergus Estuary, Inishdea, Owenshere, Killadysart, Inishcorker, Knock, Querin, Rinevilla Bay**

Saltmarsh type: Substrate type:

2 SITE DESCRIPTION

Carrigafoyle saltmarsh is located in north-east Co. Kerry in the outer part of the River Shannon estuary. Extensive saltmarsh has developed in a long sinuous inlet called Ballylongford Creek. This inlet forms the estuary of Ballyline River. The outer part of the inlet is quite wide with extensive intertidal mudflats while the inner part is quite narrow. Ballylongford Town is positioned at the head of this small estuary. The R551 regional road marks the landward limit of the western branch of this inlet with a smaller stream entering the estuary at this point.

Carrigafoyle Castle is located in the north-western part of the survey site along the shoreline. Part of the mouth of the inlet is sheltered by Carrig Island. The island is connected to the mainland by a causeway near the castle. There is also a shingle ridge along the western side that has enclosed the channel. This area is quite low-lying and dominated by farmland. There is scattered habitation around the site.

This site is notable for the extensive mature *Spartina* swards that have developed in the shallow inlet in the past 60-70 years. Common Cordgrass *(Spartina anglica)* has practically infilled or replaced mudflats as the main intertidal habitat in the channel between Carrig Island and the mainland. This area also contains some mixed sediment along the shoreline in places, particularly at Reenturk Point where the substrate is a mixture of mud and gravel and some cobble. *Spartina* swards has also formed extensive habitat along both sides of the main estuarine channel south to Ballylongford. This channel drains at low tide to expose soft

intertidal mudflats. Some low-lying land along the main channel has been reclaimed in the past and the upper boundary of the part of the east side of the estuary is marked by an embankment. There is still relic patches of established saltmarsh scattered around the survey site with the greatest extent found at the head of the inlet near Ballylongford. Some saltmarsh has also developed in sheltered patches behind shingle bars at Reenturk Point and Carrig Island Point that have developed at the mouth of the inlet.

Carrigafoyle is part of Lower River Shannon cSAC (Site Code 000343). This large cSAC includes a most of the River Shannon Estuary as well as many of the smaller bays and inlets along both sides of the estuary in Counties Kerry, Limerick and Clare. The cSAC has been designated for the presence of many Annex I and II coastal and estuarine habitats and species. Three Annex I saltmarsh habitats are found at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All three habitats are listed as qualifying interests for this cSAC. *Spartina* swards are also found on the intertidal flats at this site, although this habitat is not now considered to qualify as an Annex I habitat.

Ten other saltmarshes sites listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and located within this cSAC were surveyed during this project, Barrigone, Aughinish, Beagh, Bunratty, Shepperton, Fergus Estuary, Inishdea, Owenshere, Killadysart, Inishcorker, Knock, Querin and Rinevilla Bay. This was only a selection of the total number of saltmarshes found in the cSAC and there were 10 other sites listed on the inventory that were not surveyed during the SMP.

Most of the saltmarsh habitat is found within the digital cSAC boundary. However, a substantial portion of the Annex I habitat has been excluded, and this is mainly due to rectification issues between the OSI 2nd 6 inch map used to draw the cSAC boundaries and the actual saltmarsh distribution as outlined on the OSI 2005 series aerial photos.

3 SALTMARSH HABITATS

3.1 General description

The site can be divided into two main sections, the outer estuary around Carrig Island and Reenturk Point and the inner channel between Lislaughtin Friary and Ballylongford. The established saltmarsh is quite fragmented around the site. The most extensive Annex I habitat is ASM with a significant patch of MSM habitat found at Reenturk Point.

Outer Estuary

This section includes the saltmarsh around Carrig Island and in the sheltered side of Reenturk Point. The saltmarsh is dominate by *Spartina* swards that have almost totally infilled the channel between Carrig Island and the mainland. A shingle bar with some dune development partially blocked the western side of this channel but with a small tidal connection still present. However there has now been blocked and the shingle bar stretches across the entire length of this channel. There is only minor development of ASM around the edges of the *Spartina* sward, generally between 1-5 m wide in extent. Most of the saltmarsh habitat is enclosed by field boundaries and there is very little unmodified transition to terrestrial habitats. The main area of Annex I habitat is found at the eastern side of the island at Carrig Island Point. MSM has developed in low-lying land and there is some ASM development along the leeward side of a shingle spit. There are several smaller patches of saltmarsh development along the

northern side of the island, generally sheltered by shingle bars, some of which have been partially enclosed with embankments.

Further east along the southern side of the inlet there is continued development of *Spartina* sward along the shoreline with very little ASM or MSM habitat along the landward boundary. There is some ASM development in low-lying land behind an embankment at Rusheen where there is still some tidal influence entering this area from drains.

The saltmarsh at Reehturk Point is dominated by MSM. This saltmarsh has also developed behind a shingle bar. This MSM patch has some brackish influence with patches of Common Reed developing in places. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. Further east the saltmarsh develops into a narrower band along the shoreline. *Spartina* wards are present along the seaward side of the ASM and MSM but there extent is much less developed. There is some transition to wet grassland along the landward boundary. Further east towards Saleen Pier the saltmarsh development is much more limited where the channel narrows and enters the inner section and there are some breaks in its distribution.

Inner Channel

The inner channel is much narrower with less extensive development of intertidal mudflats on both sides of the estuarine channel. There is a narrow band of ASM development along the shoreline around the main bend in the inlet. The western side has been modified by the construction of a seawall, which has been breached and now contains some patches of *Spartina* swards behind and in front of the seawall. There is more extensive fragmented ASM and MSM on the eastern side of the channel adjacent to Lislaughtin Friary on thicker mud. *Spartina* swards have developed on the mudflats adjacent to this more established saltmarsh and forms a broad band of sward along most of this side of the river. The landward boundary has been significantly modified by the construction of an embankment.

The best developed section of ASM is located and the head of the inlet adjacent to Ballylongford Town. One notable feature is that the 1st edition 6 inch map maps this area as gravel whereas it had developed as saltmarsh when the 2nd edition 6 inch map was drawn. This may have been in response to the reclamation along the inlet. This patch of saltmarsh contains some small patches of *Spartina* swards and ASM. The main channel spits near the head of the inlet and there is a smaller channel towards the west. This section also contains some patches of established ASM with patches of *Spartina* sward along the seaward side of these patches. The R551 road crosses a bridge over a stream marking the upper extent of the inlet.

Table 3.1. Area of saltmarsh habitats mapped at Carrigafoyle.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand (1310)	0.003
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	7.589
1410	Mediterranean salt meadows (Juncetalia maritimi)	4.559
non-Annex	*Spartina* swards	40.124
	Total	**52.275**

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

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

There is only very minor development of this habitat at this site. Annual Sea-blite (*Suaeda maritima*) forms some scattered patches along the back of some of the shingle banks, generally not in association with other saltmarsh habitat and generally on rocky or mixed substrate. This type of habitat was not considered to qualify as this Annex I habitat.

There were some pans within the ASM around the site that are vegetated by Glasswort sp. (*Salicornia* sp.). The Glasswort has infilled on mud with generally no other saltmarsh species in occurrence. There is also some minor development of bands of patchy Glasswort along the shoreline between the inner and outer section. This habitat was patchy and generally less than 1 m wide so it was not mapped. This type of habitat was somewhat more extensive in a small patch at Reenturk Point. This patch also includes some eroded patches of ASM on thin substrate and also some clumps of Common Cordgrass and was mapped as a mosaic.

3.3 Atlantic salt meadows (H1330)

This habitat appears a number of locations around the site. It is best developed at the head of the inlet. This area is dominated by mid-marsh and upper marsh communities with some typical zonation between these communities. The saltmarsh also has a well-developed structure with salt pans and natural creek channels present.

ASM saltmarsh found in some of the other larger fragments also contains some well-developed examples of mid and mid-upper zones. The grazing intensity varies on these sections and some are not grazed at all. The ungrazed sections contain shallow hollows with a low-mid zone. This zone contains Sea Plantain (*Plantago maritima*), Sea Pink (*Armeria maritima*), Lax-flowered Sea Lavender (*Limonium humile*), Annual Sea-blite, Common Scurvygrass (*Cochlearia officinalis*) and Common Saltmarsh-grass (*Puccinellia martima*). Some of these larger patches of ASM contain very little Common Cordgrass. There are also patches of more typical mid marsh vegetation where Lax-flowered Sea Lavender and Common Saltmarsh-grass disappears and species such as Red Fescue (*Festuca rubra*) and Saltmarsh Rush (*Juncus gerardii*) become more prominent. Some patches are dominated by a sward of Saltmarsh Rush. There is some zonation to an upper marsh community along the edge of the embankments where Creeping Bent-grass (*Agrostis stolonifera*) becomes dominant. There are further landward transitions along the embankment to Twitch-dominated vegetation and patches of scrub on the embankment.

Some of the graced sections contain more frequent Common Cordgrass cover. Long term Grazing and poaching has promoted the spread of this species into some of the more established ASM vegetation and formed mosaics. This can be seen south of the embankment around Lislaughtin Friary and at Reenturk Point.

The narrow saltmarsh fringe found along the shoreline in some of the other parts of the site usually contains a mixture of clumps of Common Cordgrass (sometimes forming a narrow band of sward) although with a narrow zone of saltmarsh vegetation with a mixture of low, mid and upper species depending on the micro-topography and including Sea Rush (*Juncus maritimus*). Some of this saltmarsh has developed on patches of mud of different heights.

Saltmarsh has also developed at several locations behind berms where there is still some tidal inundation entering along drains. The vegetation at Rusheen was somewhat brackish and was dominated by Common Saltmarsh-grass with frequent Creeping Bent and occasional Sea Aster and Greater Sea-Spurrey (*Spergularia media*). Other species present included

Brookweed (*Samolus valerandi*) and Celery-leaved Buttercup (*Ranunculus sceleratus*). The ASM behind the embankment at Lislaughtin Friary shows some typical zonation from a Common Saltmarsh-grass dominated sward to a sward dominated by Red Fescue. The lower zone also contains Sea Aster, Sea Plantain and Sea Milkwort while the upper zone contains Creeping Bentgrass and White Clover (*Trifolium repens*). Both these areas are grazed and somewhat damaged by poaching from cattle with a low sward height. Both these sections were probably improved in the past as there is no sign of any typical saltmarsh structure and have reverted back to saltmarsh vegetation due to tidal inundation.

3.4 Mediterranean salt meadows (H1410)

This habitat is mainly found in two large areas at Reenturk Point and at the southern side of the inlet near Ballylongford. The large area of sward at Reenturk Point has developed behind a shingle bar. There is a gentle slope from the shingle bar to the seaward edge of the MSM. This MSM shows some typical zonation with several patches of Common Reed (*Phragmites australis*) within the Sea Rush-dominated sward near the shingle bar. The sward is generally quite tussocky and also contains present Red Fescue. Other species present include Creeping Bent, Sea Milkwort, Common Scurvy-grass, Autumn Hawkbit (*Leontodon autumnalis*), Spear-leaved Orache (*Atriplex prostrata*), Parsley Water-dropwort (*Oenanthe lachenalii*) and White Clover. There are some patches of mosaic with more typical grassy patches of ASM where Saltmarsh Rush is more prominent. Further east there is some transition from the MSM to transitional wet brackish grassland where species such as Purple Moor-grass (*Molinia caerulea*) and Purple Loosestrife (*Lythrum salicaria*) appear. This area shows some signs of erosion in the past with a saltmarsh cliff near the front of the MSM. However, Sea Rush is spreading at the base of this saltmarsh cliff on mixed sediment in places to develop new saltmarsh. In some cases it is spreading into the *Spartina* sward that lines the seaward edge of the MSM sward. Common Cordgrass has also spread into the lower MSM sward, particularly into some of the old drains that were cut through this area. Further east along Reenturk Point there is some development of MSM in a low-lying area where Common Cordgrass is spread more extensively to form a complicated mosaic with patches of *Spartina* sward, patches of ASM and patches dominated by Sea Rush.

The southern section near Ballylongford is not grazed and is quite tussocky and dominated by dense Sea Rush. There are a series of old drains and partially enclosed embankments that probably represent historical land-use and former reclamation. The MSM is species poor and rank in places. Other species present include Red Fescue, Sea Arrow-grass, Sea Milkwort, Creeping Bent, and Spear-leaved Orache. The saltmarsh still contains some large salt pans. Common Cordgrass is not a part of the MSM vegetation at this location. There is some transition on low mounds to a transitional wet grassland type and species like Purple Loosestrife, Silverweed (*Potentilla anserina*), Yorkshire Fog (*Holcus lanatus*) , Soft Rush (*Juncus effusus*) and False Oat-grass (*Arrhenatherum elatius*) appear in the sward, which is still mainly dominated by Sea Rush.

3.5 *Spartina* swards

The *Spartina* swards at this site are very well developed and very mature. The most extensive swards can be seen in the channel between Carrig Island and the mainland. These swards are very dense and cover soft mud. There has been very little habitat succession along the upper boundary of these *Spartina* swards so far. Species such as Common Saltmarsh-grass, Glasswort, Sea Aster and Lax-flowered Sea Lavender are frequently found

along the upper boundary but their distribution does not extend very far into the *Spartina* sward.

There is some natural transition from *Spartina* sward to ASM along a landward gradient on a shingle bar at the eastern tip of Carrig Island. This is the best example of this habitat transition at this site and the cover of Common Cordgrass gradually increases from patchy clumps down to dense sward with few ASM elements on a moderate seaward gradient.

There are several small areas where Common Cordgrass has formed mosaics with both ASM and MSM. These mosaics can be seen at Reenturk Point and adjacent to Lislaughtin Friary. Common Cordgrass probably spread into established saltmarsh that was disturbed by the construction of the embankment at Lislaughtin Friary. These mosaics contain patches of pure MSM and ASM vegetation intermixed with *Spartina* sward that has infilled around or sediment at a lower level. Species such as Lax-flowered Sea Lavender, Sea Aster, Common Saltmarsh-grass, Sea Plantain and Greater Sea-spurrey are all present within the *Spartina* sward created some mixed vegetation. Common Cordgrass has also spread along the back of some of these relic patches of established saltmarsh along drains dug adjacent to the embankment.

4 IMPACTS AND ACTIVITIES

This site is affected by several impacts and activities (Table 4.1). The main impact affecting this site is the spread of Common Cordgrass. This is an invasive species of saltmarsh and mudflats (954). It was planted in the River Shannon Estuary during the 1930's (Nairn 1986), but it is not known when Ballylongford Creek was planted or colonised by this species. This species has mainly colonised intertidal mudflats to form extensive swards. The area of these swards (77%) now far exceeds the former area of the established saltmarsh. Common Cordgrass has colonised some of the established saltmarsh but it has not replaced an extensive area of this established saltmarsh with *Spartina* sward. There has been some development of patches of *Spartina* mosaics with ASM and MSM. The area of these mosaics is relatively small compared to the total area of established ASM and MSM (0.3 ha or about 2%). The development of these swards has also lead to the development of minor patches of ASM (< 0.01 ha), mainly where there has been some succession of habitat along the upper boundary of the *Spartina* sward. Clumps of Common Cordgrass are also scattered over the established ASM and MSM but do not form a significant part of the vegetation. The impact of its presence is assessed as low negative influence. There is unlikely to have been significant spread of Common Cordgrass during the current monitoring period as the *Spartina* swards are already quite mature. Therefore its impact on the ASM and MSM is assessed as neutral. However it is present in the small area of *Salicornia* flats.

A significant portion of the saltmarsh is grazed. Cattle or sheep access saltmarsh at Lislaughtin Friary, Carrig Island Point and Reenturk (140). Saltmarsh found behind the embankment at Rusheen is also grazed. There is some localised damage and overgrazing that is causing some damage from heavy poaching (143). A track (501) is also located along the upper saltmarsh boundary along the south-east side of Carrig Island saltmarsh. There are several other tracks that bisect the saltmarsh and allow access to the shoreline. There are some signs of nutrient enrichment to the saltmarsh around Saleen Pier.

The site has been modified by reclamation in the past. Some former saltmarsh has been reclaimed by building a polder or berm around the seaward side, enclosing it, and draining and improving this land (870). This is seen at Lislaughtin Friary and in Rusheen Townland. Attempts were also made to enclose some of the estuary on the western side of the channel opposite the friary. The western estuary shoreline south of Rusheen House was significantly modified by the construction of an embankment and reclamation of saltmarsh during the 19th century. However, this wall was breached and the low-lying land has reverted to intertidal flats, *Spartina* sward and some ASM behind this embankment. There have been smaller enclosures on Carrig Island. There is still some saltmarsh in hollows and along drains behind some of these embankments where there is still some tidal influence. These impacts are not assessed as they occurred outside the current monitoring period.

There has been some infilling of saltmarsh at various points around the site. A small hollow with some ASM behind an embankment at the northern side of the Carrig Island was being infilled at the time of the survey (803). This infilling has destroyed about 0.15 ha already and if the hollow is complexly infilled then about 0.3 will be infilled. There has also been some infilling of ASM and *Spartina* sward at Rusheen House in the intertidal area behind the seawall. About 0.2 ha has been infilled at this location, but over a longer period of time and some of the infilling has occurred outside the current monitoring period.

Erosion (900) has not been a significant impact at this site. While typical indictors of erosion appear around the site, particularly along the seaward side of the saltmarsh at Reenturk Point where there is some scouring along a saltmarsh cliff, there is no indication of any significant erosion. A comparison of the OSI 2nd edition 6 inch map to the current 2005 series aerial photos shows that there has been no significant erosion during this period. So there has been no significant erosion during the current monitoring period either. The extensive *Spartina* sward probably protects the other established saltmarsh to some extent. The impact of erosion is assessed as neutral.

Impacts and activities around the site are mainly related to farming (102, 120, 140). There is scattered habitation (403) around this site and a sewage outflow is likely to be responsible for the nutrient enrichment seen at one location. Ballylongford Town Is positioned adjacent to the southern end of the inlet (402). Roads are located to the site at several locations including at Carrig Island where the road marks the upper limit of the *Spartina* sward and there is some tidal inundation over this road during high spring tides. There is a small pier at Saleen Harbour with some moored fishing boats.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	954	B	-1	0.003	Inside
1330	140	C	0	3.0	Inside
1330	143	B	-1	2.5	Inside
1330	501	C	-1	0.1	Inside
1330	803	A	-2	0.2	Inside
1330	900	C	0	0.5	Inside
1330	954	C	-1	1.0	Inside
1410	140	C	0	2.0	Inside
1410	143	B	-1	2.5	Inside
1410	900	C	0	0.5	Inside
1410	954	C	-1	1.0	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the 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 was no specific information available for this site.

Carrigafoyle saltmarsh contains few features of significant conservation interest. It has been significantly modified over the years by the construction of the berms. Common Cordgrass has colonised the estuary to create dense swards, mainly on former unvegetated mudflats, but has spread into the established saltmarsh in places. The overall conservation status is *unfavourable-bad*. Some of the ASM has been damaged by infilling.

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.

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

Habitat	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 - 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

The extent of this habitat is assessed as *favourable*. Only a very small area of this habitat was recorded at this site. There has been no significant loss of habitat due to land use changes, development, spread of Common Cordgrass 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*. Due to the very limited extent of this habitat no monitoring stops were recorded in the habitat. However, a visual assessment indicates that the structure and functions of the habitat seem to be favourable. Common Cordgrass is present within this habitat although it is not known if this species has spread significantly due to the lack of accurate baseline information.

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. Common Cordgrass is present within this habitat and has the potential to spread within this habitat in the future and threaten the extent of the habitat.

5.3 Atlantic salt meadows (H1330)

5.3.1 Extent

The extent of this habitat is assessed as *unfavourable-inadequate*. There has been a small loss of habitat due to recent infilling at two separate locations. There has been no other

significant loss of habitat due to land use changes, the spread of Common Cordgrass 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-bad.* Fifteen monitoring stops were carried out in this habitat and six stops failed. The main reasons for the failed stops were over-grazing and poaching by cattle. There is localised damage from cattle grazing around the site on the established saltmarsh and in saltmarsh behind the embankment. Some sections of the ASM are in relatively good condition.

The ASM saltmarsh at this site is quite diverse overall with several different zones and vegetation communities present due to differing conditions and topography around the site. The best developed SM with the best example of saltmarsh structure is located at the head of the inlet. This section has typical saltmarsh zonation from low-mid to high marsh zones. Creeks and salt pans are present. The structure of many of the other saltmarsh portions has been modified in the past by land reclamation. Common Cordgrass is present at this site and has formed extensive swards, mainly on mudflats at the seaward side of the established saltmarsh. It has colonised some ASM to form a *Spartina*/ASM mosaic but this is a relatively minor area compared to the overall area of ASM. This colonisation probably occurred prior to the current monitoring period so the spread of Common Cordgrass is assessed as neutral.

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 such as grazing continue in the near future. The ASM is vulnerable to further infill in the future and one area at the northern side of Carrig Island is vulnerable to being completely destroyed. The current level of grazing is causing localised damage and this is likely to continue in the future. Common Cordgrass has already created mature swards at this site so its capacity for further colonisation of the saltmarsh is limited at this site.

5.4 Mediterranean salt meadows (H1410)

5.4.1 Extent

The extent of this habitat is assessed as *favourable*. There has been no significant loss of habitat due to land use changes, development and the spread of Common Cordgrass or erosion within the current monitoring period.

5.4.2 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 they all passed. All of the attributes reached their targets for favourable conservation status of the structure and functions at the monitoring stops. Most of the MSM habitat is in good condition. However, these monitoring stops do not reflect some localised damage caused by cattle grazing and poaching along Reenturk Point. Therefore the conservation status of the structure and functions are revised as *unfavourable-inadequate*.

The MSM has a typical species assemblage and some zonation is evident in several sections, particularly at Reenturk Point. This area has a largely unmodified structure in places and

some salt pans are present. There is some natural unmodified transition to transitional wet grassland, which contains terrestrial species. However the structure of most of the MSM saltmarsh has been modified by land reclamation and drainage in the past. Common Cordgrass is not a significant feature of most of the MSM but it has spread into some small areas forming mosaics with the MSM.

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 such as grazing continue in the near future. Grazing is causing some localised damage to this habitat and is likely to continue to do so in the future. Common Cordgrass is not likely to spread into this habitat in the future.

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for this site.

7 REFERENCES

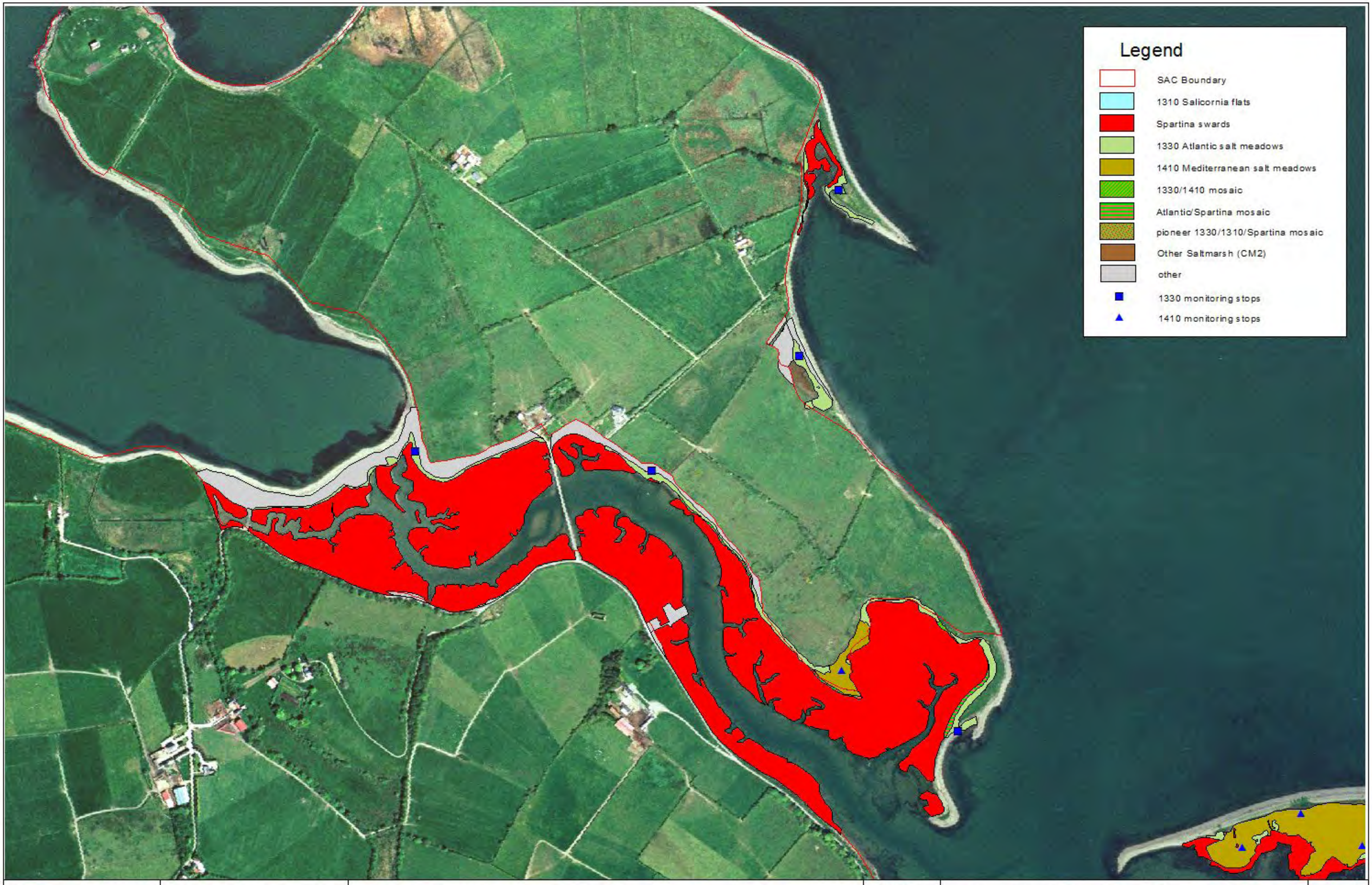
Curtis, T.G.F.C. and Sheehy-Skeffington, M.J. (1998). The salt marshes of Ireland: An inventory and account of their geographical variation. *Biology and Environment: Proceedings of the Royal Irish Academy* **98B**, 87-104.

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)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats	0.001	0.001				
2	Spartina swards	40.021					40.021
3	1330 Atlantic salt meadow	7.081		7.081			
4	1410 Mediterranean salt meadow	4.153			4.153		
5	ASM/MSM mosaic (50/50)	0.812		0.406	0.406		
6	ASM/*Spartina* mosaic	0.202		0.101			0.101
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	7.023					
10	*Spartina* clump/mudflat mosaic (50/50)						
11	Isolated *Spartina* clumps on mud (5%)						
12	pioneer 1330/1310/*Spartina* mosaic	0.007	0.002	0.002			0.002
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)	0.186					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**59.486**	**0.003**	**7.589**	**4.559**		**40.124**



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

Saltmarsh Monitoring Project 2007-2008

Carrigafoyle (Map 1 of 3)

Lower River Shannon SAC (002165)

SMP code: SMP0078

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

0 80 160 240 320 400 Meters

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:6000

N

Legend

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

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

Saltmarsh Monitoring Project 2007-2008

Carrigafoyle (Map 2 of 3)

Lower River Shannon SAC (002165)

SMP code: SMP0078

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

0 80 160 240 320 400 Meters

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:6000

N

Legend

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

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

Saltmarsh Monitoring Project 2007-2008

Carrigafoyle (Map 3 of 3)

Lower River Shannon SAC (002165)

SMP code: SMP0078

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

0 80 160 240 320 400 Meters

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:6000

N

Cromane

1 SITE DETAILS

SMP site name: **Cromane**		SMP site code: **SMP0073**	
Dates of site visit **05-06/05/2008**		CMP site code: **N/A**	
SM inventory site name: **Cromane**		SM inventory site code: **165**	
NPWS Site Name: **Castlemaine Harbour**			
NPWS designation	cSAC: **343**	MPSU Plan: **old format draft 2 plan available**	
	pNHA: **343**	SPA: **4029**	
County: **Kerry**		Discovery Map: **71,78**	Grid Ref: **070305, 097946**
Aerial photos (2000 series): **O 5868-C,D; O 5931-A,B,C,D; O 5932-C; O 5987-A,B; O 5988-A**		6 inch Map No: **Ke 056**	

Annex I habitats currently listed as qualifying interests for Castlemaine Harbour cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **Rossbehy, Whitegate-Fybagh, Inch**

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

2 SITE DESCRIPTION

Cromane saltmarsh is located in Castlemaine Harbour in south-west Co. Kerry. Cromane is a shingle spit that extends into Castlemaine Harbour from the southern side of the estuary and is located 7.5 km west of Kilorglin Town. The spit is quite low-lying and has been converted to improved grassland. A shingle beach is found along the seaward side of the spit in places. There are extensive intertidal flats around the spit especially on the eastern side, and an estuarine channel flows around Cromane and south around Inch sand spit to the west. The mainland adjacent to the spit is quite low-lying and some of the adjacent land has been reclaimed and is protected by a berm. There is scattered habitation along the spit and also along the mainland shoreline. The tip of the spit is used by a mussel fishery.

Saltmarsh has developed in the sheltered low-lying intertidal area at the tip of the shingle spit and also in the sheltered area behind the spit and along the mainland shoreline. Much of the saltmarsh along the mainland is found on perched 'islands' of peat that have become separated from the mainland shoreline and are surrounded by intertidal mudflats. Saltmarsh with this type of structure is distributed from Cromane spit eastwards to the River Laune tidal river channel for about 7.5 km. Only the shoreline between Cromane Spit and a small inlet at Tullig was surveyed (about half this saltmarsh). Saltmarsh is also developing in one area behind a recently breached berm where Cromane Spit connects to the mainland.

Cromane is part of Castlemaine Harbour cSAC (Site Code 000343). This cSAC covers most of the intertidal and sub-tidal parts of Castlemaine Harbour east of Rossbehy and Inch spits.

The cSAC also includes the sand dune complexes at Inch and Rossbehy and the shingle spit at Cromane. The cSAC also includes some of the catchments of the Rivers Laune and Maine, which both flow into the head of the bay and forms the estuary of these rivers. Three Annex I saltmarsh habitats are found at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All three habitats are listed as qualifying interests for this cSAC. *Spartina* swards are also found on the intertidal flats at this site, although this habitat is not now considered to qualify as an Annex I habitat.

Three other saltmarshes sites listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and located within this cSAC were surveyed during this project, Inch, Rossbehy and Whitegate-Fybagh. There is additional saltmarsh development in many of the small indentations along the shoreline, including a significant areas of unsurveyed saltmarsh located between Cromane and the mouth of the River Laune.

Turf fucoids are the only species of local distinctiveness recorded at this site and these are typical of saltmarsh found along the western coast of Ireland.

Nearly all the saltmarsh habitat is found within the digital cSAC boundary. The entire saltmarsh habitat found on the sand spit is situated within the cSAC. The cSAC boundary then extends to the east and includes most of the saltmarsh habitat within the cSAC. However the outer berm is used as the cSAC boundary in one section and this excludes some saltmarsh habitat that has developed behind the berm.

The saltmarsh habitats were accessed from several points along the shoreline, including the tip of Cromane spit and a small inlet at Tullig. Some of the intertidal mudflats between the shoreline and the saltmarsh islands are extremely soft and treacherous.

3 SALTMARSH HABITATS

3.1 General description

This site can be split into two main sections, saltmarsh at the tip of Cromane Peninsula and saltmarsh along the mainland, including the back of Cromane Peninsula. Overall, Mediterranean salt meadows (MSM) has the greatest extent of habitat (Table 3.1).

The saltmarsh at the tip of the peninsula has developed in a low-lying intertidal area sheltered by shingle and cobble banks. These banks surround an intertidal area called Lough Commoge. Saltmarsh has developed on low-lying areas adjacent to the back of the shingle bank and along low-lying land adjacent to the rest of the peninsula. Some of these patches are ‘islands’ separated from the shingle bank by deep intertidal channels. Most of this saltmarsh is MSM, with some Atlantic salt meadow (ASM). There are also some patches of Common Reed on these islands on low mounds. There are small patches of *Spartina* sward and isolated patches of Common Cordgrass (*Spartina anglica*) in the intertidal mud channels between the established saltmarsh. One significant feature of this saltmarsh is the drains across these fragments indicating previous land-use. There is also a low embankment and drain around the seaward side of the larger patches of saltmarsh. Some of the saltmarsh adjacent to the shingle bank has been infilled. A low berm divides this intertidal area from adjacent low-lying land on the peninsula. However, there is some development of saltmarsh behind the berm in one field where there has been a breach. A mosaic of *Spartina* sward and

ASM is developing in this area and it also contains some waste material such as concrete and spoil.

The most significant feature of saltmarsh development along the mainland shore is the presence of saltmarsh on isolated islands, particularly towards the eastern side. Dense rank MSM is found on these relatively high islands that are perched on mud with steep saltmarsh cliffs 1(-2 m high) marking the seaward boundary. There is also significant development of other non-Annex I saltmarsh vegetation on these island including stands of Common Reed (*Phragmites australis*) and 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. There is a notable pattern to their distribution around the edges of some of these islands. There are also several patches of Twitch (*Elytrigia repens*)-dominated vegetation developing on some low mounds on these islands. This vegetation is also classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. There is very little development of typical low marsh communities and zonation from low to upper marsh communities at this site.

Much of the saltmarsh along the western half of the mainland shore is joined to the mainland but is still quite fragmented into different sections of various sizes. This saltmarsh is a mosaic of ASM and MSM. The seaward boundary of this saltmarsh shows frequent indicators of erosion and a saltmarsh cliff marks much of the lower boundary with features such as slumping, eroded mud platforms, eroded hags of mud and runnels into the saltmarsh. Some of the saltmarsh has developed on a thinner layer of substrate overlaying cobble and shingle material and these sections are more vulnerable to erosion. There are frequent modifications to its structure, including drains and channels dug along the landward boundary, channels connecting to the seaward side and development of berms and low embankments of various heights and ages. Some berms are relatively new. This means that the landward transition of habitats has been significantly modified and there are few sections that have been left intact. There is some development of wet grassland adjacent to the saltmarsh in places and patches of Sea Club-rush and Common Reed appear in some of the landward channels.

The main feature of the saltmarsh at the neck of the spit is the newly developing saltmarsh in the low-lying area behind a breached berm. Some intact saltmarsh is still present on the landward side of the berm, but some of this saltmarsh has been modified by the use of mud from the saltmarsh to create the berm.

The low-lying area behind the berm is a mosaic of habitats and is still developing. This area was not mapped in detail due to this complex mosaic and the fact the soft intertidal mud in the channels was treacherous. Some of this land had been improved prior to the breach of the berm. The most extensive habitats include Common Reed beds along the southern side and a significant part of this area contains bare mudflats. The former structure of this area is still evident with old drainage channels (now mudflats) and old ditches with standing dead trees and hedges still present. There is some development of MSM along the inside of the berm. The northern section also contains some typical ASM vegetation developing on several low-lying fields. The western section is a very complex mosaic for newly developing saltmarsh communities, brackish Reedbeds and some relic terrestrial patches of wet grassland and improved grassland that is related to the topography in this area. This saltmarsh is still developing and some of the vegetation is typical of pioneer communities where other parts have more typical mid-high saltmarsh communities. Much of the vegetation is quite open and contains patches of bare mud. The saltmarsh structure is poorly developed and considerably modified due to the former reclamation and land-use in this area. A track marks a coarse

upper boundary of saltmarsh development with some saltmarsh development in low-lying fields landward of the track. Most of the saltmarsh within this area does not qualify as ASM or MSM as the structure has been significantly modified and the vegetation communities are still developing.

Table 3.1. Area of saltmarsh habitats mapped at Cromane.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	13.907
1410	Mediterranean salt meadows (Juncetalia maritimi)	29.315
non-Annex	*Spartina* swards	1.007
	Total	**44.229**

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

3.2 Atlantic salt meadows (H1330)

The ASM at this site is best developed at the tip of the Cromane Peninsula. There is a rather large area of typical mid marsh saltmarsh with a vegetation community dominated by Sea Plantain (*Plantago maritima*) and Sea Pink (*Armeria maritima*). Other species present includes Common Saltmarsh-grass (*Puccinellia martima*), Sea Arrowgrass (*Triglochin maritimum*), Lax-flowered Sea Lavender (*Limonium humile*) and Sea Aster (*Aster tripolium*). This area also contains frequent small shallow salt pans. There is some zonation to mid-upper marsh towards the shingle bank with increased cover of Saltmarsh Rush (*Juncus gerardii*) or Red Fescue (*Festuca rubra*) on low mounds. The mid upper zone also contains Common Scurvy-grass (*Cochlearia officinalis*) in addition to some of the species mentioned above. This area also contains some clumps of Common Cordgrass, generally in the salt pans are in the creeks or artificial drainage channels in this area. The former drainage of this area has left some of the saltmarsh vulnerable to colonisation by Common Cordgrass. This ASM has a generally low sward height and is grazed by sheep. There are some signs of grazing damage in places. Turf fucoids are present in the heavier grazed ASM where low-mid substrate is being exposed.

There is some development of ASM along the mainland shoreline. This ASM is mainly dominated by mid-upper marsh communities. The sward height is variable along this shoreline. There are occasional fields where there is no protective berm and ASM saltmarsh extends into these fields. Some of the fields are heavily overgrazed and the species assemblage is affected by the grazing with Common Saltmarsh-grass (*Puccinellia martima*) dominant in a zone where Red Fescue and Sea Plantain should be dominant. There are some examples of reverse zonation where ASM is found along the landward side of the MSM. This is mainly due to modifications caused by land reclamation and coastal protection. Some of the intact ASM towards the western side and along the back of the peninsula contains scattered clumps of Common Cordgrass, but most of the saltmarsh along this shoreline contains very little Common Cordgrass.

There is some natural unmodified transition of upper ASM along the upper boundary to a community dominated by Twitch and containing species like Sea Beet (*Beta maritima*) and Sea Mayweed (*Tripleurospermum maritimum*). This zonation is found along the sheltered side of the peninsula north of the breached section where there has been less disturbance.

There is generally very little development of low marsh communities at this site. This is because most of the seaward boundary is generally a saltmarsh cliff. However, there is some development of a sward dominated by Common Saltmarsh-grass along a moderate slope adjacent to the inside of the shingle bank at the tip of the peninsula. This community is also re-vegetating some of the shallower scrapes on the mudflats where material was removed to repair the berms. Common Cordgrass is also colonising these scrapes. Some pioneer and developing ASM vegetation is present in the area behind the berm. There are some almost pure swards of Common Saltmarsh-grass present in the area behind the berm and along the lane. Some of these swards are badly grazed.

3.3 Mediterranean salt meadows (H1410)

Much of the MSM at this site is notable for being perched on 'islands' of saltmarsh isolated from the mainland shore. These islands are generally quite high and most of the saltmarsh vegetation is in an upper saltmarsh zone. The MSM is dominated by Sea Rush (*Juncus maritimus*) and is quite rank in places with a low diversity. These islands have not been grazed for some time. Other species found within this Sea Rush sward include Red Fescue, Creeping Bent-grass (*Agrostis stolonifera*), Spear-leaved Orache (*Atriplex prostrata*), Common Scurvy-grass (*Cochlearia officinalis*), Sea Aster (*Aster tripolium*) and Sea Plantain. Some sections are dominated by Red Fescue and Sea Rush is less abundant. Much of the MSM also contains some Common Reed and there are also transitions to stands of pure Common Reed. These islands have retained a well-developed saltmarsh topography in places and there are frequent small salt pans and some mounds present. This influences the internal zonation of these areas with the distribution of some species obviously affected by the topography.

The MSM along the rest of the mainland has a similar species assemblage and structure with some sections containing abundant Red Fescue. There is some development of a mid-upper marsh zone in places with increased cover of Sea Plantain and less cover of Red Fescue. Some of the MSM is also grazed and these sections also contain patches of typical ASM vegetation with Sea Plantain, Sea Pink and Red Fescue. Some of the grassy ASM patches within the MSM are quite large. There is also some patches of lower marsh vegetation around some of the creeks with Sea Pink and Common Saltmarsh-grass prominent. Some of these patches are badly poached by cattle. The creek structure in much of this saltmarsh has been modified by the old drainage channels that dissect the saltmarsh. However salt pans are still present.

The MSM at the tip of the peninsula is dominated by upper marsh MSM with Sea Rush and Red Fescue prominent. This community also contains Creeping Bent-grass, Spear-leaved Orache and Common Scurvy-grass. There is some zonation along the seaward edges with the development of Sea Rush and a Sea Plantain-dominated sward. This community also contains Sea Pink and contains some sections with patches of Common Cordgrass within the artificial drainage channels and within the salt pans within this habitat. However the cover is less than 1%. The structure of this MSM has been significantly modified by drainage and cultivation in the past. The old drains are infilling and forming linear pan features. There are sections where the old drains have infilled and are vegetated with a mid marsh Sea Plantain-Sea Pink sward.

There are several small areas of MSM/ASM mosaic on the site. There are areas where there is typical mid or mid-upper ASM sward that also contains scattered clumps and large patches

dominated by Sea Rush at various densities. The MSM community in these mosaic areas is dominated by Sea Rush and Sea Plantain.

MSM found adjacent to the berm at the neck of the Cromane Peninsula is immature with a sward dominated by clumps of Sea Rush on mud also containing patches of bare mud that have not been colonised. Other species present include Common Saltmarsh-grass and Sea Aster.

3.4 *Spartina* swards

Spartina swards are not well-developed at this site. There are fragmented patches of *Spartina* swards developing on the intertidal mudflats along the berm and within the channels between these fragmented saltmarsh islands. These patches of sward have developed where large clumps have coalesced. The pattern of these large clumps is still visible. One notable feature is that there has been no significant recruitment recently of new clumps in this area and there are very few small clumps present. There is no significant development of transitional zones between the established saltmarsh and the *Spartina* sward at the eastern end of the site because of the significant height difference.

There are some new small clumps of Common Cordgrass developing on the newly formed intertidal area behind the breached berm at the neck of the Cromane Peninsula but overall it is rare (< 1%). Common Cordgrass has the capacity to spread in this area and create more significant patches of *Spartina* swards, probably in mosaic with other habitats.

4 IMPACTS AND ACTIVITIES

The saltmarsh at this site is affected by a range of impacts and activities (Table 4.1). These impacts and activities reflect the fact that the saltmarsh and shoreline is much more accessible compared to other sites in Castlemaine Harbour. Erosion and activities to protect adjacent land (coastal protection) are some of the main activities affecting the saltmarsh at this site.

Grazing is not a widespread activity at this site (140). Much of the saltmarsh, particularly on the isolated islands of saltmarsh, is not grazed anymore, although they were grazed historically. Some of the islands also used to have the Rushes and Reeds cut for bedding and thatch in the past. A local landowner states that the extent of Common Reed seems to be increasing on these islands due to the lack of grazing and other disturbance (149). Saltmarsh at the tip of the peninsula is grazed by sheep. Cattle graze some sections along the mainland shore. Some of the saltmarsh is located in fields behind field boundaries and berms on the shoreline and some of this saltmarsh is grazed to various degrees. Some of the saltmarsh is badly damaged by localised overgrazing in some of these fields (143).

Erosion (900) is one of the main impacts affecting this site. Indicators of erosion can be seen all along the saltmarsh and the berms along the mainland shoreline including a large area of developing saltmarsh and brackish marsh in an area behind a breached berm. The saltmarsh within the partly enclosed shingle banks at the tip of the peninsula is not significantly eroded. The saltmarsh along the seaward boundary is fragmenting in places and also contains a high saltmarsh cliff 0.5-1 m high in places. Slumping and eroded mud platforms along the seaward boundary are quite frequent and isolated eroded peat hags are also present. Eroded runnels extend into the saltmarsh. A comparison of the OSI 2nd edition six inch map

to the current 2005 aerial photo series shows that there has been some measurable loss of saltmarsh habitat during this period. This represents a loss of 5-10 m of saltmarsh in places and some small islands of saltmarsh along the shoreline have been completely eroded away. However, the shape of some of these islands has also remained intact during this period so erosion has not been very significant. The loss of saltmarsh is likely to be < 0.5 ha in the past 100 years, mainly MSM. However, there has been no measurable erosion during the current monitoring period. Erosion is assessed as having a negative impact on the saltmarsh at this site. There are poor prospects for retreat of saltmarsh at this site (apart from in the area behind the embankment) so the impact of erosion is assessed as having an irreparable influence.

There has been some infilling at the tip of the spit (803). This is mainly related to maintaining the access road to the mussel fishery, which is located on a narrow shingle bank that is vulnerable to erosion. Infilling (803) and dumping of construction waste has occurred along both sides of the shingle bank and on the saltmarsh to reinforce this access road. There is also likely to be a waste disposal element to this dumping of material (422). This destroyed a relatively minor area of saltmarsh at the tip of the spit. Dumping of all sorts of material is a common feature around the site, especially along the shoreline and berms vulnerable to erosion. This material is mainly construction and demolition waste but also includes industrial waste such as car batteries. This material is being used as coastal protection to reinforce these berms in places. There was frequent dumping of material along the access track at the neck of the peninsula. This has not destroyed a significant area of saltmarsh but is a negative impact. Some of the developing saltmarsh in the area behind the berms contains frequent waste material.

Established saltmarsh has also been used to supply material for berm repairs. This activity has left channels and pits with bare mud within the saltmarsh at the western end near the neck of the spit (870). The berms at the eastern side of the survey site are maintained by OPW whereas privative land-owners are attempting to repair the berms at the western end where there have been breaches. Erosion is also uncovering some of the old material used to build the berms such as old car wrecks. Some saltmarsh developing behind berms at the tip of the spit is likely to be destroyed in the future when the berms are repaired and the tidal influence is excluded again.

A small area of mudflats at the eastern side of the site has also been poldered (801) and infilled and used for housing development in the past 5 years. However, this infilling has not destroyed any saltmarsh.

The shoreline along the survey site has been significantly modified in the past due to historical reclamation. Some of the saltmarsh at the tip has been used for cultivation and was drained and old lazy beds are still evident in the topography of this area. Tall berms were built to protect low-lying land at the tip of the spit, the neck of the spit and at the eastern end of the survey site at Tullig. Smaller embankments are also found along the remaining sections of shoreline, sometimes on the seaward side of the saltmarsh. Some of these berms were built in the 19th century and have been subsequently been strengthened and extended during the 20th century. These berms have mainly been built along the upper saltmarsh boundary. However, saltmarsh was enclosed by the construction of these berms at the eastern and western ends of the site on the mainland (801).

The largest section of former reclamation was enclosed at the neck of the peninsula and this is the area where the berm has been breached and saltmarsh is now re-developing. This

berm was repaired in 2002 but was breached again soon after. There are several breaches now present. Improved grassland that was reseeded after the berm was repaired has now partially reverted to intertidal communities. This area contains a mosaic of habitats and one notable feature is the presence of standing dead trees and hedgerows along some of the field boundaries in this area. This is an example of unmanaged retreat of saltmarsh.

Common Cordgrass is present at this site and this is an invasive species of saltmarsh and mudflats (954). This is an invasive species (954) and is widely distributed in Castlemaine Harbour. This is its most southerly limit along the western Irish shoreline and it is only found again in Clonakilty Bay, Co. Cork. It is not known when it was planted in Castlemaine Harbour although it is known from this area since the 1960's (Nairn 1986). The first ASI report (Goodwillie 1972) noted that Common Cordgrass was not found at Cromane at that time (probably the saltmarsh at the spit). It is now found at the tip of the spit and is scattered along the shoreline, forming some patches of *Spartina* sward in the intertidal channels situated amongst the various saltmarsh islands to the east of the survey site.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	C	0	10.0	Inside
1330	143	B	-1	2.0	Inside
1330	422	B	-1	1.0	Inside
1330	803	A	-2	0.05	Inside
1330	870	A	-2	0.3	Inside
1330	900	B	-2	2.0	Inside
1330	954	C	0	2.0	Inside
1410	140	C	0	4.0	Inside
1410	149	C	0	7.5	Inside
1410	422	B	-1	2.0	Inside
1410	870	A	-2	0.3	Inside
1410	900	B	-2	3.0	Inside

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

Common Cordgrass has not significantly colonised the established saltmarsh and its overall cover on the saltmarsh is quite low (< 1%). The impact of its presence is assessed as neutral. Its current extent is quite low compared to Inch and is also still quite low compared to the extent of the established saltmarsh. Most of the clumps on the mudflats are quite large and there is little active recruitment of new small clumps like that seen at Inch. The established saltmarsh is not vulnerable to the invasion of Common Cordgrass as most of the habitat is perched at a relatively high level on the shoreline in upper marsh zones. The newly formed intertidal area behind the berm is vulnerable to invasion by this species.

The main Impacts and activities around the site are related to farming (102, 120. 140) and shellfish harvesting (210) and aquaculture (200). There is also scattered habitation around the site (403) and several tracks (501) that are used to access the shoreline and facilitate dumping. Some houses are on low-lying land behind berms adjacent to saltmarsh and land-owners are taking measures to repair and reinforce these berms with impacts already listed. These impacts and activities are having 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 was no detailed information available for this site.

Cromane saltmarsh is moderate-large site with several feature of conservation interest. These include the unusual structure of some of the saltmarsh isolated on 'islands' along the mainland shoreline. The overall conservation status of this site is *unfavourable-bad*. This is mainly due to negatively impacting activities to the saltmarsh that are related to coastal protection. There is a significant erosional trend acting on the saltmarsh and shoreline of this site and this means that the saltmarsh will continue to be vulnerable both by erosion and from damage caused by coastal protection to protection farmland and dwellings built on low-lying land behind berms. There have also been significant modifications to the saltmarsh structure in the past, related to land relation and coastal protection. Common Cordgrass is present at this site and while it is not extensive, it has the potential to increase its cover significantly on the mudflats along this saltmarsh. The breach of a berm at the neck of the peninsula has lead to new saltmarsh developing in a formerly reclaimed area. This is a positive feature but this habitat development is vulnerable to repairs to the berm to exclude the tide in the future.

This site is located within Castlemaine Harbour SAC. An old format NPWS management plan is available for this SAC but is now out of date.

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

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

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

The extent of this habitat is assessed as *unfavourable-inadequate*. There have been some minor losses of habitat due to infilling at the tip of the peninsula. Some saltmarsh has also been destroyed by the use of material from the saltmarsh to repair some of the berms. These losses are about 2-3% of the total ASM saltmarsh at this site.

There are indications of a natural erosional trend at this site. However, there has been no significant loss of saltmarsh at this site due to erosion during the current monitoring period. The breach of berm at the neck of the peninsula has meant that some new ASM is now developing in previously reclaimed land. This is a positive feature.

5.2.2 Habitat structure and functions

The structure and functions of this habitat area assessed as *unfavourable-inadequate*. Twelve monitoring stops were carried out in this habitat and four stops failed (25%). Most of the attributes required for favourable conservation status reached their targets. A significant part of the ASM saltmarsh is being damaged by a range of impacts and activities, including overgrazing, erosion and dumping of material used for coastal protection. Overgrazing on its own only affects a small area. Common Cordgrass is present at this site but is not a significant feature of the ASM vegetation. The impact of its spread on species composition is assessed as neutral.

There is a range of typical ASM saltmarsh communities at this site. Some small patches of habitat are relatively undisturbed and contain typical examples of zonation and also saltmarsh topography with natural creeks and pans. However, the saltmarsh structure has been largely modified by a range of activities in the past including drainage and cultivation at the tip of the peninsula and land reclamation and coastal protection along the mainland shore. These latter activities have modified much of the upper saltmarsh boundary and there are few intact examples of transition from upper ASM communities to brackish habitat or other vegetation left.

The structure and function of the ASM developing behind the berm is poor. Much of this saltmarsh is poorly developed as it is so young and there are a range of pioneer communities present.

5.2.3 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 such as grazing continue in the near future. The ASM is likely to continue to be damaged by a range of activities related to coastal protection such as dumping of material along the shoreline and infilling. Other activities such as the use of saltmarsh material to repair berms destroys habitat and leaves the remaining disturbed habitat vulnerable to the spread of Common Cordgrass.

There is also an erosional trend at this site that in the long-term threatens the extent of ASM saltmarsh as there is little opportunity for the retreat of saltmarsh. The extent of ASM may be lowered in the future if some berms are repaired and the tidal influence to developing saltmarsh behind berms is excluded. Alternatively if these berms are not repaired then there is an opportunity for development of new ASM saltmarsh.

5.3 Mediterranean salt meadows (H1410)

5.3.1 Extent

The extent of this habitat is assessed as *favourable*. There has been no significant loss of habitat due to land use changes, development or erosion within the current monitoring period. Some saltmarsh has also been destroyed by the use of material from the saltmarsh to repair some of the berms. These losses are about 1% of the total MSM saltmarsh at this site.

There are indications of a natural erosional trend at this site. There has been some measurable loss of MSM saltmarsh from erosion in the past 100 years. However, there has been no significant loss of saltmarsh at this site due to erosion during the current monitoring period. The breach of berm at the neck of the peninsula has meant that some new MSM is now developing in previously reclaimed land. This is a positive feature.

5.3.2 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 they all passed. All the attributes required for favourable conservation status reached their targets. The structure and functions of the MSM are in generally good condition. There are some negative indicators but fewer than in the ASM. Some sections of the MSM are locally damaged by poaching and overgrazing but these are relatively minor. Some of the MSM is also affected by activities related to coastal protection such as dumping on the habitat and the use of saltmarsh material to repair the berms.

The species assemblage of the MSM is typical of this vegetation type. A significant portion of the MSM is isolated on islands from damaging activities. There is some zonation of the MSM into different communities. There is some transition from MSM to other saltmarsh vegetation dominated by Common Reed on the isolated islands. This MSM is quite rank and may be suffering from a lack of grazing with Common Reed spreading in the MSM. However, this is considered to be relatively minor and is not assessed as a significantly negative impact. Some of the MSM has retained its natural topological features and saltmarsh structure but a large part of the saltmarsh structure has been modified in the past, mainly related to drainage and coastal protection. There are few intact examples of transition from upper MSM communities to brackish habitat or other vegetation left along the mainland.

The structure and function of the MSM developing behind the berm is poor. Much of this saltmarsh is poorly developed as it is so young and there are a range of pioneer communities present.

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. Some of the MSM is likely to continue to be damaged by a range of activities related to coastal protection such as dumping of material along the shoreline and infilling. Other activities such as the use of saltmarsh material to repair berms destroys habitat and leaves the remaining disturbed habitat vulnerable to the spread of Common Cordgrass. However a significant portion of the MSM is isolated on islands from any significantly damaging activities. The relative height of these islands protects them from colonisation by Common Cordgrass.

There is also an erosional trend at this site that in the long-term threatens the extent of MSM saltmarsh as there is little opportunity for the retreat of saltmarsh. The extent of MSM may be lowered in the future if some berms are repaired and the tidal influence to developing saltmarsh behind berms is excluded. Alternatively if these berms are not repaired then there is an opportunity for development of new MSM saltmarsh.

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.

Goodwillie, R. (1972). A Preliminary Report on Areas of Scientific Interest in County Kerry. Dublin, An Foras Forbartha.

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)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats						
2	Spartina swards	0.75					0.75
3	1330 Atlantic salt meadow	11.103		11.103			
4	1410 Mediterranean salt meadow	27.92			27.92		
5	ASM/MSM mosaic (50/50)	2.64		1.32	1.32		
6	ASM/*Spartina* mosaic	0.513		0.256			0.257
7	1330/other SM (CM2) mosaic	2.391		1.196			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	4.113					
10	*Spartina* clump/mudflat mosaic (50/50)						
11	Isolated *Spartina* clumps on mud (5%)	0.004					0.000
12	pioneer 1330/1310/*Spartina* mosaic						
13	1410/other SM (CM2) mosaic	0.15			0.075		
14	*Spartina* sward dominated, with some ASM						
15	1310/*Spartina* mosaic						
16	ASM dominated with some Spartina	0.021		0.021			
17	1330/sand dune mosaic						
18	Other SM (CM2)	9.872					
19	1330/rocky shore mosaic	0.021		0.011			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**59.498**		**13.907**	**29.315**		**1.007**

Legend

- SAC Boundary
- Spartina swards
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- 1330/1410 mosaic
- Atlantic/Spartina mosaic
- 1330/other SM (CM2) mosaic
- 1330 dom, some Spartina
- 1330/rocky shore mosaic
- 1410/other SM (CM2) mosaic
- Isolated Spartina clumps
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stops
- 1410 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

Cromane (Map 1 of 3)

Castlemaine Harbour SAC (000343)

SMP code: SMP0073

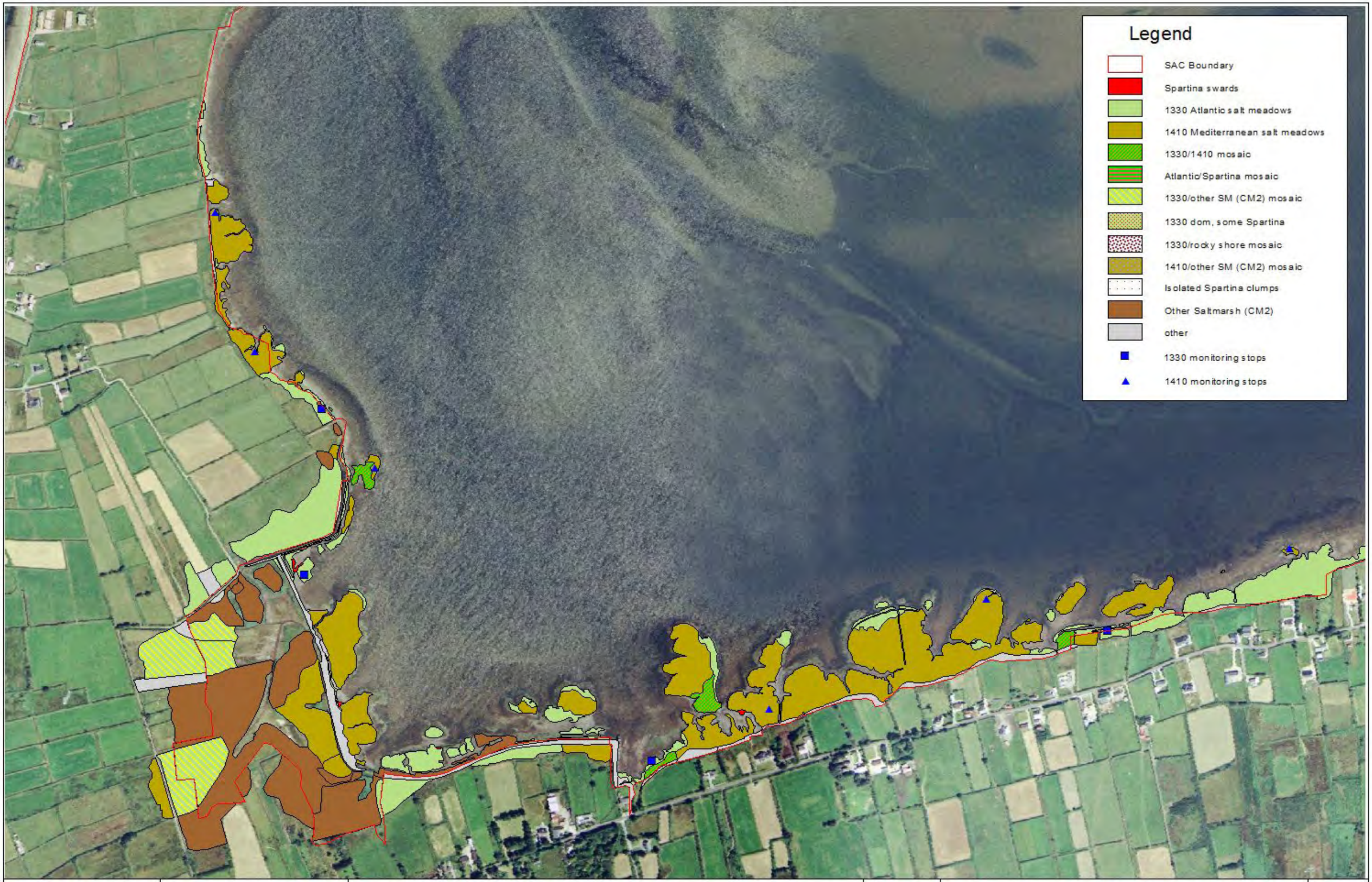
This habitat map was created with a compilation of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953)

0 80 160 240 320 400 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:6000

N



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

Saltmarsh Monitoring Project 2007-2008

Cromane (Map 2 of 3)

Castlemaine Harbour SAC (000343)

SMP code: SMP0073

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

0 80 160 240 320 400 Meters

N

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:6000

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

Saltmarsh Monitoring Project 2007-2008

Cromane (Map 3 of 3)

Castlemaine Harbour SAC (000343)

SMP code: SMP0073

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

0 80 160 240 320 400 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:6000

N

Dereen House

1 SITE DETAILS

SMP site name: **Dereen House**		SMP site code: **SMP0068**	
Date of site visit **19/20/06/2008**		CMP site code: **N/A**	
SM inventory site name: **Dereen House**		SM inventory site code: **175**	
NPWS Site Name: **Kenmare River**			
NPWS designation	cSAC: **2158**	MPSU Plan: **N/A**	
	pNHA: **N/A**	SPA: **N/A**	
County: **Kerry**		Discovery Map: **84**	Grid Ref: **076968, 057663**
Aerial photos (2000 series): **O 6524-C; O 6559-A**		6 inch Map No: **Ke 108**	

Annex I habitats currently listed as qualifying interests for Kenmare River cSAC:

H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

H1410 Mediterranean salt meadows (Juncetalia maritimi)

Other SMP sites within this SAC/NHA: **Dinish, Tahillia, Dereen House**

Saltmarsh type: **Fringe** Substrate type: **Phragmites**: **Peat**

2 SITE DESCRIPTION

Dereen House saltmarsh is located in south-west Co. Kerry on the Beara Peninsula and along the southern shore of Kenmare River. This site is located about 19 km south-west of Kenmare Town. The survey site is located at the head of a small bay called Kilmakilloge Harbour. The Croanshagh River flows into the head of the bay. The head of Kilmakilloge Harbour has an irregular and inundated shoreline with several small islands and knolls. One of these knolls cuts off most of the head of the bay creating a somewhat circular almost enclosed intertidal area with a small narrow tidal connection to the rest of the bay. The R571 regional road between Kenmare and Castletownbere passes through the village of Lauragh and crosses the head of the bay. A road bridge (Cappaul Bridge) links the two sides of the bay. The majority of the saltmarsh habitat is located around the shoreline of this area cut off from the rest of the harbour.

Dereen House is a large ornamental garden and estate woodland found on the shoreline of this harbour near the village of Lauragh. The Dereen House gardens are located to the north of this bridge. The survey site also includes the shoreline between Cappaul Bridge and Derreen House gardens. There is scattered habitation in the area around the village of Lauragh and along the minor roads around the site.

The landscape of this area is dominated by upland habitats with hills and mountains the main landscape feature along the peninsula. The main habitats include wet heath, wet grassland and some blanket bog found in the higher areas. There is some development of woodland on the lower slopes close to the shoreline around the harbour. The main part of the site is quite isolated and difficult to access. The main section of this site is notable for the presence of semi-natural habitats around the saltmarsh that form a buffer zone. There is a natural

transition from intertidal saltmarsh to wet grassland and blanket bog and then to developing semi-natural woodland along a landward gradient. Much of this land around the enclosed bay is not farmed intensively anymore and is generally unmanaged although it may be grazed in places. There are frequent signs of previous land-use in this area with old face-backs where peat was cut and drainage channels around the site. However, woodland and scrub is spreading into the adjacent terrestrial land around the southern side of the bay.

The site is located within the Kenmare River cSAC (0002158). This cSAC covers most of the marine parts of Kenmare River and it contains a diverse range of marine habitats. Some sections of coast have also been included such as the Sand dune and saltmarsh complex at Derrynane. Two Annex I saltmarsh habitats are found at this site, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Both these habitats are listed as qualifying interests for this cSAC. Three other saltmarshes sites listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and located within this cSAC were surveyed during this project. These include Dinish located further north-east of Dinish along the southern side, and Tahillia and West Cove located along the northern side of Kenmare River. Two other saltmarsh sites listed on the SM inventory along the northern side of Kenmare River, Sneen and Derrynane, were not surveyed during the SMP. Dereen House saltmarsh is the largest saltmarsh site surveyed in Kenmare River. There is additional minor saltmarsh development in many of the small indentations along the shoreline.

Most of the saltmarsh habitat found at this site is positioned inside the digital cSAC boundary. This is mainly because the lower shoreline boundary on the OSI 6 inch map was used as the cSAC boundary along this part of the shoreline and most of the saltmarsh habitat is positioned above this boundary.

This site was accessed by crossing adjacent land at various access points including Croanshagh Bridge and Capaul Bridge.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh at this site is dominated by Mediterranean salt meadows (MSM) (Table 3.1). This is a typical ‘fringe’ type site and the main saltmarsh has developed in a small basin on thick blanket peat with some relic blanket bog vegetation adjacent to the saltmarsh. The natural topography of the basin with gentle inclines around the shoreline has allowed the development of a relatively wide band of saltmarsh habitat between 50-100 m wide.

One notable aspect of this site is that the main part of the saltmarsh surrounds a small partially enclosed bay that is linked to the outer bay by a small waterfall or narrow tidal race. This means that the main saltmarsh has developed in the upper part of the tidal range and is only covered by the higher spring tides. Therefore, typical upper saltmarsh communities predominate around the enclosed section and there is no development of typical mid marsh or lower marsh vegetation. There is also a significant area of other or non-Annex I vegetation types dominated by stands of Common Reed (*Phragmites australis*) around the enclosed bay. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. There are also frequent transitional indicators within the saltmarsh vegetation such as some more typical wet

grassland and blanket bog species. This gives an indication of the freshwater influence on this marsh.

The main enclosed intertidal area empties at low tide to expose intertidal mud. There are tall peat saltmarsh cliffs along the lower saltmarsh boundary. The lower boundary is fringed by typical MSM vegetation. However within the saltmarsh the surface topography is irregular in places and there are sections where low mounds are vegetated by a mixture of Sea Rush (*Juncus maritimus*) and Common Reed.

Some of these mounds are also vegetated with a transitional vegetation type, which is characterised by a mixture of Sea Rush with other species such as Purple Moor-grass (*Molinia caerulea*) and Black Bog-rush (*Schoenus nigricans*). The natural topography of the basin with gradual inclines means that there is substantial development of transitional vegetation. This transitional vegetation type is also frequently seen at the landward boundary of much of the saltmarsh. There are subtle changes from MSM vegetation to adjacent wet grassland or blanket bog vegetation. The dominance of the two latter species was used to map the upper saltmarsh boundary.

The south-western section shows signs of peat cutting and there is a complex network of face-banks, channels and peat ridges. This area was difficult to map accurately with the upper saltmarsh boundary difficult to distinguish at times. The ridges contain typical bog vegetation and scrub such as Gorse (*Ulex europaeus*) whereas the channels contain Sea Rush dominated vegetation that extends into the blanket bog. Small mounds or relic peat hags from the cutting are found towards the lower boundary may contain isolated Gorse bushes surrounded by Sea Rush. There are natural vegetation successions in places along a landward gradient from MSM to transitional brackish wet grassland to wet grassland then to scrub and then to developing mature wet woodland dominated by Alder (*Alnus glutinosa*).

The outer part of the survey site contains less developed saltmarsh habitat that generally forms a narrow strip along the shoreline. The shoreline is generally more steeply sloped and the saltmarsh habitat is only a few metres wide. This saltmarsh is more fragmented and patchy in places and much of the shoreline is marked by exposed bedrock in places. The saltmarsh has developed on a layer of much thinner mud/peat substrate. This section contains some patches of ASM/MSM mosaic in places. There is also some typical saltmarsh zonation with ASM in the lower zone and MSM developing along the upper zone. There is some zonation from typical ASM or MSM to stands of Sea Club-rush (*Bolboschoenus maritimus*) in this section. There is also some zonation from saltmarsh to non Annex I saltmarsh vegetation dominated by Twitch (*Elytrigia repens*) and containing Spear-leaved Orache (*Atriplex prostrata*).

Table 3.1. Area of saltmarsh habitats mapped at Dereen House.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.748
1410	Mediterranean salt meadows (Juncetalia maritimi)	9.021
	Total	**9.769**

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

3.2 Atlantic salt meadows (H1330)

Some small narrow patches of ASM vegetation have developed in the north-east corner of the main area. The ASM has developed on thinner substrate that overlays the rocky material along the shoreline. The ASM contains some narrow zones with a typical mid marsh and upper marsh zone developing in places. The mid marsh vegetation is dominated by Sea Plantain (*Plantago maritima*) and Red Fescue (*Festuca rubra*) in this section. There is also a community dominated by Saltmarsh Rush (*Juncus gerardii*) and containing frequent Buck's-horn Plantain (*Plantago coronopus*). Other species present include Creeping Bent (*Agrostis stolonifera*), Sea Pink (*Armeria maritima*), Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*), Autumn Hawkbit (*Leontodon autumnalis*), Sea Arrowgrass (*Triglochin maritimum*), Long-bracted Sedge (*Carex extensa*) and Sea Plantain. The surface topography of this habitat is quite variable and there are frequent small mounds and hollows present that influence the vegetation and introduce zonation of ASM species into the habitat. The ASM also contains small amounts of Sea Rush and tussocks of this species are occasionally scattered through the ASM. The saltmarsh topography is poorly developed in this habitat and there are few typical salt pans present.

There are small patches of typical mid marsh Sea Pink-Sea Plantain sward in the narrow fringe of saltmarsh found around the outer bay. Turf fucoids were recorded in this habitat.

3.3 Mediterranean salt meadows (H1410)

The majority of the MSM habitat is characterised by a dense sward with a very high cover of Sea Rush. The MSM contains variable cover of Red Fescue and Saltmarsh Rush, both of which may be quite frequent. This vegetation type generally contains small amounts of Sea Pink, Creeping Bent, Sea Plantain, Sea Arrowgrass and Sea Milkwort. It also occasionally or rarely contains species such as Sea Aster, Common Scurvygrass (*Cochlearia officinalis*), Sea Club-rush, Distant Sedge (*Carex distans*), Long-bracted Sedge and Brookweed (*Samolus valerandi*). Small amounts of peat or bare mud is occasionally exposed at ground level under the tall sward of Sea Rush.

One notable feature of the MSM vegetation is that Common Reed is widespread in this habitat but generally at low cover values. There are also frequent patches dominated by Common Reed and mapped as other saltmarsh vegetation (CM2). There are frequently gradual transitions from the sparse Common Reed cover in vegetation dominated by Sea Rush to patches dominated by Common Reed. Turf fucoids are present on exposed peat along the lower saltmarsh boundary.

Zonation within the MSM is most typically seen where the surface topography is variable and the vegetation changes from channels to mounds. The vegetation is quite heterogeneous in places due to the underlying topography. This site is also notable for the presence of a significant amount of Sea Rush-dominated vegetation with frequent brackish or transitional indicators such as Purple Moor-grass and Black-Bog-rush. These species are frequently found within Sea Rush-dominated vegetation on some of the mounds and along the upper transitional zone that are inundated by fewer spring tides. There is some typical saltmarsh zonation in places where typical MSM vegetation found at the lower saltmarsh boundary transitions to a mixed community with Purple Moor-grass and other species along a landward gradient. There are small patches of Spike-Rush (*Eleocharis* sp.) dominated vegetation within the MSM in places along the upper boundary.

The MSM habitat contains some deep artificial drainage channels. There are also natural drainage channels present in places. Typical salt pans are quite rare. The sward height is generally quite high as the overall level of grazing is low.

There is a band of heterogeneous marginal brackish vegetation near Croanshagh Bridge with species such as Grey Club-rush (*Schoenoplectus lacustris* spp. *tabernaemontani*), Autumn Hawkbit, Sea Pink, Spike Rush, White Clover (*Trifolium repens*), Common Reed, Sea Rush, Brookweed, Black Bog-rush, Sea Arrow-grass and Purple Moor-grass. This zone also contains tussocks with species such as Gorse and Birdsfoot present. This zone is patchy and fragmented in places and contains exposed rock in places. This species assemblage reflects the greater freshwater influence on the marginal vegetation along the river channel at this point.

The outer part of the bay also contains some MSM vegetation that is typically dominated by Sea Rush with frequent cover of Saltmarsh Rush and Red Fescue. Other transitional MSM vegetation is present near the shoreline of Dereen Gardens where saltmarsh has developed in a sheltered area behind a small shingle spit. This vegetation is dominated by Sea Rush but also contains species such as Birdsfoot (*Lotus corniculatus*), Sea Arrowgrass, Bindweed, Curled Dock (*Rumex crispus*), Silverweed (*Potentilla anserina*), Yorkshire Fog (*Holcus lanatus*) and Purple Moorgrass in the upper zone.

4 IMPACTS AND ACTIVITIES

There are few impacts and activities affecting this site. The main impact affecting the site is cattle grazing (140). However most of the saltmarsh is not grazed and the majority of the habitat that is grazed, is only grazed with a light intensity. The site is also grazed by deer and there are frequent deer tracks (501) though the saltmarsh in places. There are few other activities directly affecting the saltmarsh habitat as it is quite isolated.

There are frequent signs of old land-use around the site with drainage channels cut through the adjacent wet grassland and blanket bog into the bay. There are also signs that peat from the blanket bog has been cut in the past and there are old face-banks present. Some of the adjacent grassland may have been more improved in the past but has now been left unmanaged and has become semi-natural. These impacts are not assessed as they occurred outside the current monitoring period. However, they have had a significant residual impact on the structure and topography of the habitat.

There are few signs of natural erosion (900) at this site. There are tall saltmarsh cliffs with exposed peat marking much of the lower saltmarsh boundary in the main section. However, a comparison of the 1995, 2000 and 2005 OSI aerial photos series indicates shows that there has been no measurable loss of habitat during the monitoring period. A comparison of the OSI 2nd edition 6 inch map to the OSI 2005 series aerial photos also shows that there have been no significant changes to the shoreline during this period. There is some cliff toppling in the north-west corner but this is probably related to erosion along the river channel. This intertidal area is likely to be quite sheltered at the head of the bay and not prone to erosion. The impact of erosion is assessed as neutral.

The main impacts and activities around the site are related to farming such as grazing (140), although farming is not intensive in this area. Other impacts include dispersed habitation

(403) and minor roads (502). These activities have little or no measurable impact on the saltmarsh habitats.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	C	0	0.300	Inside
1410	140	C	0	2.000	Inside
1410	143	C	-1	0.050	Inside
1410	501	C	0	0.050	Inside
1410	900	C	0	0.050	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

Dereen saltmarsh is a moderately sized site. Its size is one feature of particular conservation interest and it is the largest saltmarsh surveyed in Kenmare River. The position of the site in a small basin at the head of a bay and positioned at an elevation near the upper limit of saltmarsh development means that the vegetation contains many transitional features and the site is a mosaic of typical MSM and stands of Common Reed and other transitional vegetation. The overall conservation status of the site is *favourable*. The saltmarsh is in relatively good condition. A small area was badly poached but this only affects a very minor area compared to the rest of the site. Most of the site is not grazed. Few other impacts affect the site due to its relative isolation and the fact that it is surrounded by scrub and woodland. The relatively natural succession along a landward gradient from saltmarsh to wet woodland is also a notable feature.

This site is located within Kenmare River cSAC. A NPWS Conservation management plan is not available for this cSAC.

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

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

5.2 Atlantic salt meadows (H1330)

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

5.2.1 Habitat structure and functions

The structure and functions of this habitat were assessed as *favourable*. Two monitoring stops were carried out in this habitat and they all passed. All the attributes required for favourable conservation status reached their targets. The ASM only covers a small area and is generally poorly developed.

Several typical ASM communities are present and the diversity is typical of this habitat. Some zonation was noted between different ASM communities at one location. There are some natural successional communities to other saltmarsh vegetation present but these are generally poorly developed due to the relatively steep shoreline topography where the ASM is generally found. The saltmarsh topography is relatively poorly developed but this is typical of these relatively small fragments of ASM. Turf fucoids were recorded in this habitat but these are fairly typical of heavily grazed fringe type saltmarshes along the west coast of Ireland.

5.2.2 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 grazing continue in the near future. The habitat is not affected by any significantly damaging impacts or activities at present.

5.3 Mediterranean salt meadows (H1410)

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

5.3.1 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Fourteen monitoring stops were carried out in this habitat and one stop failed. Most the attributes required for favourable conservation status reached their targets. The structure and functions of the MSM are in generally good condition. One stop failed due to excessively heavy poaching at one location. However, the overall grazing level is low and much of the site is not grazed at all. There are no other significant negative indicators within this habitat.

The species assemblage of the MSM is typical of this vegetation type. There is typical zonation of the MSM into different communities with the appearance of Common Reed and transitional species such as Purple Moorgrass the most obvious indicator of zonation within this habitat. There is some development of a transitional brackish zone along the upper boundary of the saltmarsh in places with a mixture of Purple Moor-grass and Sea Rush. There are natural drainage channels present within the MSM but the topography and structure of the habitat has been modified in the past by drainage, peat cutting and previous reclamation.

5.3.2 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 grazing continue in the near future. The habitat is not affected by any significantly damaging impacts or activities at present. Some of the saltmarsh habitat is located outside the cSAC.

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for this site.

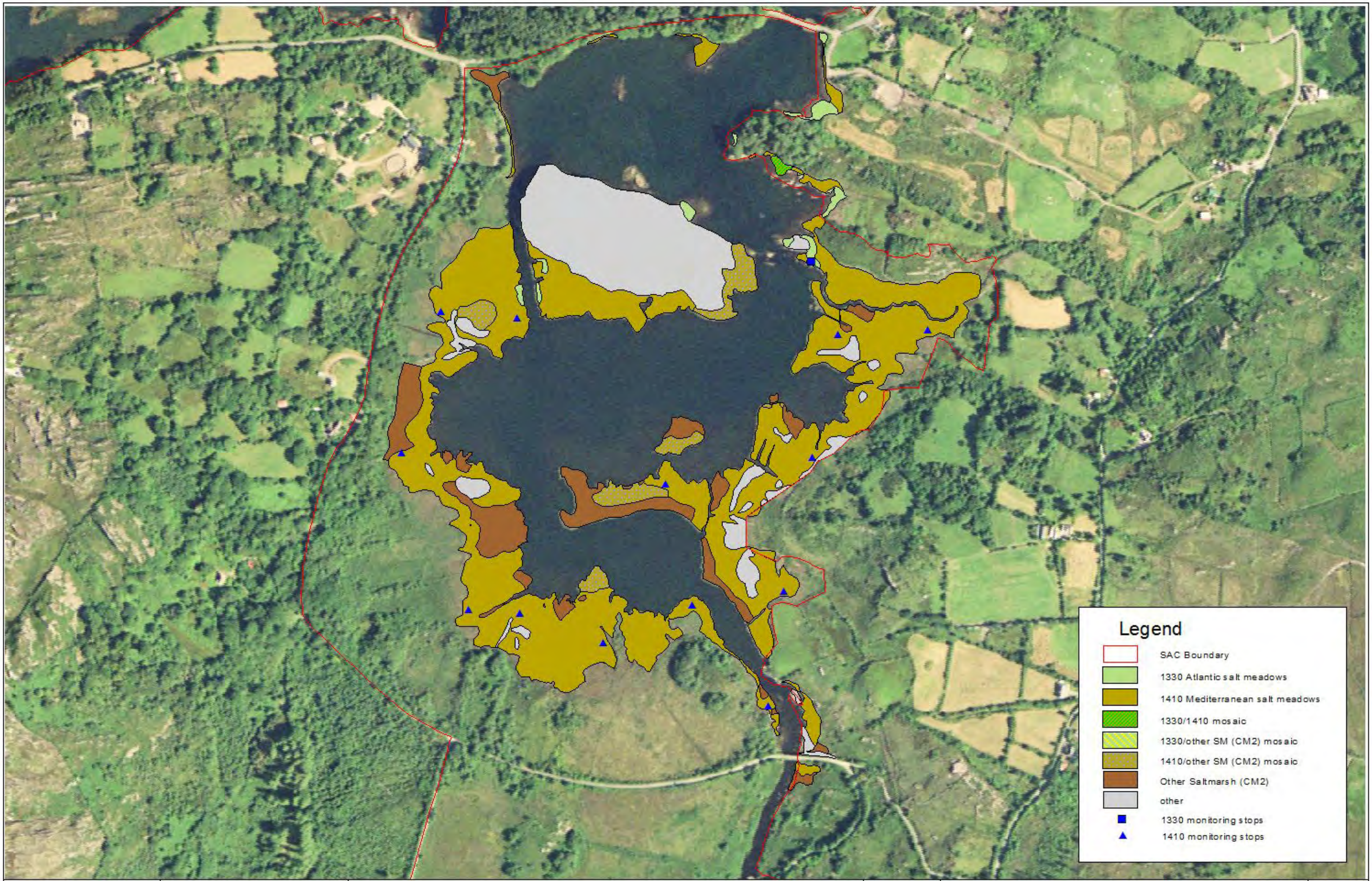
7 REFERENCES

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.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	0.719		0.719			
4	1410 Mediterranean salt meadow	8.676			8.676		
5	ASM/MSM mosaic (50/50)	0.056		0.028	0.028		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic	0.002		0.001			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	3.199					
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	0.633			0.317		
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)	1.666					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**14.951**		**0.748**	**9.021**		



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

Saltmarsh Monitoring Project 2007-2008

Dereen House (Map 1 of 2)

Kenmare River SAC (002158)

SMP code: SMP0068

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

0 60 120 180 240 300 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:4000

N

Legend

- 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

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

Saltmarsh Monitoring Project 2007-2008

Dereen House (Map 2 of 2)

SMP code: SMP0068

0 60 120 180 240 300 Meters

N

Kenmare River SAC (002158)

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

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:4000

Dinish

1 SITE DETAILS

SMP site name: **Dinish**	SMP site code: **SMP0069**
Date of site visit **19/06/2008**	CMP site code: **N/A**
SM inventory site name: **Dinish**	SM inventory site code: **174**
NPWS Site Name: **Kenmare River**	
NPWS designation cSAC: **2158**	MPSU Plan: **N/A**
pNHA: **N/A**	SPA: **N/A**
County: **Kerry**	Discovery Map: **85** Grid Ref: **087410, 67738**
Aerial photos (2000 series): **O 6407-C,D; O 6449-A,B**	6 inch Map No: **Ke 092, 092, 101**

Annex I habitats currently listed as qualifying interests for Kenmare River cSAC:

H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

H1410 Mediterranean salt meadows (Juncetalia maritimi)

Other SMP sites within this SAC/NHA: **West Cove, Tahillia, Dereen House**

Saltmarsh type: **Fringe** Substrate type: **Peat**

2 SITE DESCRIPTION

Dinish saltmarsh is located in south-west Co. Kerry on the Beara Peninsula and along the southern shore of Kenmare River. This site is located quite far up the peninsula and is 6.5 km south-east of Kenmare Town. The survey site is located in a small bay or indentation in the shoreline where Dinish Island is found. The landscape of this area is dominated by upland habitats with hills and mountains the main landscape feature along the peninsula. The main habitats with wet heath, wet grassland and some blanket bog found in the higher areas. There is some development of improved grassland and woodland on the lower slopes close to the shoreline. Exposed rock covered with brown algae is the main habitat along this part of the shoreline and there is very little development of saltmarsh due to the relatively steep shoreline topography. The main regional road between Kenmare and Castletownbere (R571) is positioned close to the shoreline along this small cove and there is an embankment along parts of the cove to support this road. There are scattered dwellings along this road.

Saltmarsh is mainly developed on the west side of this small indentation. This is quite a small site with little saltmarsh development due to the topography of the shoreline. There are several tiny patches further east along the shoreline and on the east side of the cove. There is also some saltmarsh development around Dinish Island. However, this part of the site could not be surveyed due to access difficulties.

The site is located within the Kenmare River cSAC (0002158). This cSAC covers most of the marine parts of Kenmare River and it contains a diverse range of marine habitats. Some sections of coast have also been included such as the Sand dune and saltmarsh complex at Derrynane. Two Annex I saltmarsh habitats are found at this site, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Both these habitats are listed as qualifying

interests for this SAC. Three other saltmarshes sites listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and located within this SAC were surveyed during this project. These include Dereen House located further south-west of Dinish along the southern side, and Tahillia and West Cove located along the northern side of Kenmare River. Two other saltmarsh sites listed on the SM inventory along the northern side of Kenmare River, Sneen and Derrynane, were not surveyed during the SMP. There is additional minor saltmarsh development in many of the small indentations along the shoreline.

Most of the saltmarsh habitat found at this site is positioned outside the digital cSAC boundary. This is mainly because the lower shoreline boundary on the OSI 6 inch map was used as the cSAC boundary along this part of the shoreline and most of the saltmarsh habitat is positioned above this boundary.

This site was accessed by crossing the road embankment and entering the shoreline area.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh habitat at this site is mainly located at the western side of the small sheltered cove around Dinish Island. Most of the saltmarsh has developed on a small peninsula and there are also some fragments of habitat found along the base of the roadside embankment. These fragments are found along a mainly rocky shoreline. There is some immature broad-leaved woodland and scrub found along the shoreline and adjacent to the saltmarsh. There is minor development of wet heath/wet grassland dominated by Purple Moor-grass (*Molinia caerulea*) in a transitional zone between the woodland and the saltmarsh. Some of the upper shoreline around the western shoreline is marked by a low dry stone wall. There are several patches of Common Reed (*Phragmites australis*) and Sea Club-rush (*Bolboschoenus maritimus*) along the shoreline, generally situated higher up on the shoreline. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification.

A small stream flows into the cove at the western end and there is some ASM development along this stream. There is also minor development of a brackish community at the mouth of this stream. There is some intertidal mud and mixed sediment along the shoreline and adjacent to the saltmarsh. However the intertidal zone is quite narrow as the shoreline is quite steep and the intertidal zone shelves quickly to sub-tidal and marine water.

The saltmarsh on the peninsula dominated by MSM that has developed on peat. There is a small mound present dominated by Sea Rush (*Juncus maritimus*) but with some terrestrial species such as Birdsfoot (*Lotus corniculatus*), Silverweed (*Potentilla anserina*) and Curled Dock (*Rumex crispus*) indicating that it is out of reach of most tides. An irregular and highly indented saltmarsh cliff marks the lower edge of the MSM with some exposed peat. Other sections have no distinct cliff between the saltmarsh vegetation and the lower shore and the lower boundary is marked by the lower limit of Sea Rush clumps or other saltmarsh vegetation on the shoreline.

The saltmarsh around Dinish Island is dominated by ASM. This was confirmed with a visual assessment.

Table 3.1. Area of saltmarsh habitats mapped at Dinish.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.302
1410	Mediterranean salt meadows (Juncetalia maritimi)	0.344
	Total*	**0.646**

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

3.2 Atlantic salt meadows (H1330)

Most of the ASM mapped at this site is located on Dinish island was not examined in detail. There are very small patches of ASM vegetation along the roadside embankment and on the sides of the small peninsula feature on the west side of the cove. The ASM patches are generally dominated by a mid-marsh *Plantago-Armenia* sward. Other species present include Lax-flowered Sea Lavender (*Limonium humile*) and Common Saltmarsh-grass (*Puccinellia martima*). There is some zonation present on a relatively steep shoreline along the road with patches dominated by Saltmarsh Rush (*Juncus gerardii*) or Red Fescue (*Festuca rubra*) positioned higher up the shoreline.

The ASM generally forms a mosaic with the rocky shoreline and there is no significant development of saltmarsh topography. The ASM has developed on thin relic patches of peat or on muddy substrate. There are also small patches of ASM within the main area of saltmarsh and these form a mosaic with the MSM or contain scattered clumps of Sea Rush.

3.3 Mediterranean salt meadows (H1410)

This habitat was dominated by Sea Rush and contained a typical species assemblage with some patches dominated by Saltmarsh Rush, Creeping bent or Red Fescue. Other species present within the tall tussocks of Sea Rush included Sea Plantain (*Plantago maritima*), Sea Pink (*Armeria maritima*), Long-bracted Sedge (*Carex extensa*), Sea Arrowgrass (*Triglochin maritimum*), Greater Sea-Spurrey (*Spergularia media*), Spear-leaved Orache (*Atriplex prostrata*), Common Scurvy-grass (*Cochlearia officinalis*), Sea Milkwort (*Glaux maritima*), White Clover (*Trifolium repens*) and Autumn Hawkbit (*Leontodon autumnalis*). There are small patches of ASM within the area mapped as MSM that are dominated by Red Fescue, Sea Plantain and Sea Pink.

The MSM is found on peat and has an irregular topography with mounds and shallow hollows and channels present. This topography has created some zonation of species into the MSM and species like Common Saltmarsh-grass and Sea Aster (*Aster tripolium*) are found with Sea Rush along the lower saltmarsh boundary. There are some deep small salt pans present within this habitat. The extent of habitat was too small for significant development of typical saltmarsh creeks, although there are some low channels present.

4 IMPACTS AND ACTIVITIES

This site is affected by few impacts and activities (Table 4.1). The main area is not grazed regularly. Cattle (141) graze the adjacent area of immature woodland, scrub and wet

grassland. There are some signs of minor poaching within the saltmarsh area. There are also indications of poaching-induced erosion in places.

There is no sign of any significant erosion at this site even though some erosion features are present. A comparison of the OSI 6 inch map to the current extent of saltmarsh shows that there has been no significant loss of saltmarsh at this site during this period. The impact of erosion is assessed as neutral.

The main Impacts and activities around the site are related to farming such as mowing/cutting (102), fertilization (120) and grazing (140), although farming is not intensive in this area. Other impacts include dispersed habitation (403) and minor roads (502). A water sports centre (621) is also located in this small cove towards the eastern side. These activities have little or no measurable impact on the saltmarsh habitats.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	C	0	0.05	Inside
1330	900	C	0	0.005	Inside
1410	140	C	0	0.344	Inside
1410	900	C	0	0.005	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

Dinish saltmarsh is a very small site with no features of particular conservation interest. The overall conservation status of the site is *favourable*. Its small size means there is no significant development of saltmarsh topography but some zonation of vegetation was noted and several communities were present. The saltmarsh is in relatively good condition. It was probably grazed in the past by cattle but there was no grazing of this site in recent times.

This site is located within Kenmare River cSAC. A NPWS Conservation management plan is not available for this cSAC.

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

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

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, development or erosion within the current monitoring period.

5.2.2 Habitat structure and functions

The structure and functions of this habitat were assessed as *favourable*. Due to the relatively small extent of habitat along the mainland no monitoring stops were recorded. However a visual assessment indicated that the ASM habitat was in good condition. The ASM is poorly developed due to its relatively small size but several different vegetation types were noted along the shoreline.

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 grazing continue in the near future. The habitat is not affected by any significantly damaging impacts or activities at present.

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, 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*. Three monitoring stops were carried out in this habitat and they all passed. All the attributes required for favourable conservation status reached their targets. The structure and functions of the MSM are in generally good condition. There are few negative indicators. The habitat is

likely to have been grazed in the past causing some damage but there was no recent grazing of the site.

The species assemblage of the MSM is typical of this vegetation type. There is no zonation of the MSM into different communities although some zonation of different species was noted and one small mound within the MSM contains some terrestrial species along with MSM. There is some transition from MSM to other saltmarsh vegetation dominated by Common Reed. There are also mosaic of ASM and MSM present. The saltmarsh topography within this habitat is poorly developed due to its relatively small size.

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 such as grazing continue in the near future. The habitat is not affected by any significantly damaging impacts or activities at present.

6 MANAGEMENT RECOMMENDATIONS

There are no specific 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

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	0.273		0.273			
4	1410 Mediterranean salt meadow	0.315			0.315		
5	ASM/MSM mosaic (50/50)	0.058		0.029	0.029		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	0.015					
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						
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)	0.013					
19	1330/rocky shore mosaic	0.009					
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**0.683**		**0.302**	**0.344**		

Legend

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

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

Saltmarsh Monitoring Project 2007-2008

Dinish

Kenmare River SAC (002158)

SMP code: SMP0069

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

0 50 100 150 200 250 Meters

N

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:3500

Emlagh East

1 SITE DETAILS

SMP site name: **Emlagh East**		SMP site code: **SMP0076**	
Date of site visit **09/05/2008**		CMP site code: **N/A**	
SM inventory site name: **Emlagh East**		SM inventory site code: **162**	
NPWS Site Name: **Emlagh Salt Marshes**			
NPWS designation	cSAC: **N/A**	MPSU Plan: **N/A**	
	pNHA: **1961**	SPA: **N/A**	
County: **Kerry**		Discovery Map: **70**	Grid Ref: **048395, 100435**
Other SMP sites within this SAC/NHA: **N/A**			
Saltmarsh type: **Fringe**		Substrate type: **Phragmites/peat/sand**	

2 SITE DESCRIPTION

Emlagh East saltmarsh is located in west Co. Kerry along the southern side of the Dingle Peninsula. This site is located 4 km east of Dingle Town. The site is located in an unusual small bay called Short Strand. A long narrow outflow channel only 100 wide widens significantly to create an enclosed bay about 1.5 km wide that is over 1 km inland. Much of the landscape adjacent to the northern side of this site is low-lying and flat and dominated by farmland. There are low hills on the east and west side of the bay. Some low sand hills are present at the mouth of the channel at Doonshean. The main road between Dingle and Annascaul (N80) crosses close to the north side of the bay and there is a significant area of wetland and farmland in the area between the road and the bay. A tourist centre has been developed in the wetlands to the north-east of the bay.

This bay drains at low tide to expose extensive sand flats and some mudflats. Mudflats are more predominant along the northern shoreline. The bay is fringed by saltmarsh that extends around most of the shoreline and is perched on peat. The structure of this saltmarsh is notable has there has been extensive modifications in the past and much of the saltmarsh has been cutaway or 'hollowed out' to create narrow remnant ridges of saltmarsh that enclose intertidal mud. Many of these structures have been marked on the 2nd edition OSI 6 inch map indicating that they occurred during the 19th century. The 1st edition OSI six inch map shows how some of these hollows in the south-west section are much less developed and much of the saltmarsh along the northern side of the bay is still intact. It is assumed that the peat was cut for fuel but there may be a different reason as there are no typical indicators of peat cutting such as regular old face-banks that are seen at other sites where blanket bog extends to the shoreline. This type of topography was not observed at any other site.

Several rivers flow into this bay including Owenalondrig River at the north-east corner and the Abhainn na Gairfeana River at the north-west corner of the bay. There is extensive development of wetland habitats including, brackish marsh, Reed marsh (FS2), scrub and wet grassland in low-lying areas along both these rivers, particularly the Owenalongdrig River that extend from the bay to the main road. These wetland areas may have been covered with some blanket peat in the past that extended onto the shoreline.

This site has been proposed as an NHA. This is one of few NHAs around the country that were designated primarily for the presence of saltmarsh habitat. However, it is not part of an SAC. Two Annex I saltmarsh habitats are found at this site, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). The pNHA also includes the adjacent wetlands to the north along the rivers and the sand hills at Doonshean.

Turf fucoids are the only species of local distinctiveness recorded at this site and these are typical of saltmarsh found on peat along the western coast of Ireland.

Mot of the saltmarsh habitat is located within the pNHA boundary. There are small patches positioned outside the digital boundary, particularly along the northern shoreline. This is because the saltmarsh habitat extends beyond the upper shoreline boundary marked on the OSI 2nd edition 6 inch map in several places and this boundary was used to mark the pNHA boundary.

The site was accessed from several locations around the bay including some ridges of way onto the shoreline. Some parts of the saltmarsh were quite dangerous with large deep holes covered with vegetation present.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh at this site is dominated by MSM (Table 3.1). Several small patches around the site contain ASM. There are no areas with typical development of natural zonation between ASM in the lower saltmarsh and MSM in the upper saltmarsh. Most of the saltmarsh is perched on blanket peat with a tall face-bank or saltmarsh cliff along the seaward boundaries. This seaward saltmarsh cliff becomes lower towards the end of the main channel draining the bay. Sandflats are more prominent towards the end of the channel while soft mudflats are found adjacent to the rest of the saltmarsh. Mixed sediment is found within the mouths of the river channels flowing into the bay. Some exposed rock appears along the lower saltmarsh boundary near the mouth of the bay.

The saltmarsh topography has been significantly modified by the peat cutting and there are few sections with natural features left. Some parts of the saltmarsh are covered with deep man-made holes and drainage channels. Some sections also contain low embankments that extend onto the saltmarsh from the adjacent land that may have been used for access onto the saltmarsh. Some embankments extend along the edge of artificial drainage channels. Some small sections contain natural slopes and gradients and are relatively unmodified.

There is extensive development of transitional vegetation along the upper saltmarsh boundary in places. The northern side contains a transitional wet grassland/saltmarsh vegetation type with a combination of Purple Moorgrass (*Molinia caerulea*) and Sea Rush (*Juncus maritimus*). This vegetation type further transitions to wet grassland at higher levels with Purple Moorgrass, Bog Myrtle (*Myrica gale*) and some Gorse (*Ulex europaeus*). This vegetation is found on naturally occurring low mounds in the marsh. A similar community is also found at the south-west part of the site with a combination of Sea Rush, Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*), Tall Fescue (*Festuca arundinacea*), Tufted Hair-grass (*Deschampsia caespitosia*), Ragged Robin (*Lychnis flos-cuculi*), Marsh Bedstraw (*Galium palustre*), Black Bog-rush (*Schoenus nigricans*), Sedge sp., Sweet Vernal-grass

(*Anthoxanthum odoratum*), Jointed Rush (*Juncus articulatus*), Silverweed (*Potentilla anserina*), Angelica (*Angelica sylvestris*) and Marsh Ragwort (*Senecio aquaticus*). Other species such as Bindweed (*Calystegia sepium*), Bramble (*Rubus fruticosus*) and Gorse appear further up the slope where the influence of tidal inundations is diminished. This type of vegetation was also noted on some of the low embankments that extended into the saltmarsh but remained out of reach of tidal inundation.

Common Reed (*Phragmites australis*) is spreading into the MSM along the upper boundary along the western side and north-eastern sides of the site. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. There is a gradual gradient in cover of Common Reed from quite sparse cover on the saltmarsh to dense Reed beds higher up on the marsh. Much of the saltmarsh on the eastern and western sides of the site has extensive stands of Common Reed (mapped as CM2 or non-Annex I saltmarsh) adjacent to the landward side of the saltmarsh. These stands of Reeds develop into freshwater marsh upstream of the rivers. The cover of Reeds may have increased in the saltmarsh compared to the extent as indicated from the aerial photos (2000). There is also some development of non-Annex I vegetation dominated by Twitch (*Elytrigia repens*) and also containing Sea Mayweed (*Tripleurospermum maritimum*), Creeping Bent (*Agrostis stolonifera*) and Sea Beet (*Beta maritima*) along the upper boundary of the saltmarsh.

Table 3.1. Area of saltmarsh habitats mapped at Emlagh East.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.979
1410	Mediterranean salt meadows (Juncetalia maritimi)	10.220
	Total	**11.199**

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

3.2 Atlantic salt meadows (H1330)

While the overall extent of ASM is quite low, several different vegetation communities are represented at this site. The ASM is generally found as small patches surrounded by MSM. Many small patches where not mapped as they were too small. The saltmarsh topography within these patches of ASM is poorly developed and there are few pans present. The topography of the marsh has been significantly modified and most of the saltmarsh is found on a thick layer of peat with a relatively tall face-bank or cliff along the seaward boundary. This means that lower saltmarsh development is poorly developed.

Lower marsh ASM is found in some of the eroded indentations within the peat along the northern boundary. Small patches of ASM vegetation dominated by Common Saltmarsh-grass (*Puccinellia martima*) have developed on thin substrate at a lower elevation compared to the more established saltmarsh on the adjacent peat. Other species present include Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*), Glasswort (*Salicornia* sp.) and a small amount of Sea Plantain.

ASM has also developed on the deeper peat with several communities present. Most of the vegetation is dominated by Red Fescue and or Saltmarsh Rush (*Juncus gerardii*) and are upper saltmarsh community types. Other species present include small amounts of Common Scurvygrass (*Cochlearia officinalis*), Sea Rush, Sea Plantain, Creeping Bent, Sea Milkwort,

Sea Aster, Autumn Hawkbit (*Leontodon autumnalis*) and Sea Pink (*Armeria maritima*). There is also some development of a mid marsh saltmarsh dominated by Sea Plantain and Red Fescue close to the lower saltmarsh boundary in places. There is a small amount of low-mid and mid-marsh vegetation developed in the south-east corner of the site, near the mouth of the channel on thinner depths of peat and mud substrate.

There is also some development of an upper transitional saltmarsh community along the upper saltmarsh boundary in places where there are dense stands of Common Reed situated adjacent to the saltmarsh. A transitional community dominated by Common Reed, and Red Fescue and also containing Sea Plantain, Sea Arrowgrass (*Triglochin maritimum*), Spear-leaved Orache (*Atriplex prostrata*), Creeping Bent and Common Scurvygrass is present on higher platforms and some ridges in the saltmarsh.

3.3 Mediterranean salt meadows (H1410)

The MSM at this site was quite variable with several vegetation types present. The main vegetation type is a typical community dominated by Sea Rush and other grasses such as Red Fescue and Creeping Bent. The sward height was generally quite high (0.5-1 m) and rank in places. There are some sections with relatively low diversity. Small amounts of Common Scurvygrass, Sea Pink, Sea Aster, Sea Milkwort, Sea Plantain, Parsley Water-dropwort (*Oenanthe lachenalii*), Spear-leaved Orache, Common Reed and White Clover (*Triglochin maritimum*) are present within the MSM. The largest sections of saltmarsh display well-developed zonation along a gradual gradient from the landward to the seaward boundary of the MSM. Sea Plantain and Sea Pink are found more frequently and Red Fescue found less frequently towards the seaward edge of the marsh at some locations. Twitch was also noted within the upper MSM. A significant amount of MSM around the site also contains small amounts of Common Reed.

Sea Rush is also spreading onto bare intertidal mud at the base of the peat platforms and a significantly lower level compared to most of the other MSM vegetation. These patches of Sea Rush are generally mono-specific swards and contain few other species.

Two clumps of Common Cordgrass (*Spartina anglica*) were recorded close to each other along the northern side of the bay. These clumps are growing with Common Reed on a bare peat platform found at a lower height compared to the surrounding saltmarsh. No other Common Cordgrass was noted at the site.

4 IMPACTS AND ACTIVITIES

There are few impacts or activities affecting this site at present (Table 4.1). One small area was grazed by livestock with some minor poaching, but overall most of the site is left ungrazed. One local farmer stated that the site was treacherous for livestock, due to the many deep holes and channels that were cut through the peat. Wheel-ruts were noted at several locations (501) but vehicle activity is rare. The 6 inch map marks an old track across the bay and sandflats from one side to the other (501).

There has been some dumping (422) on MSM and on Common Reed stands at the south-east corner of the site, adjacent to an access road close to the shoreline.

The site has been significantly affected by major modifications in the past (19th and early 20th century). Peat cutting or some other activity has created very unusual topographical features not seem at other sites where the saltmarsh seems to have been hollowed out to leave remnant narrow ridges of saltmarsh around the former seaward edge of certain sections that surround deep holes containing intertidal mud in the former interior of the saltmarsh. These impacts are not included in this assessment as they occurred prior to the current monitoring period, although they have are having a very significant residual impact on the saltmarsh. Some of these hollows, but not all, have been marked on the OSI 6 inch map meaning the activity has continued in the early 20th century. Old embankments and modified drainage channels can also been seem on the saltmarsh.

There are frequent indicators of erosion around the site as the saltmarsh is perched on peat with a tall peat face-bank (1-2 m) above the adjacent intertidal sediment marking the lower saltmarsh boundary. The saltmarsh is dominated by upper saltmarsh vegetation communities and typical lower saltmarsh communities are rare. This face-bank or SM cliff is bare of vegetation and some sections seem to be eroding to create bare peat platforms with some saltmarsh vegetation in places. Cliff toppling was also noted. The extensive peat-cutting or excavations has left the saltmarsh vulnerable to erosion and eroded peat tussocks are all that remains of some of these eroded ridges and these can be seen around the site.

A comparison of the current extent of the saltmarsh to the extent mapped by the OSI 6 inch map shows that there has been some loss of saltmarsh due to erosion during this period. These losses are mainly seen in areas damaged by the excavations where thin ridges of saltmarsh where left vulnerable to erosion. This erosional trend is likely to be continuing. However, an examination of the 1995, 2000 and 2005 aerial photo series and the field survey GPS points shows that there has been no measurable loss of saltmarsh during the current monitoring period, so the rate of erosion is quite low. Erosion is assessed as having a low negative impact. There are moderate prospects for landward retreat of saltmarsh at this site.

Two clumps of Common Cordgrass were noted at this site. This is an invasive species that is frequently found associated with saltmarshes in Castlemaine Harbour at the head of Dingle Bay such as Inch, Rossbehy and Cromane. It has not been recorded in this 10 km grid square before (Preston *et al.* 2000). However, it is known from an adjacent square to the south that also covers part of Dingle Harbour where it is presumably present. There is potential for Common Cordgrass to spread on the intertidal mud around the shoreline including some of the enclosed spaces hollowed out of the former saltmarsh. However, there is little potential for this species to spread into the existing saltmarsh due to it's relative height above the shoreline and the fact the saltmarsh is dominated by upper marsh communities. Common Cordgrass is unlikely to spread significantly within Short Strand to create extensive sward areas as the substrate (sand) is unsuitable.

The main Impacts and activities around the site are related to farming such as mowing/cutting (102), fertilization (120) and grazing (140). Other impacts include dispersed habitation (403), roads (502) and an interpretative centre (610) (former fish-farm?). These activities have little or no measurable impact on the saltmarsh habitats.

Table 4.1. Intensity of various activities on saltmarsh habitats at Emlagh East.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	C	0	0.05	Inside
1330	501	C	-1	0.005	Inside
1330	900	C	-1	0.25	Inside
1330	954	C	-1	0.001	Inside
1410	501	C	-1	0.05	Inside
1410	422	C	-1	0.001	Inside
1410	900	C	-1	1.0	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the 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. Notes from the NHA survey for this site are somewhat more detailed and describe the saltmarsh in detail in places.

The overall conservation status of this site is *unfavourable-inadequate* (Table 5.1). Emlagh East saltmarsh is a moderately-sized site with several features of interest. The saltmarsh habitats are in generally good condition. Most of the saltmarsh is perched on tall peat platforms and there is very little development of lower saltmarsh communities. The site is not grazed so there is no overgrazing damage although some sections are quite rank and have a relatively low diversity. There is extensive development of transitional vegetation communities along the upper saltmarsh boundaries in places.

The site has been significantly modified by peat cutting or digging in the past and this has left a site with a fairly unique structure with remnant saltmarsh in thin ridges adjacent to large excavated holes containing intertidal sediment. These former activities have had a very significant impact on the structure and topography of this site and are still having residual impacts as some of the saltmarsh on thin ridges is now vulnerable to continued erosion.

There are extensive intertidal mud and sandflats in the bay at Emlagh East. *Salicornia* flats could have been expected to have been recorded at this site as suitable habitat is present. However this habitat is not present.

There is no NPWS management plan available for this NHA.

Table 5.1. Conservation status of Annex I saltmarsh habitats at Emlagh East.

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

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 erosion, natural changes and land-use changes during the current monitoring period. The overall site is being affected by erosion, but there was no measurable erosion during the current monitoring period and the MSM is more likely to be affected due to its greater extent and position on the marsh.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-inadequate*. Five monitoring stops were carried out in this habitat and they all passed bar one stop that failed due to erosion. All of the attributes required for the structure and functions of this habitat generally reached their targets. A small amount of habitat has been damaged by recent dumping. This habitat is generally in good condition but is not present in large areas so typical zonation and ASM topography is poorly developed. There are few impacts and activities acting on this habitat, apart from some erosion. The species assemblage is typical of this habitat and several ASM communities are present due to the fact that ASM has developed on peat platforms of various heights and eroded indentations within the marsh. The site is not grazed so some of the ASM sward is quite rank in places. However, the presence of several vegetation types including low marsh communities means there is range of sward heights 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 such as grazing continue in the near future. The saltmarsh is generally in good condition and it is not affected by any significantly damaging impacts or activities. A small amount of habitat has been damaged by dumping. The site is also affected by erosion and this has the potential to further reduce the extent of ASM at the site. Erosion has been exacerbated by peat cutting and modifications to this site in the past that has left some saltmarsh remaining on thin ridges of substrate vulnerable to erosion.

Common Cordgrass is present at this site, although only two clumps were recorded. This is an invasive species has the capacity to spread into a small amount of the ASM developed at lower levels in eroded indentations within the marsh. However most of the ASM is not likely to be vulnerable to the invasion of this species at this site due to its position on elevated peat platforms.

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 significant loss of habitat due to erosion, natural changes and land-use changes during the current monitoring period. The site is being affected by erosion, but there was no measurable erosion during the current monitoring period. Some erosion has been noted over a longer period (when comparing the extent of saltmarsh from the OSI 2nd edition 6 inch map to its current extent) and this is an indication of an erosional trend at this site. These impacts are not assessed as they occurred outside the current monitoring period but is having a significant residual impact.

5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Twelve monitoring stops were carried out in this habitat (all in the main community dominated by Sea Rush) and they all passed. All of the attributes required for the structure and functions of this habitat reached their targets. This habitat is generally in good condition and there are few impacts and activities acting on this habitat. The saltmarsh topography has been significantly modified by the peat cutting/digging at the site in the past

The vegetation assemblage is typical of this habitat. Zonation within the MSM is well developed with MSM developed on peat platforms at various heights above the adjacent intertidal flats. The site is not grazed and the vegetation is quite rank in places. Zonation to transitional vegetation is also well developed and there is extensive development of several transitional vegetation community types that increase the conservation value of the site as a whole. There is extensive transition to freshwater wetland vegetation along the rivers that flow into 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 activities and level of impacts such as grazing continue in the near future. The saltmarsh is generally in good condition and it is not affected by any significantly damaging impacts or activities. A small amount of habitat has been damaged by dumping. The site is also affected by erosion and this has the potential to further reduce the extent of ASM at the site. Erosion has been exacerbated by peat cutting and modifications to this site in the past that has left some saltmarsh remaining on thin ridges of substrate vulnerable to erosion.

Common Cordgrass is present at this site, although only two clumps were recorded. This is an invasive species that has the capacity to spread into saltmarsh vegetation. However, the MSM is not vulnerable to invasion by this species as this habitat is dominated by upper marsh communities. Common Cordgrass is a lower marsh species and does not spread into the upper marsh to any great extent.

6 MANAGEMENT RECOMMENDATIONS

While the site is not grazed and this has lead to the development of vegetation that is rank in places, grazing on the site is not recommended. The topography of the site with some deep holes in the peat that are obscured by vegetation means that it is dangerous to livestock.

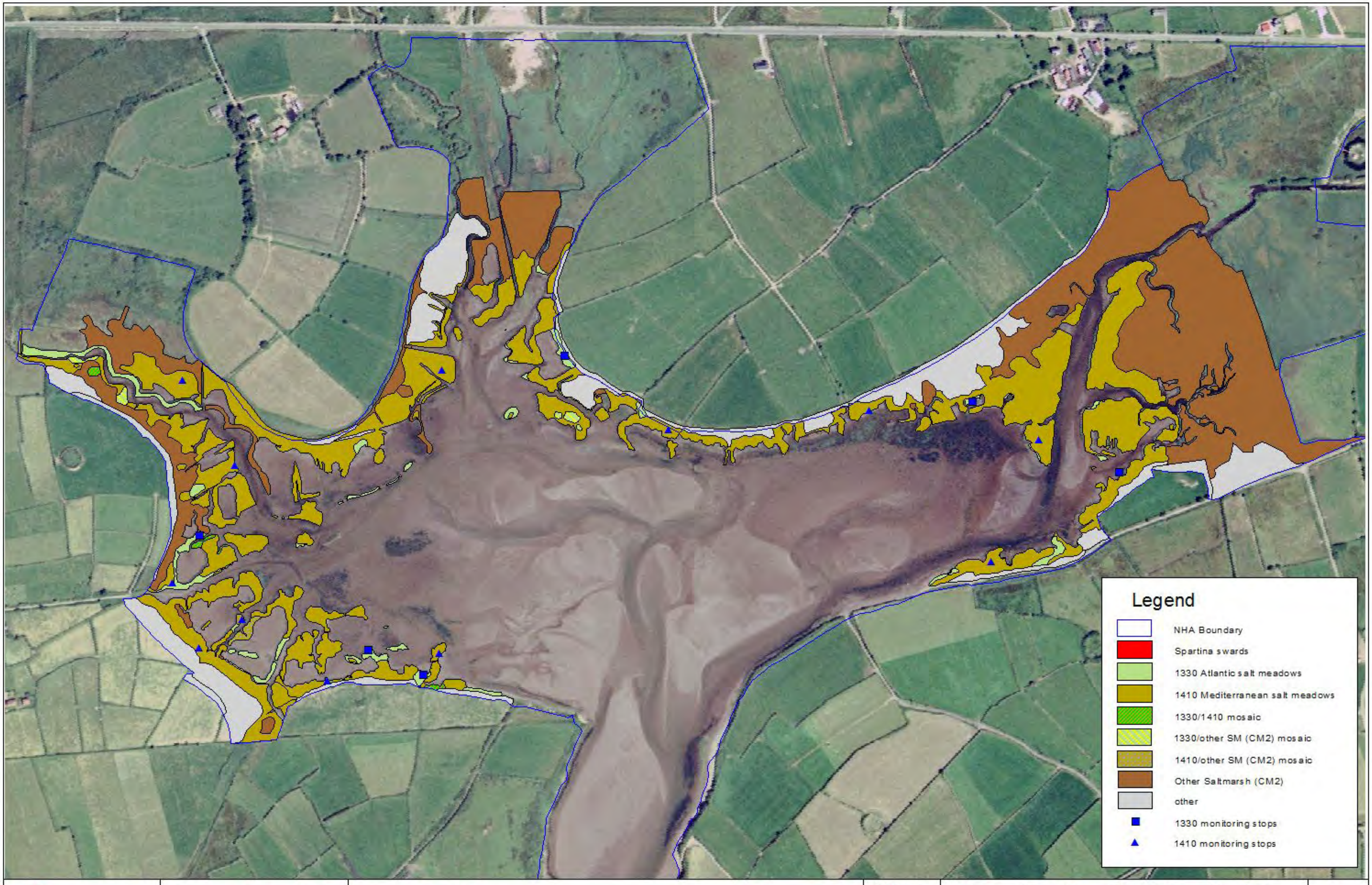
7 REFERENCES

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)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats						
2	Spartina swards	0.000					< 0.001
3	1330 Atlantic salt meadow	0.901		0.901			
4	1410 Mediterranean salt meadow	11.060			11.060		
5	ASM/MSM mosaic (50/50)	0.062		0.031	0.031		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic	0.093		0.047			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	5.204					
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	0.059			0.03		
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)	10.887					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**28.266**		**0.979**	**11.121**		



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

Saltmarsh Monitoring Project 2007-2008

Emlagh East

Emlagh Salt Marshes NHA (001961)

SMP code: SMP0076

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

0 70 140 210 280 350 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:5000

N

Inch

1 SITE DETAILS

SMP site name: **Inch**		SMP site code: **SMP0075**	
Dates of site visit **06-08/08/2008**		CMP site code: **70**	
SM inventory site name: **Inch**		SM inventory site code: **163**	
NPWS Site Name: **Castlemaine Harbour**			
NPWS designation	cSAC: **343**	MPSU Plan: **old format draft 2 plan available**	
	pNHA: **343**	SPA: **4029**	
County: **Kerry**		Discovery Map: **71, 78**	Grid Ref: **066143, 099835**
Aerial photos (2000 series): **O 5930-A,B,C,D; O 5866-D; O 5867-C,D; O 5986-A,B**		6 inch Map No: **Ke 045, 055**	

Annex I habitats currently listed as qualifying interests for Castlemaine Harbour cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **Cromane, Whitegate,-Fybagh, Rossbehy**

Saltmarsh type: **Estuary** Substrate type: **Peaty clay, sand**

2 SITE DESCRIPTION

Inch is located in south-west Kerry along the northern side of Dingle Bay/Castlemaine Harbour and is located 18 km from Castlemaine. Inch is a long sand spit that divides the shallower Castlemaine Harbour from the outer Dingle Bay, along with the adjacent Rossbehy sand spit, which projects from the southern side of the bay. This sand spit is considered to be one of the finest examples of a sand dune system in the county, particularly as it has not been significantly developed and is relatively intact. Inch beach is an important amenity area and attracts many local people and tourists that visit the area. The beach is popular for swimming and water-sports such as surfing. The northern section is most heavily used and there is some infrastructure such as car-parks and a restaurant located at the northern end of the beach. There is an on-going proposal to develop a golf course at this site. The site is also grazed by sheep and cattle.

The landscape of this area on the adjacent Dingle Peninsula is dominated by steeply sloping land fairly close the shoreline. There is some low-lying land found in the sheltered area adjacent to the sand spit. This area is dominated by wet grassland and marsh land in the low-lying area with some improved grassland on the higher ground. This low-lying ground soon disappears further east and there are steeper slopes along the shoreline that significantly limit the development of saltmarsh.

Saltmarsh is found along the sheltered eastern side of the sand dune complex with a small amount also found along the adjacent mainland shoreline. The survey site included the entire sand spit and included the shore of Castlemaine Harbour between the spit and east of a small

river flowing into the bay called Emlagh River. There are very notable and important transitions from tall dunes to transitional wet grassland vegetation and then to saltmarsh communities and onto intertidal flats along a gentle seaward gradient in the northern section. The relatively large size of the site increases the overall diversity and extent of the saltmarsh and transitional communities. There is also a notable gradient from mud to sand towards the tip of the spit and this also influences the saltmarsh habitat. The adjacent intertidal flats also contain a significant area of Eelgrass (*Zostera* spp.) beds.

Inch saltmarsh is part of Castlemaine Harbour cSAC (Site Code 000343). This cSAC covers most of the intertidal and sub-tidal parts of Castlemaine Harbour east of Inch and Rossbehy spits. The cSAC also includes the sand dune complexes at Inch and Rossbehy and the shingle spit at Cromane. The cSAC also includes some of the catchments of the Rivers Laune and Maine, which both flow into the head of the bay and forms the estuary of these rivers. Three Annex I saltmarsh habitats are found at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All three habitats are listed as qualifying interests for this cSAC. *Spartina* swards are also found on the intertidal flats at this site, although this habitat is not now considered to qualify as an Annex I habitat.

Three other saltmarshes sites listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and located within this cSAC were surveyed during this project, Rossbehy, Cromane and Whitegate-Fybagh. There is additional saltmarsh development in many of the small indentations along the shoreline, including a significant areas of unsurveyed saltmarsh located between Cromane and the mouth of the River Laune.

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. Turf fucoids are the only species of local distinctiveness recorded at this site and these are typical of saltmarsh found along the western coast of Ireland.

Nearly all the saltmarsh habitat is found within the digital cSAC boundary. The entire saltmarsh habitat found on the sand spit is situated within the cSAC. The cSAC boundary then extends to the east and includes most of the saltmarsh habitat within the cSAC. However the outer berm is used as the cSAC boundary in one section and this excludes some saltmarsh habitat that has developed behind the berm.

The saltmarsh was easily accessed from across the dunes after a bit of a hike.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh is located along the eastern sheltered side of the sand dunes along Inch. The majority of the established Annex I saltmarsh habitat is dominated by Mediterranean salt meadows (MSM). However, it should be noted that there is a greater area of *Spartina* sward compared to the total area of Annex I habitat developed on the mudflats adjacent to the established marsh. Most of the saltmarsh habitat is found in the northern half of the site. A

band of mainly homogenous MSM saltmarsh about 100 m wide has developed with a transition to transitional wet grassland along a landward gradient. Further north there is some typical saltmarsh zonation with MSM on the landward side and ASM on the seaward side whereas further south the MSM habitat stretches from the upper to lower boundary with no development of ASM vegetation.

Further south the saltmarsh habitat is divided by a small area of sand dune habitat that protrudes into the intertidal area. A second large area of saltmarsh has developed mid way along the sand spit and south of this small protrusion in a low-lying inlet that protrudes into the dunes. Attempts were made in the 19th century to reclaim this area and an embankment was built along the seaward side to enclose this inlet. This embankment is now breached. This area is more heterogeneous and while dominated by MSM, it also contains a significant area of ASM, *Spartina* sward and also brackish marsh. Patches of Sea Club-rush (*Bolboschoenus maritimus*) are found towards the landward side particularly along some of the artificial and natural drainage channels in this area. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. Common Cordgrass (*Spartina anglica*) is found more frequently towards the old embankment and forms some mosaics of *Spartina* sward with MSM and ASM.

This saltmarsh transitions to wet grassland with elements of dune slack vegetation along the landward side. This vegetation succession takes place on a gentle gradient with a subtle topological height difference between the MSM and the transitional zone. This meant mapping the upper boundary was difficult in places. The transitional zone is dominated by Sea Rush and also contains species such as Purple Moor-grass (*Molinia caerulea*), Birdsfoot (*Lotus corniculatus*), Silverweed (*Potentilla anserina*), Yellow Flag (*Iris pseudacorus*), False Oat-grass (*Arrhenatherum elatius*) (on tussocks), Red Clover (*Trifolium pratense*), Soft Rush (*Juncus effusus*), Compact Rush (*Juncus conglomeratus*), Jointed Rush (*J. articulatus*), False Fox Sedge (*Carex otrubae*), Sow-thistle sp. (*Sonchus* sp.), Purple Loosestrife (*Lythrum salicaria*), Yorkshire Fog (*Holcus lanatus*), Distant Sedge (*Carex distans*) and Mouse-ear (*Cerastium fontanum*). The appearance of these species indicates a decline in tidal inundation and greater influence of freshwater groundwater. Part of this area may have been dune slack in the past or there may be some vegetation succession from saltmarsh dune slack type vegetation as this site matures. Seaward of the old embankment there is extensive *Spartina* sward.

A narrow band of saltmarsh (ASM) continues further south along fixed dunes, south of a point on the dunes called Dromdarny. The ASM habitat gradually develops into pioneer saltmarsh vegetation as the substrate becomes sandier and is finally mapped as *Salicornia* flats. The saltmarsh habitat then disappears and a narrow beach alongside the sand dunes develops. *Spartina* swards are still distributed on the adjacent mudflats but these swards are less mature and more fragmented. There is a large area of mudflats with scattered clumps of Common Cordgrass is distributed at low densities.

The southern half of the sand dune system only has two small areas of Annex I saltmarsh development, both in low-lying features that protrude into the sand dunes. Both of these are dominated by MSM with landward transition to transitional wet grassland. Small patches of ASM are found on the seaward side of these small inlets that are generally drained by one main channel. Clumps of Common Cordgrass are still widely scattered on the adjacent mudflats and sand flats, with some development of *Spartina* sward in places. The sward in this area is actively spreading.

A small inlet at the tip of the sand dune complex contains a large area of pioneer saltmarsh dominated by *Salicornia* flats on sand. This low-lying area has developed due to the growth and expansion of the sand dune system at the southern end to form a small secondary spit that shelters this area.

Table 3.1. Area of saltmarsh habitats mapped at Inch.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand (1310)	1.241
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	9.483
1410	Mediterranean salt meadows (Juncetalia maritimi)	29.112
non-Annex	*Spartina* swards	43.354
	Total	**83.190**

*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 along the salt marsh. Two small areas are located at the end of ASM saltmarsh where there was a break in the habitat. Both these patches are distributed on sandy sediment. The central patch (at Dromdarny) has developed south of a small cobble ridge that forms a natural barrier to the ASM distribution. They are typical of pioneer vegetation where lower marsh vegetation gradually transitions to pioneer vegetation dominated by Glasswort (*Salicornia* sp.). These patches also contain some Common Saltmarsh-grass (*Puccinellia martima*) and Annual Sea-blite (*Suaeda maritima*). Clumps and seedlings of Common Cordgrass are also present and both these areas are located adjacent to *Spartina* sward lower down on the mudflats.

A large patch of this habitat has developed at the southern tip of the island. This patch has developed in isolation from other saltmarsh habitat in a low-lying sandy intertidal area surrounded by dunes. The vegetation is dominated in part by Annual Sea-blite and this species has colonised pure sand. Other sections are dominated by Glasswort. The distribution of both species is discontinuous and there are patches with sparse or no cover in this section. Common Saltmarsh-grass was rare in this area and there was no Common Cordgrass. This area is likely to be quite dynamic and the extent of the habitat is likely to vary from year to year. There are small patches of embryonic dunes developing in this area. There were no signs of ASM development in this area.

A second rarer Annex I *Salicornia flats* community (Sagino maritimae-Cochlearietum danicae) (Ephemeral saltmarsh vegetation with *Sagina maritima*) was also recorded at this site. This community was recorded in a typical situation where ASM saltmarsh protruded along a narrow channel into a low-lying area in the dunes. This community was noted in the upper transitional area between the ASM and the adjacent fixed dune vegetation. It was moderate-heavily grazed by rabbits and sheep and had a low sward dominated by Red Fescue (*Festuca rubra*), Buck's-horn Plantain (*Plantago coronopus*) and some Sea Plantain (*Plantago maritima*). Clumps of Marram (*Ammophila arenaria*) are interspersed through this zone, which is quite narrow, only 0.5 m wide. Rabbit burrows are also present. This community is patchily distributed and is quite localised in appearance.

3.3 Atlantic salt meadows (H1330)

The ASM habitat found at this site is separated into several discrete patches of habitat that are scattered along the whole of the saltmarsh. This increases the overall diversity of the habitat as the ASM has developed in different situations and in association with different saltmarsh habitats.

The largest area of ASM is found in the central section. Several zones are present. Upper marsh vegetation with Red Fescue, White Clover (*Trifolium repens*) and Creeping Bent (*Agrostis stolonifera*) both prominent is present in patches surrounded by MSM. Other species present include Sea Plantain, Saltmarsh Rush (*Juncus gerardii*), Sea Arrowgrass (*Triglochin maritimum*) and Autumn Hawkbit (*Leontodon autumnalis*). Further into the basin there is some extensive patches of mid marsh ASM vegetation, some of which form a mosaic with scattered clumps of Sea Rush (MSM). This mid marsh zone is dominated by Sea Plantain and Sea Pink (*Armeria maritima*) with patches dominated by Saltmarsh Rush. Red Fescue appears in some higher mounds. Other species present include Sea Aster (*Aster tripolium*), Creeping Bent, Sea Milkwort (*Glaux maritima*) and Sea Arrowgrass. The saltmarsh topography is well developed and there are frequent salt pans in this section. The natural drainage system has been modified by artificial drains that dissect this area.

ASM is also located in several small linear patches adjacent to the sand dunes and on a gentle-moderate gradient. These sections are typically zoned due to the gradient with the development of low, mid and upper zones. The mid zone is generally the best developed zone and is dominated by Red Fescue and Sea Plantain. This zone also contains the best developed salt pans and a good example of these can be seen in the ASM found at the northern end of the site behind the embankment.

The ASM found outside the embankment in the central section also has a transitional zone from low marsh vegetation dominated by Common Saltmarsh-grass with Sea Pink, Sea Plantain, Glasswort and Annual Sea-blite to *Spartina* sward along a gentle gradient, where the cover of Common Cordgrass gradually increases in abundance (north of Dromdarny). Turf fucoids are also present. This patch of ASM gradually transitions to low marsh and pioneer ASM vegetation where the sward breaks up and scattered clumps of Common Saltmarsh-grass are colonising the sandier sediment with Glasswort, Annual Sea-blite and Sea Milkwort (south of Dromdarny). Small clumps of Common Cordgrass are actively recruiting in this area and seedlings are also present. There is further zonation to a small patch of *Salicornia* flats.

ASM saltmarsh also develops in some low-lying areas that extent into the dunes. These are characterised by narrow channels containing saltmarsh vegetation that are only 5-10 m wide and extend into a lager area of saltmarsh developed in a basin. The vegetation is dominated by Red Fescue, Sea Plantain and some Sea Pink and grazed to a low sward mainly by rabbits. The saltmarsh transitions to dune slack type vegetation where Sea Rush (*Juncus maritimus*) is found with Glaucous Sedge (*Carex flacca*) and Hairy Sedge (*Carex hirsuta*) and Mint (*Mentha aquatica*).

3.4 Mediterranean salt meadows (H1410)

The MSM forms the largest component or the Annex I habitats at this site. This habitat has formed a wide linear zone of dense sward dominated by Sea Rush in the northern section. This sward is notable as it stretches from the upper boundary to the lower boundary of the established marsh with no typical zonation and development of ASM communities at the

seaward side. This zone is about 100 m wide and covers a gentle landward gradient. The relatively wide zone of MSM development means that zonation within this habitat is well-developed. The saltmarsh topography is also well developed in this section and there are frequent salt pans and natural drainage creeks in this unit. There are also small mounds present in places that increase the diversity of the zonation. While the vegetation overall is dominated by Sea Rush the abundance of grasses such as Red Fescue and Creeping Bentgrass include towards the upper boundary. Other species present at low cover values include Saltmarsh Rush, Sea Milkwort, Autumn Hawkbit, Sea Plantain, Spear-leaved Orache (*Atriplex prostrata*), Common Scurvy-grass (*Cochlearia officinalis*) and Sea Arrowgrass. Species such as Purple Moor-grass and Parsley Water-dropwort (*Oenanthe lachenalii*) begin to appear close to the upper boundary.

Species such as Common Saltmarsh-grass, Sea Aster and Greater Sea-spurrey (*Spergularia media*) all appear in the MSM towards the lower seaward boundary. Most of this boundary is adjacent to *Spartina* sward. However, there is one section that has not been colonised by Common Cordgrass and Sea Rush is spreading into the mudflats along the base of an old saltmarsh cliff.

One notable feature of the MSM at this site is the relatively wide zone of transitional vegetation with a mixture of Sea Rush, Purple Moor-grass, Silverweed, Marsh Bedstraw (*Galium palustre*), Curled Dock (*Rumex crispus*), Twitch (*Elytrigia repens*), Ragged Robin (*Lychnis flos-cuculi*), Tall Fescue (*Festuca arundinacea*) and other terrestrial species along the landward boundary of the MSM. The upper boundary was difficult to map in places as there was a very subtle change from the MSM to the adjacent transitional grassland. This boundary was generally recorded by assessing the relative abundance of Sea Rush and other grasses. The upper boundary has also been modified by the presence of an old drain and low embankment that runs parallel to the saltmarsh.

The central section of the saltmarsh is notable for the development of a large more heterogeneous area of saltmarsh in a low-lying area protruding into the dunes. MSM forms a mosaic with ASM in this area. The structural diversity of this section is also increased by the appearance of Sea Club-Rush and Common Reed stands spreading into the MSM and probably reflecting freshwater influence. This area also has a narrow band of transitional vegetation along the upper MSM boundary with a mixture of Sea Rush and other terrestrial species. In this case there are elements of dune slack vegetation spreading into the Sea Rush vegetation at the most landward point of this saltmarsh.

There are several smaller patches of MSM in the smaller patches of established saltmarsh in the southern half of the sand dune system. These have a similar species assemblage and also show similar zonation with transition to transitional wet grassland along the upper boundary. These patches of saltmarsh are drained by one central drainage channel.

MSM also dominates the saltmarsh along the mainland saltmarsh. MSM is found along a seaward fringe with a saltmarsh cliff marking the lower boundary. There is some development of stands of Sea Club-rush and Common Reed (*Phragmites australis*) along drains and along the landward boundary in places. There are also transitions to transitional wet grassland along a landward gradient in places. Some of this grassland is dominated by Sea Rush with Brambles (*Rubus fruticosus*) growing on some tussocks.

3.5 *Spartina* swards

This site is notable for the extensive development of dense *Spartina* swards on mudflats along the seaward side of the established saltmarsh. A large and probably the oldest area of sward is found in the northern section. This sward is between 60-200 m wide and forms a continuous dense band of sward alongside the saltmarsh. There is a distinctive boundary between the sward and the adjacent ASM and MSM that is marked by an old saltmarsh cliff, indicating that Common Cordgrass only colonised the mudflats and did not spread into the established saltmarsh. The northern part is adjacent to ASM vegetation whereas MSM forms the upper boundary further south. There is a narrow transitional zone where Sea Rush or ASM species such as Common Saltmarsh-grass and Lax-flowered Sea Lavender are spreading into the landward side of the *Spartina* sward. However, there is no large-scale vegetation succession of *Spartina* swards to other saltmarsh communities. There are some scattered clumps at the seaward side of the dense *Spartina* sward.

The largest area of sward is adjacent to the central section of saltmarsh. The distribution of *Spartina* sward is discontinuous and there is a gap containing bare mudflats between this area and the area to the north. This central area is notable as it contains a much wider zone of scattered clumps on mudflats situated seaward of the denser sward. This zone of scattered clumps is 400 m wide in places. This area is also somewhat different as Common Cordgrass has spread into some of the adjacent established saltmarsh to form vegetation mosaics. It has spread into the saltmarsh area that has been modified by reclamation attempts. These reclamation works probably promoted the spread of Common Cordgrass into this area due to drainage, the creation of bare mudflat patches and the disturbance of vegetation.

The vegetation mosaic are similar to those seen along the transitional zone between ASM and *Spartina* sward with a mixture of Common Cordgrass, Common Saltmarsh-grass and some Sea Aster Sea Plantain, Glasswort and Lax-flowered Sea Lavender. This vegetation type is found along the creeks in places. One notable feature of this area is the development of mixed patches of Sea Rush and Common Cordgrass. This community is quite unusual and not frequently encountered during the SMP project.

The southern half of the saltmarsh is notable for the presence of several smaller patches of *Spartina* sward that are less consolidated compared to the sward further north. The sediment is also sandier and this is clearest close to the sand dunes where the sediment is pure sand. Some of the *Spartina* sward has developed adjacent to the sand dunes with no other established saltmarsh in the zone between the *Spartina* sward or scattered clumps and the sand dunes. There are frequent new small clumps in this zone indicating that Common Cordgrass is spreading. Some of the larger clumps are also being colonised by Common Saltmarsh-grass and Glasswort. The *Spartina* sward is spreading further south and there is a large area on the intertidal mudflats and sand flats with scattered isolated clumps of Common Cordgrass. These clumps are colonising mudflats that also are vegetated by Eelgrass beds (*Zostera marina*) and Eelgrass is also found in some of the unconsolidated *Spartina* sward, or bare patches of mud within the sward. A comparison of the 2000 and 2005 series aerial photos shows that some of the patches of *Spartina* sward in this southern section have consolidated and grown significantly during this period. There also has been some dieback of clumps in places.

4 IMPACTS AND ACTIVITIES

This site is affected by several impacts and activities (Table 4.1), with the main impacts being the spread of Common Cordgrass and grazing. The saltmarsh is relatively isolated from other damaging activities related to amenity use by the dunes and is therefore in much better condition compared to Rossbehy.

One of the main impacts is grazing (140). The overall grazing intensity is low on Inch spit and there is little extensive damage from grazing by sheep and cattle. Sheep seem to graze the spit as commonage and there are several more established fenced enclosures towards the northern end that also contain saltmarsh habitat and are grazed by cattle. The NPWS management plan indicates that the site is grazed by sheep in the summer and by cattle in the winter. There is some localised damage to the saltmarsh along the mainland, but this is only a small area relative to the overall site. The saltmarsh is also bisected by some tracks (501) in places. Some of these are created by sheep and cattle while there is a track along part of the upper saltmarsh along the spit that is used by vehicles (probably related to farming) accessing the tip. The site is also used by walkers (622) hiking around the spit but these are likely to have a very minor impact on the saltmarsh relative to the overall size of the site. Some wheel ruts (623) were also noted in the *Salicornia* flats vegetation mapped at the southern tip. Vehicles probably access this area by driving down the beach.

The other main impact is the spread of Common Cordgrass, an invasive species of saltmarsh (954). It is widely distributed in Castlemaine Harbour and is most abundant at this site. This is its most southerly limit along the western Irish shoreline and it is only found again in Clonikilty Bay, Co. Cork. It is not known when it was planted in Castlemaine Harbour although it is known from this area since the 1960's (Nairn 1986). The first AFF report (Goodwillie 1972) indicated that Common Cordgrass was spreading on the mudflats at this site and this is still the case. A comparison of the 2000 and 2005 series OSI aerial photos shows that some of the larger patches of *Spartina* sward consolidated and got bigger during this period. The *Spartina* sward is likely to be spreading at the expense of Eelgrass flats and Eelgrass was noted in some of the unconsolidated *Spartina* sward and around isolated clumps at several locations. There are numerous small clumps of Common Cordgrass in the mudflats and sandflats indicating that it is reproducing and recruiting successfully in recent times.

Common Cordgrass has also spread into established saltmarsh in the central area along the spit, creating mosaic of MSM, ASM and *Spartina* swards. Its presence is assessed as having a negative impact due to the development of these mosaic areas and areas of ASM or MSM with relatively high Common Cordgrass cover (20-40%). There are some patches with high cover of Common Cordgrass and it has colonised along creeks and in pans in this area. Outside of the embankment that formerly protected this area there is an unmodified transitional zone between *Spartina* sward and ASM along a gentle landward gradient. It has not spread significantly into much of the other established saltmarsh, although there are several small areas of ASM/*Spartina* sward mosaic and small clumps may be found in ASM close to its lower boundary with *Spartina* swards and mudflat. It is also found associated with the pioneer ASM and *Salicornia* flats in the central area.

Common Cordgrass has the capacity to spread into more if the established lower zone ASM, especially in conjunction with heavy grazing damage. However, the fact that a significant portion of the ASM has developed on sandy substrate means that it may be less vulnerable to invasion by Common Cordgrass. Common Cordgrass also has the capacity to spread into

any saltmarsh developing in the low-lying area at the southern tip, especially if pioneer saltmarsh begins to accumulate muddy sediment. The MSM is much less vulnerable to the spread of Common Cordgrass.

The saltmarsh at this site has been modified by reclamation works in the past. This is most clearly seen in the central section where attempts where made to enclose and drain a large area of saltmarsh that extends into the dunes in a low-lying area in the 19th century. There are two series of embankments at this location an outer embankment and a more complete inner embankment. The outer embankment is marked on the 2nd edition 6 inch map while the inner embankment postdates the drawing of this map. Ultimately this attempted reclamation was unsuccessful and the saltmarsh within the embankment still retains many natural features, although it is criss-crossed by drains. Embankments and drainage can also be seen in the saltmarsh at other locations, particularly at the northern end of the spit where there are several established enclosures. An old earth berm runs along the seaward side of the saltmarsh and divides the saltmarsh from the intertidal channel and the *Spartina* sward. Some large drains also run parallel to the landward boundary. These impacts are not assessed as they occurred outside the current monitoring period.

The saltmarsh along the sand dune system has not been significantly affected by erosion (900). Much of the established saltmarsh is protected from erosion by *Spartina* sward. There are saltmarsh cliffs along the seaward edge of the mainland saltmarsh. This area may be prone to erosion and there are more indicators of erosion towards the east as the saltmarsh habitat narrows and becomes a slim band. Accretion (910) is influencing minor growth of saltmarsh along the central section where there is pioneer ASM and *Salicornia* flats habitat. It has also influenced the growth of the spit at the southern end and lead to the development of the low-lying area where *Salicornia* flats vegetation is currently developing. An examination of the OSI 2nd 6inch map shows that the sand dune complex did not extend as far as this point at that time so there has been significant growth of the sand dune complex. There has been no significant growth or expansion of established saltmarsh during the current monitoring period.

One notable feature of this site is that it is quite dynamic and there has been considerable natural habitat succession (990). This is more evident at a large site like Inch. An examination of the OSI 2nd edition 6 inch map shows that the saltmarsh (or area covered by spring tides, which approximates to saltmarsh) was much more extensive when this map was drawn. The landward boundary of the saltmarsh seems to have retreated seawards since this map was drawn and there has been development of wet grassland with dune slack elements along the upper boundary as well as a wide zone of transitional wet grassland with a mixture of some Sea Rush and terrestrial species such as Purple Moor-grass. This may be related to some extent to the development of extensive *Spartina* swards seaward of the saltmarsh, so that the saltmarsh as a whole (established saltmarsh and *Spartina* sward) has 'moved' seawards. Several large areas formerly covered by spring tides (and probably containing saltmarsh) now are completely covered by sand dunes, indicating natural geomorphological processes. These impacts are not assessed as the most significant change occurred prior to the current monitoring period, but these natural processes are likely to continue in the future. The impact of these natural processes are assessed as neutral.

Other processes such as the spread of MSM and ASM vegetation into the landward side of the *Spartina* sward were also present. However the extent of this transitional vegetation (5-10 m wide) is relatively minor compared to the overall size of the *Spartina* sward (50-100 m

wide). The natural succession of *Spartina* sward to other mid marsh and upper marsh communities is quite slow.

Impacts and activities around the site include recreational use the beach on the other side of the dunes (620), dispersed habitation (403) and grazing and other agricultural practises (120, 140) on the improved grassland adjacent to the saltmarsh along the mainland. Aquaculture (200) is carried on the mudflats adjacent to Inch. These activities have little or no measurable impact on the saltmarsh habitats at Inch.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	623	C	-1	0.25	Inside
1310	954	B	-1	0.2	Inside
1330	140	C	0	9.483	Inside
1330	501	C	0	0.5	Inside
1330	622	C	0	0.5	Inside
1330	900	C	0	0.2	Inside
1330	910	C	+1	0.4	Inside
1330	954	B	-1	3.0	Inside
1330	990	C	0	2.5	Inside
1410	140	C	0	29.012	Inside
1410	143	C	-1	0.1	Inside
1410	501	C	0	1.0	Inside
1410	622	C	0	0.5	Inside
1410	900	C	0	2.0	Inside
1410	954	B	-1	3.0	Inside
1410	990	C	0	7.5	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

Inch saltmarsh is a large site with several features of notable conservation interest. The most notable feature of the site is the relatively intact and natural succession of habitats from fixed dune to wet grassland to saltmarsh and then to mudflats along a seaward gradient. The saltmarsh forms a notable part of this larger coastal ecosystem. Due to the size of the site the saltmarsh is quite diverse and there are well developed examples of several different saltmarsh communities present at the site. A second rarer Annex I *Salicornia flats* subtype (Sagino maritimae-Cochlearietum danicae) (Ephemeral saltmarsh vegetation with *Sagina maritima*) has been recorded from this site. Turf fucoids are the only species of local distinctiveness recorded at this site and these are typical of saltmarsh found along the western coast of Ireland.

Overall the saltmarsh is in good condition. Grazing levels are generally low. The saltmarsh has been modified in the past by drainage and attempted reclamation to one section. These works have altered the structure of the saltmarsh. The spread of Common Cordgrass at this site is also significant and it should be noted that the total estimated area of *Spartina* sward is greater than the established Annex I saltmarsh habitats. The Common Cordgrass has mainly spread on the mudflats adjacent to the saltmarsh and therefore has not had a significant impact on the saltmarsh. However, it is present in some zones including pioneer ASM and *Salicornia* flats and this is the main reason for the overall conservation assessment as *unfavourable-inadequate* (Table 5.1). The extent of *Salicornia* flats is likely to be reduced by this species. *Spartina* swards are likely to continue to spread at this site and threaten the extent of Eelgrass beds and the conservation status of the mudflats at this site (although this habitat is not being assessed).

There is evidence to show that natural habitat succession is occurring at this site. Saltmarsh habitat may have been more extensive in the past but former areas covered by spring tides are now sand dunes. Pioneer saltmarsh is present in a low-lying area near the tip of the sand dune system. This area is relatively young and has developed due to continued accretion of sand and growth of the sand dunes. This area may be a precursor to further development of established saltmarsh in the future and is an example of these natural dynamic processes that are important for a healthy coastal ecosystem. However the tip of Inch sand dune system is quite dynamic and it is not known how this area will change in the future.

The accretion and built of sand dunes and potential saltmarsh at the tip of the sand dune system can also be assessed as part of the larger coastal system of Castlemaine Harbour. Rossbehy sand spit on the opposite side of the bay is suffering from erosion and this is also affecting saltmarsh habitat. The status of saltmarsh habitat at both sites could be assessed as being somewhat in equilibrium with accretion affecting one site and erosion affecting the other.

This site is located within Castlemaine Harbour cSAC. An old format NPWS management plan is available for this cSAC but is now out of date.

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

Habitat	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

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, development or erosion within the current monitoring period. Common Cordgrass is found in this habitat but there is no evidence that it has spread during the current monitoring period to reduce the extent of this habitat, mainly due to the lack of accurate baseline data. This site contains a significant area of this habitat developing at the tip of the sand dune system.

5.2.2 Habitat structure and functions

The structure and functions of this habitat area assessed as *favourable*. Three monitoring stops were carried out in this habitat and all three passed. All the attributes for the favourable status of this habitat reached their targets. The Salicornia flats form part of the wider saltmarsh zonation and form part of the pioneer vegetation at several locations. There are natural transitions to pioneer ASM along the upper boundary of the *Salicornia* flat zone.

There was some damage to the southern section of habitat from vehicle traffic and wheel ruts. Common Cordgrass is present in the two northern sections and as there is no baseline data, is not assessed as having spread significantly within the current monitoring period.

A second rarer Annex I *Salicornia flats* community (Sagino maritimae-Cochlearietum danicae) (Ephemeral saltmarsh vegetation with *Sagina maritima*) was also recorded at this site. It was recorded in its typical situation along the sand dune/saltmarsh interface. The presence of this community was probably under-recorded as it is difficult to identify without detailed survey. This community increases the diversity of this habitat and the site as a whole. This community was previously recorded at this site (Wymer 1984).

5.2.3 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 such as grazing continue in the near future. The main threat to this habitat is the presence of Common Cordgrass. This invasive species has the capacity to continue to spread and reduce the extent of this habitat. Both small areas located in the northern half of the site contain small clumps and seedlings of this species indicating that it is actively spreading. Common Cordgrass is not present in the patch of habitat found at the tip of the island. This area may naturally change in the long-term and develop other saltmarsh vegetation including ASM as the site naturally develops.

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, development, or erosion within the current monitoring period. The overall extent of ASM may have been reduced natural in the past 100 years due to natural habitat succession and geomorphological changes, including shifting sand. Common Cordgrass has spread into the saltmarsh and formed some mosaic but there is no evidence to suggest this occurred during the current monitoring period, mainly due to the lack of baseline data.

5.3.2 Habitat structure and functions

The structure and functions of the ASM area assessed as *favourable*. Ten monitoring stops were carried out in this habitat and they all passed. All of the attributes required for favourable conservation status of this habitat reached their targets. The ASM is in good condition and there are few damaging activities. The grazing intensity was generally low-moderate. Common Cordgrass, an invasive species, is present in this habitat but overall is not frequent and mainly confined to the *Spartina* sward. It is generally found at less than 5% cover with some increased cover in the central section where *Spartina* sward forms mosaics with the ASM. The impact of its spread on species composition is assessed as neutral.

The ASM diversity at this site is relatively high and there are well developed examples of all the major zones present. The zonation is well developed and the ASM is also part of a larger saltmarsh zonation with the other saltmarsh habitats such as MSM, *Salicornia* flats and *Spartina* sward. The ASM is also part of a larger coastal ecosystem and is found in association with fixed dune habitat. There are examples of natural transition zones of gentle gradients between *Salicornia* flats and ASM and also *Spartina* swards and ASM. The saltmarsh topography is well developed as would be expected from a large site such as Inch. There have been some modifications related to attempted reclamation in the 19th and 20th century.

5.3.3 Future prospects

The future prospects of the ASM 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. The ASM is not being affected by any significant negatively impacting activities. Erosion is not a significant feature at this site. Common Cordgrass is the main threat to the ASM habitat. However, this species is not likely to spread significantly into the ASM in the future and only a portion of the ASM is vulnerable to this

species. This includes the pioneer ASM vegetation. The upper and mid marsh zones are much less vulnerable to the spread of this species.

There is evidence of natural habitat succession at this site with saltmarsh habitat being replaced by sand dune habitats. These natural processes are likely to continue in the future. This is a sign of a healthy coastal system when natural changes of this scale are present. There has not been a corresponding accretion and growth of ASM saltmarsh in other parts of the site. The development of *Salicornia* flats at the southern tip of the sand dune system may be a precursor to the future development of ASM at 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 loss of habitat due to land use changes, development, spread of Common Cordgrass or erosion within the current monitoring period. The overall extent of MSM may have been reduced natural in the past 100 years due to natural habitat succession and geomorphological changes, including shifting sand.

5.4.2 Habitat structure and functions

The structure and functions of the MSM habitat are assessed as *favourable*. Thirteen monitoring stops were carried out in this habitat and only one failed. Nearly all of the attributes required for the favourable conservation status of this habitat reached their targets. One stop failed due to heavy poaching levels. However the damaged area is quite minor compared to the overall extent of the MSM (< 1% overall) so the structure and functions are reassessed as *favourable*. The MSM is in good condition and is not being affected by any significantly damaging activities. The grazing intensity in the MSM is low. Some of the MSM could benefit from increased grazing levels as it was somewhat rank in places.

The MSM is quite structurally diverse at this site. Natural features such as salt pans and natural drainage channels are present within the MSM. The structure has been modified by attempted reclamation and drainage in the past. The species assemblage is typical of this habitat. One notable aspect is the presence of a relatively wide zone of transitional wet grassland along the upper boundary of the MSM due to the gentle gradient from the landward to the seaward saltmarsh boundaries. Some of the saltmarsh is quite heterogeneous with a mosaic of MSM, ASM and brackish marsh with stands of Common Reed and Sea Club-rush. Common Cordgrass has also spread into the MSM in places, particularly in the mid section. The impact of its spread on species composition is assessed as neutral. There is some minor spread of Sea Rush into the adjacent *Spartina* sward and mudflats at the lower seaward boundary.

5.4.3 Future prospects

The future prospects of the MSM are assessed as *favourable*. This assessment assumes that the current management activities and level of impacts such as grazing continue in the near future. The MSM is not being affected by any significant negatively impacting activities. The grazing intensity overall is quite low. This habitat is not vulnerable to the significant colonisation by Common Cordgrass, which is present at this site, due to its location in the saltmarsh zonation towards the upper part of the saltmarsh and the fact that the sward is usually so dense.

6 MANAGEMENT RECOMMENDATIONS

There are no specific 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.

Goodwillie, R. (1972). A Preliminary Report on Areas of Scientific Interest in County Kerry. Dublin, An Foras Forbartha.

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)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats	1.241	1.241				
2	Spartina swards	36.552					36.552
3	1330 Atlantic salt meadow	7.87		7.87			
4	1410 Mediterranean salt meadow	27.701			27.701		
5	ASM/MSM mosaic (50/50)	2.813		1.4065	1.4065		
6	ASM/*Spartina* mosaic	0.412		0.206			0.206
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	14.99					
10	*Spartina* clump/mudflat mosaic (50/50)	6.671					3.336
11	Isolated *Spartina* clumps on mud (5%)	65.212					3.261
12	pioneer 1330/1310/*Spartina* mosaic						
13	1410/other SM (CM2) mosaic	0.009			0.005		
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)	7.412					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**170.883**	**1.241**	**9.483**	**29.112**		**43.354**

Legend

- SAC Boundary
- 1310 Salicornia flats
- Spartina swards
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- 1330/1410 mosaic
- Atlantic/Spartina mosaic
- Spartina clump/mudflat mosaic
- Isolated Spartina clumps
- 1410/other SM (CM2) mosaic
- Other Saltmarsh (CM2)
- other
- 1310 monitoring stops
- 1330 monitoring stops
- 1410 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

Inch (Map 1 of 3)

Castlemaine Harbour SAC (000343)

SMP code: SMP0075

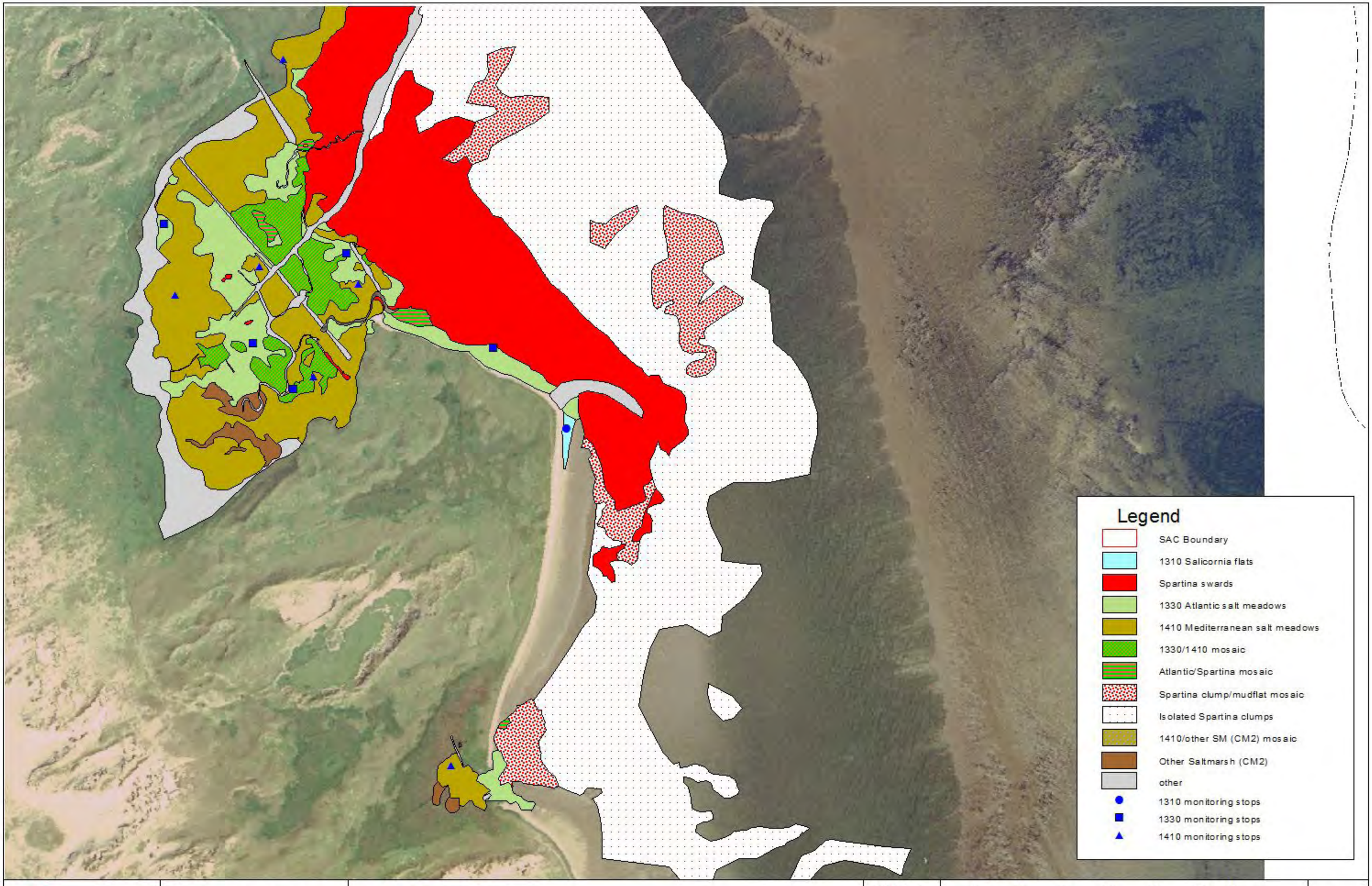
This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953)

0 80 160 240 320 400 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:6000

N



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

Saltmarsh Monitoring Project 2007-2008

Inch (Map 2 of 3)

Castlemaine Harbour SAC (000343)

SMP code: SMP0075

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

0 80 160 240 320 400 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:6000

N

Legend

- SAC Boundary
- 1310 Salicornia flats
- Spartina swards
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- 1330/1410 mosaic
- Atlantic/Spartina mosaic
- Spartina clump/mudflat mosaic
- Isolated Spartina clumps
- 1410/other SM (CM2) mosaic
- Other Saltmarsh (CM2)
- other
- 1310 monitoring stops
- 1330 monitoring stops
- 1410 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

Inch (Map 3 of 3)

Castlemaine Harbour SAC (000343)

SMP code: SMP0075

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

0 80 160 240 320 400 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:6000

N

Rossbehy

1 SITE DETAILS

SMP site name: **Rossbehy**	SMP site code: **SMP0072**
Date of site visit **07/05/2008**	CMP site code: **68**
SM inventory site name: **Rossbehy**	SM inventory site code: **166**
NPWS Site Name: **Castlemaine Harbour**	
NPWS designation cSAC: **343**	MPSU Plan: **old format draft 2 plan available**
pNHA: **343**	SPA: **4029**
County: **Kerry**	Discovery Map: **78** Grid Ref: **064800, 091070**
Aerial photos (2000 series): **O 5986-C; O 6031-A,C,D; 6076-A**	6 inch Map No: **Ke 055, 063**

Annex I habitats currently listed as qualifying interests for Castlemaine Harbour cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **Cromane, Whitegate-Fybagh, Inch**

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

2 SITE DESCRIPTION

Rossbehy saltmarsh is located in south-west Co. Kerry in Dingle Bay. The head of this bay is called Castlemaine Harbour and Rossbehy is a shingle and sand spit containing a sand dune complex that extends into the bay from southern shoreline, about 2.5 km form Glenbeigh. Rossbehy together with Inch sand spit, which extends from the northern shore, forms a natural barrier and shelters the shallower Castlemaine Harbour.

Rossbehy is an important amenity area and the sandy beach along the front of the sand spit is used by locals and by tourists in the area. The beach was awarded a Blue Flag in 2005, indicating that certain minimum standards of water quality and other criteria such as safety provisions and environmental objectives had been met.There is some amenity infrastructure at the neck of the spit including a playground and carpark. A Caravan park was also recently located in the adjacent dunes. The dune system was surveyed by the CMP project (Ryle *et al.* 2009).

The landscape of this area is dominated by upland habitats with very steep slopes along the shoreline that form cliffs further west of Rossbehy. This hillside is dominated by dry heath. Further east of the sand spit there is some low-lying land along the shoreline before the topography rises up steeply to the slopes of the adjacent steep hillside. This low-lying land was formerly reclaimed and an old berm is situated along the shoreline, which is now breached in places. Saltmarsh has developed in the sheltered area along the back of the narrow spit and along the shoreline in front and also behind the old berm. The saltmarsh transitions to wet grassland and Reedbeds in the low-lying land along the shoreline. There is a wide expanse of intertidal sandflats and mudflats between the sand spit and the shoreline

called Rossbehy Creek. The mudflats are found in the more sheltered inner section of the intertidal area where the spit is connected to the mainland. The river Behy flows into this sheltered intertidal area east of the spit and marks the limit of the survey site.

Rossbehy is part of Castlemaine Harbour cSAC (Site Code 000343). This cSAC covers most of the intertidal and sub-tidal parts of Castlemaine Harbour east of Rossbehy and Inch spits. The cSAC also includes the sand dune complexes at Inch and Rossbehy and the shingle spit at Cromane. The cSAC also includes some of the catchments of the Rivers Laune and Maine, which both flow into the head of the bay and forms the estuary of these rivers. Three Annex I saltmarsh habitats are found at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All three habitats are listed as qualifying interests for this SAC. *Spartina* swards are also found on the intertidal flats at this site, although this habitat is not now considered to qualify as an Annex I habitat.

Three other saltmarshes sites listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and located within this cSAC were surveyed during this project, Inch, Cromane and Whitegate-Fybagh. There is additional saltmarsh development in many of the small indentations along the shoreline, including significant areas of unsurveyed saltmarsh located between Cromane and the mouth of the River Laune.

Turf fucoids are the only species of local distinctiveness recorded at this site and these are typical of saltmarsh found along the western coast of Ireland.

Nearly all the saltmarsh habitat is found within the digital cSAC boundary. The entire saltmarsh habitat found on the sand spit is situated within the cSAC. The cSAC boundary then extends to the east and includes most of the saltmarsh habitat within the cSAC. However the outer berm is used as the cSAC boundary in one section and this excludes some saltmarsh habitat that has developed behind the berm.

The saltmarsh was easily accessed from the carpark at Rossbehy.

3 SALTMARSH HABITATS

3.1 General description

This site can be divided into two main sections, the saltmarsh along the back of Rossbehy spit and saltmarsh that has developed along the mainland behind the old berm. These two sections are separated by an intertidal area called Rossbehy Creek.

Saltmarsh along Rossbehy spit.

This saltmarsh was dominated by ASM and also contained some MSM. This saltmarsh was in very bad condition, mainly due to heavy grazing pressure from sheep. There were also small amounts of *Spartina* sward along the edge of the saltmarsh and on the adjacent intertidal flats. The saltmarsh has developed behind a shingle spit at the southern end. There is a natural transition from saltmarsh habitat to fixed dune habitat along a landward gradient. This transition has been modified and disturbed towards the southern end by infilling and the creation of the carpark and associated amenity infrastructure including a playground. The development of the football pitch also affected the structure of part of the transition area between the dunes and the saltmarsh. Further north the ASM saltmarsh is

separated from the sand dunes by bare substrate created by vehicle use and the main track that accesses the northern end of the spit.

The upper boundary of the saltmarsh was difficult to map along this fixed dune grassland/saltmarsh transition in places, particularly around the football pitch. The upper boundary was undulating and indented in places where saltmarsh vegetation extended into shallow hollows between ridges with more typical fixed dune vegetation. The gentle gradient of the saltmarsh/sand dune topography has allowed a wide transitional zone to develop in parts of this site. There is a subtle transition between these habitats in places and the lower saltmarsh habitat frequently contains small mounds with fixed dune vegetation. Sea Rush (*Juncus maritimus*) also spreads into the adjacent fixed dune vegetation in places. Some of these patches dominated by Sea Rush along the upper boundary also contain fixed dune species such as Birdsfoot (*Lotus corniculatus*), Sand Sedge (*Carex arenaria*) Glaucous Sedge (*Carex flacca*) and increased Bryophyte cover.

The lower saltmarsh boundary is marked by a saltmarsh cliff 0.2-0.5 m high in the southern section with sand flats and mudflats adjacent to this boundary. Further north there is an accretion ridge marking the edge of the saltmarsh.

Saltmarsh along the mainland.

This saltmarsh has developed in land that was formerly reclaimed behind a berm. It is dominated by MSM with only a very small area of ASM. The reclamation was not successful and the berm was quickly breached, probably at some time in the 19th century as some of this land in the western section has been mapped as saltmarsh on the 2nd edition six inch map. This berm has been breached in several locations and this land has been allowed to revert back to saltmarsh as the berms have not been maintained. More land towards the east has reverted back to saltmarsh in the past 100 years. The western section is the oldest saltmarsh in this section.

This area is likely to have contained saltmarsh in the past before there were any attempts at reclamation. However it is not known if there is any of this relic saltmarsh left undamaged or unmodified by the attempted reclamation works. There are still signs of old drainage channels and creeks within this section that are likely to have been part of the original saltmarsh topography.

This saltmarsh is sub-divided into several sections by old field boundaries and associated channels. The field boundaries where built on embankments and acted as further sea protection in this low-lying area but tidal inundation still occurs through the drainage channels. There is less saltmarsh development behind the berm towards the east side of this section as the adjacent land is somewhat higher and out of reach of regular spring tides. This saltmarsh transitions at the landward side to brackish Reed beds and to wet grassland in the terrestrial areas. There are also patches of Common Reed (*Phragmites australis*) and Sea Club-rush (*Bolboschoenus maritimus*) extending up some of the artificial drainage channels. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. Parts of the eastern section are eroding, particularly along the seaward boundary, and there are wide channels containing mudflats between the saltmarsh and the old berm.

There are also some patches of saltmarsh located at the north-east corner that are outside the old berm. These patches of saltmarsh are old isolated hags of muddy substrate covered

with a mosaic of ASM and MSM. They are showing signs of erosion and are surrounded by soft mudflats. It is not known if these patches are relic intact saltmarsh as the 1st edition OSI 6 inch map shows that these patches are located within a reclaimed area.

This low-lying area is vulnerable to flooding and a large area was flooded by exceptionally high winter spring tides in 2002, flooding some of the houses built along the Behy River channel at the eastern side. Local reports state that the flood water reached the road at Faha Lodge.

Table 3.1. Area of saltmarsh habitats mapped at Rossbehy.

EU Code	Habitat	Area (ha)
1310	*Salicornia* and other annuals colonizing mud and sand (1310)	0.002
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	7.286
1410	Mediterranean salt meadows (Juncetalia maritimi)	16.096
non-Annex	*Spartina* swards	0.147
	Total	**23.531**

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

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

There is only a very small amount of this habitat mapped at this site. The small patches of *Salicornia* flats were noted in the saltmarsh behind the berm along the shoreline. The *Salicornia* flats habitat is found on the eroding fringe of ASM along the channel behind the berm. Erosion has left some bare mud platforms that are being colonised by Glasswort (*Salicornia* spp.).

A second rarer Annex I *Salicornia flats* subtype (Sagino maritimae-Cochlearietum danicae) (Ephemeral saltmarsh vegetation with *Sagina maritima*) has been recorded from this site in the past. 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. However, it was not recorded during this survey. This community is likely to occur in the complex sand dune/salt marsh interface around the foot pitch on the spit.

3.3 Atlantic salt meadows (H1330)

The ASM is mainly found along Rossbehy spit. The ASM sward is in very bad condition, especially the northern section. This area is quite disturbed from overgrazing and frequent wheel-ruts. The heavy grazing has also affected the zonation of the northern section and the vegetation seems to be fairly uniform and dominated by a low-mid community. The saltmarsh has developed on sandy substrate and the main feature of the topography is the regular small mounds and small pan-like hollows over the surface of the saltmarsh. There is some zonation of the vegetation between these low mounds and hollows. There are few typical creeks in this saltmarsh.

Green algae cover and bare substrate cover is the dominant feature of the sward surface and the vegetation height is quite low. The main species in thee ASM vegetation are Sea Pink (*Armeria maritima*), Sea Plantain (*Plantago maritima*) and Sea Milkwort (*Glaux maritima*) which are all widespread through the habitat but may occur at low frequencies. Other species

present include Sea Aster (*Aster tripolium*), Common Saltmarsh-grass (*Puccinellia maritima*) and Buck's-horn Plantain (*Plantago coronopus*). Turf fucoids are found on bare exposed substrate near the lower boundary. Zonation is evident with some species like Saltmarsh Rush (*Juncus gerardii*) only appearing towards the upper section. Common Saltmarsh-grass is a more prominent feature of the vegetation along the seaward edge of the northern section, especially on the accretion ridge that marks the lower saltmarsh boundary. Glasswort and Annual Sea-blite (*Suaeda maritima*) is also found in this zone. Common Cordgrass (*Spartina anglica*) is present in this section but is very rare.

Further south, tussocks of Sea Rush begin to appear within the ASM. However, their overall frequency is low and only several sections with denser cover have been mapped as MSM. The ASM vegetation assemblage is similar and is dominated by mid marsh species. The southern section shows less damage from vehicle use but is still significantly overgrazed. There are also small mounds with more typical fixed dune grassland towards the upper saltmarsh boundary in places, which contain Sand sedge (*Carex arenaria*). There is some cliff toppling along the lower saltmarsh boundary in the southern section.

There is some ASM developed behind the old berm along the mainland. This ASM is found in the oldest section of saltmarsh. This area contains well-developed salt pans and creeks. The vegetation is dominated by a typical Sea Pink-Sea Plantain mid marsh sward and also contains frequent Common Saltmarsh-grass in places. This vegetation type also contains occasional clumps of Sea Rush. There is some zonation related to subtle differences in the saltmarsh height with increased Sea Plantain and Saltmarsh Rush (*Juncus gerardii*) in places.

ASM is also found on the eroding hags of mud found at the north-east corner of the site. This vegetation is dominated by mid-upper saltmarsh with Sea Plantain and Red Fescue (*Festuca rubra*) prominent. There is also significant cover of green algae in sections. There are also occasional clumps of Sea Rush present and this habitat merges into ASM/MSM mosaic with some patches of MSM.

3.4 Mediterranean salt meadows (H1410)

The MSM is present in both sections of the saltmarsh but is most developed in the saltmarsh along the shoreline. The MSM found along the spit shows frequent transitional indicators along the upper zone. The sward is dominated by Sea Rush and Red Fescue and also includes species such as Saltmarsh Rush, Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush, Sea Plantain and Autumn Hawkbit (*Leontodon autumnalis*). Sea Aster, Sea Pink, Common Scurvygrass (*Cochlearia officinalis*), White Clover (Trifolium repens), Spear-leaved Orache (*Atriplex prostrata*), Sea Milkwort and Lax-flowered Sea Lavender (*Limonium humile*) are also present in this vegetation but are rare. Glaucous Sedge is spreading into the MSM along the upper boundary with the fixed dune grassland. The saltmarsh topography is generally quite uniform with small hummocks and shallow hollows present. There are some small salt pans present but these are rare. There are also small mounds that contain more typical fixed dune grassland with Marram (*Ammophila arenaria*) in places.

The older MSM in the western part of the saltmarsh behind the berm is somewhat unusual as it contains a community with significant cover of Common Cordgrass spread within a mid marsh zone. Other species present this community includes frequent Sea Plantain. This community may have developed where both Sea Rush and Common Cordgrass where colonising bare mud in this area. This saltmarsh is generally quite flat and contains more typical saltmarsh pans. There are also some naturally occurring creeks. Further east there is

some zonation of MSM where there is more typical grassy MSM towards the upper boundary and MSM with Sea Plantain towards the old berm. The grassy MSM contains frequent Red Fescue and Creeping Bent. The low-mid marsh MSM contains frequent cover of Sea Plantain, Sea Pink and some Common Saltmarsh-grass along with sparser cover of clumps of Sea Rush.

This habitat also contains some more brackish communities with a mixture of Saltmarsh Rush, Creeping Bent, Spike-rush (*Eleocharis uniglumis*) and Sea Rush. This vegetation also contains Brookweed (*Samolus valerandi*), Autumn Hawkbit and Sea Aster. This community is found towards the upper boundary of the saltmarsh in the north-east section. This area is quite brackish and there is some development of transitional vegetation due to less tidal influence.

3.5 *Spartina* swards

Spartina swards do not form a significant portion of the saltmarsh habitat at this site. There are some large scattered clumps on the intertidal flats adjacent to the saltmarsh along the spit. These clumps have developed on a sandier substrate and the sand content of the intertidal flats in Rossbehy Creek increases towards the north. These flats are less suitable for the colonisation of Common Cordgrass compared to the mudflats found adjacent to the saltmarsh towards the more sheltered mainland. Further south clumps have coalesced to create a small narrow band of *Spartina* sward on the intertidal flats along the edge of the ASM. Clumps have also colonised the saltmarsh cliff to form a sward/ASM mosaic zone. There are generally very few clumps of Common Cordgrass on the adjacent ASM.

Common Cordgrass is more frequently found within the saltmarsh along the mainland shore and behind the berm. This area is likely to have contained more suitable conditions for colonisation of Common Cordgrass including bare soft mud substrate. However, there are no significantly large areas of Common Cordgrass in this area that could be mapped as *Spartina* sward. Small clumps are more frequently found scattered through the saltmarsh vegetation. An unusual community of Common Cordgrass and Sea Rush has developed in some sections.

4 IMPACTS AND ACTIVITIES

This site is affected by a range of impacts and activities (Table 4.1). The main impact affecting the saltmarsh on the sand spit is grazing and the ASM saltmarsh is very badly overgrazed by sheep (142). This was some of the worst damage seen during the SMP survey around the country. The sand spit is grazed as commonage. There are frequent negative indicators present such as an extremely short sward and frequent cover of green algae on the surface. Poaching damage is also evident. The ASM vegetation assemblage also shows some dwarfing of saltmarsh plants. It should be noted that the upper saltmarsh and the adjacent fixed dune grassland seems to have plenty of foliage available at the time of the survey suggesting that the sheep are selectively grazing the saltmarsh to a greater extent than the fixed dune grassland. One reason for the extreme signs of overgrazing is the timing of the survey close to the start of the growing season within the saltmarsh habitat, so less foliage is typically present anyway. Another factor to be taken into account is that the substrate is based on sand and this type of saltmarsh is more vulnerable to overgrazing. The

CMP site report (Ryle *et al.* 2009) indicated that under-grazing of the dunes was considered to be a problem at Rossbehy. However, rabbit grazing was considered to be high in places.

The saltmarsh along the shoreline between the spit and the River Behy is dominated by MSM and this habitat is much less intensively grazed compared to the saltmarsh on the spit. This section is divided into several enclosures and some of these fields have been improved in the recent past. Some of these fields are being grazed by horses.

The saltmarsh along the spit is also affected by amenity activities. There are several tracks (501) that pass through the saltmarsh habitat and are used by vehicles. The ASM saltmarsh is accessible to vehicles and there are frequent wheel ruts in some sections (623). There are pony trekking tracks across the saltmarsh and repeating trekking is damaging the sward surface and causing minor erosion in places (622). A caravan park was recently located on adjacent dunes close to the saltmarsh and the presence of this caravan park increased the recreational and vehicular pressure on the saltmarsh. However, no caravans were present at the time of the survey.

Part of the saltmarsh has been damaged by adjacent infilling during the current monitoring period as part of the new car-parking area (803). A house is also being constructed on infilled land behind the berm at the north-east corner of the site (within the SAC). This infilled area is likely to have contained some MSM habitat (about 0.15 ha).

Common Cordgrass is present at this site. This is an invasive species of saltmarsh and mudflats (954) and is widely distributed in Castlemaine Harbour. This is its most southerly limit along the western Irish shoreline and it is only found again in Clonakilty Bay, Co. Cork. It is not known when it was planted in Castlemaine Harbour although it is known from this area since the 1960's (Nairn 1986). Common Cordgrass is only very rarely found within the ASM vegetation. Its impact is assessed as neutral. It is more frequently found in the MSM vegetation found behind the old berm. Its impact at this location is assessed a negative as it has formed some mosaic areas. Clumps are found on the adjacent intertidal flats and forming some small patches of sward adjacent to the saltmarsh. The *Spartina* sward cover is quite low (< 1% cover) relative to the cover of ASM and MSM saltmarsh and the remaining intertidal mudflats. Several large clumps are present on the mudflats and there are no indications of any recent recruitment. 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 frequent signs of old coastal reclamation and land improvement along the shoreline between the sand spit and Behy River (802). The main feature is the old breached berm along the current shoreline. The land behind the berm is also drained by deep channels. Much of the land in the western section has reverted back to saltmarsh or was never reclaimed entirely. Land in the eastern section is somewhat higher and is now inundated by the tides significantly.

The first edition OSI six inch map shows that attempts were made to reclaim a large parcel of intertidal land in Rossbehy Creek behind an old seawall between the sand spit and the mainland at the mouth of the Behy River during the 19th century. The low-lying land along the shoreline is mapped as agricultural fields so it is not known if there is any relic saltmarsh in this area that has been left undisturbed from the attempts at reclamation. The remains of this old seawall are still present at the site. This attempted reclamation obviously failed and the current old berm is now marked on the 2nd edition OSI 6 inch map. The position of the current

berm changed between the drawing of the 1st and 2nd edition six inch map at the north-east corner, indicating probable breaches in this section during this time. These historical attempts at reclamation have had a very significant impact on the structure of the saltmarsh along this shoreline. These impacts are not assessed as they occurred prior to the current monitoring period but they are still having a significant residual impact.

Recently there has been some flooding in this area behind the old berm. Several houses adjacent to the north east part of the site were flooded and a lot of the adjacent wet grassland and improved grassland was also flooded. A secondary embankment has now been created to prevent further flooding of this area but this does not affect any saltmarsh habitat.

There are some signs of recent accretion (910) of saltmarsh along the sand spit at this site. There are signs of active accretion at the northern end of the saltmarsh with an accreting ridge down onto the intertidal sand flats. Further south a typical saltmarsh cliff develops indicating that growth is currently absent in this section. A comparison of the OSI 2nd edition 6 inch map to the OSI 2005 series aerial photos shows that there has been significant growth of fixed dune and saltmarsh (of up to 250 m in one section around the football pitch) into Rossbehy Creek during this period.

There are visible signs of erosion of saltmarsh at the north-east corner of the site where relic hags of saltmarsh vegetation are being eroded (900). Cliff toppling is present. These small saltmarsh hags were mapped on the 2nd edition 6 inch map but have got smaller since this map was drawn (in comparison with the current aerial photos). However, the actual loss of saltmarsh is quite low and of the order of about 0.1 ha within the past 100 years. The damage to the berm along the shoreline is also an indication of an erosional trend in this area. There also seems to be erosion of saltmarsh from behind the berm, possibly due to tidal scour. There are some wide sections of bare intertidal flats present where there was previously terrestrial land or saltmarsh marked on the 2nd edition 6 inch map. A saltmarsh cliff is also present along the southern section of the saltmarsh along Rossbehy spit with some cliff toppling. However, a comparison of the 1995, 2000 and 2005 OSI aerial photos series indicates shows that there has been no measurable loss of habitat during the current monitoring period. Erosion is assessed as having a low negative impact on this ASM. There are good prospects for retreat of saltmarsh in the area behind the embankment.

The main Impacts and activities around the site are related to farming and to amenity use of Rossbehy sand dunes and adjacent beach. Farming activities such as mowing/cutting (102), fertilization (120) and grazing (140) occur in some of the adjacent low-lying land along the coastline in the south-east corner of the site. However, farming is not intensive in this area. The Rossbehy spit, beach and dunes are used for activities such as swimming, walking, camping, horse-riding etc. The southern part of the spit has been significantly modified to develop the car-park and playground (600). Some of the adjacent dune grassland has been modified to create a football pitch (600). These impacts have already been assessed or facilities were developed before the current monitoring period. Some recent infilling in the southern section of the spit has already been assessed. Other impacts around the area include dispersed habitation (403) and minor roads (502). These activities have little or no measurable impact on the saltmarsh habitats.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	142	A	-1	4.00	Inside
1330	501	C	-1	1.2	Inside
1330	622	C	-1	1.2	Inside
1330	623	B	-1	1.2	Inside
1330	900	C	-1	0.5	Inside
1330	910	C	+1	1.0	Inside
1330	954	C	0	0.001	Inside
1410	140	C	0	5.0	Inside
1410	501	C	0	0.5	Inside
1410	622	C	0	1.0	Inside
1410	954	B	-1	2.0	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the 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 was no specific information available for this site.

Rossbehy saltmarsh is a moderate-large site with several features of notable conservation interest. These include the natural transition between the saltmarsh and fixed dune habitat. There is also a significant area of saltmarsh developing in previously reclaimed land behind the old berm along the shoreline. A second rarer Annex I *Salicornia flats* subtype (Sagino maritimae-Cochlearietum danicae) (Ephemeral saltmarsh vegetation with *Sagina maritima*) has been recorded from this site in the past but was not recorded during this survey. A significant part of the transition zone between the sand dunes and the saltmarsh has been modified by a track and by the creation of a football pitch and other infrastructure. However, this rare vegetation community is still likely to be present as there is suitable habitat still present. Turf fucoids are the only species of local distinctiveness recorded at this site and these are typical of saltmarsh found along the western coast of Ireland.

A significant pert of the saltmarsh along Rossbehy spit is in very bad condition due to heavy grazing levels, vehicle activity and other amenity use. The overall conservation status of the site is assessed as *unfavourable-bad*. The overgrazing damage and the occurrence of negative indicators such as green algae cover was probably the worst seen during the SMP survey. The CMP report assessed the condition of three of five sand dune habitats as *unfavourable-inadequate* and one habitat assessed as *unfavourable-bad*. However, overgrazing was not considered to be a significant problem.

The recent erosion of Rossbehy dunes (December 2008) is not likely to directly affect the saltmarsh habitat but may have indirect impacts in the future. These may include changes in sedimentation patterns and changes in erosional and accretion trends affecting the saltmarsh. There has been some dynamic changes and growth of saltmarsh and sand dunes in one section of the spit during the past 100 years and this growth probably reflects adjustments after the failed reclamation of a large part of Rossbehy Creek and wider sedimentation patterns within Castlemaine Harbour including interactions with Inch.

This site is located within Castlemaine Harbour cSAC. An old format NPWS management plan is available for this cSAC but is now out of date.

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

Habitat	**EU Conservation Status Assessment**			
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**	**Overall EU conservation status assessment**
Salicornia flats (1310)	Extent Structure and functions Future prospects			Favourable
Atlantic salt meadows (1330)	Extent		Structure and functions Future prospects	Unfavourable - Bad
Mediterranean salt meadows (1410)	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 this habitat is assessed as *favourable*. There are no indications of any loss of habitat due to land use changes, development or erosion within the current monitoring period. Only a very small area of this habitat was mapped at the site.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Due to the relatively small extent of habitat along the mainland no monitoring stops were recorded. However a visual assessment indicated that the *Salicornia* habitat was in good condition. No clumps of

Common Cordgrass were noted in association with this habitat. The *Salicornia* flats habitat is poorly developed due to its relatively small size.

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 grazing continue in the near future. The habitat is not affected by any significantly damaging impacts or activities at present. Greater extent of *Salicornia* flats could have been expected at this site as there is suitable habitat towards the northern end of the saltmarsh where there is an accretion ridge.

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, spread of Common Cordgrass, development or erosion within the current monitoring period. There is an accretional trend acting on the saltmarsh at the northern end of the saltmarsh along the spit while there is an erosional trend acting on saltmarsh at the north-east corner of the site. However, there was no measurable loss or gain of saltmarsh during the current monitoring period.

5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-bad*. Eight monitoring stops were carried out in this habitat and seven failed. This is the worst result recorded during the SMP project and reflects the extensive damage to the ASM from high levels of overgrazing and poaching as well as wheel ruts and poaching from pony/horse trekking. There are frequent negative indicators present such as green algae cover, bare substrate cover and dwarfing of saltmarsh species. The excessive grazing has also affected the saltmarsh zonation and species assemblage of the ASM along the spit. The vegetation is dominated by a ubiquitous mid marsh sward but there is some zonation of species with Common Saltmarsh-grass found at the lower boundary and Saltmarsh Rush found at the upper boundary.

Rossbehy saltmarsh does contain some features of notable interest including natural transitions from fixed dune grassland to ASM saltmarsh and from ASM to MSM saltmarsh. Vehicle activity along the track has removed the transitional zone between ASM and fixed dune in one section. Common Cordgrass is present at this site but is only found very rarely in the ASM. The impact of its spread during the current monitoring period is assessed as neutral. There is also an accretion ridge along part of the lower ASM boundary.

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 such as grazing continue in the near future. The habitat is currently being significantly affected by overgrazing and vehicle damage. The un-licensed caravan park that was located adjacent to the ASM has been removed and this should have a positive impact on reducing the vehicle pressure on the saltmarsh habitat.

It should be noted that the CMP report on the conservation status of the sand dunes stated that the vegetation of the dunes was rank and dominated by Marram and stocking levels were too low. The NPWS Conservation management plan also states that Rossbehy dunes were ungrazed for many years and this affected the diversity of the dune grassland. The site is owned by Kerry County Council so grazing levels in general should be easily regulated. However, this problem was seen at several other sand dune complexes that are grazed as open commonage where sheep selectively overgraze the saltmarsh but the adjacent sand dunes may contain more abundant foliage. This issue needs careful consideration.

The site is also vulnerable to continuing erosion in the future. There is an erosional trend acting on the saltmarsh at the north-east corner and on some of the saltmarsh located behind the berm.

The ASM may be vulnerable to continued spread of Common Cordgrass due to the heavy grazing pressure and poaching, which creates suitable bare substrate for possible colonisation. However, this colonisation has occurred at a very slow rate in the past and is likely to continue in the future. Continued erosion may also create conditions suitable for the colonisation of Common Cordgrass.

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, development 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*. Ten monitoring stops were carried out in this habitat and they all passed. All the attributes required for favourable conservation status reached their targets. The structure and functions of the MSM are in generally good condition. There are few negative indicators. This habitat is not affected to the same extent as ASM to the heavy grazing levels and the sheep generally avoid the dense swards dominated by Sea Rush. Some sections of the MSM are locally damaged by poaching and overgrazing and there are patches of mosaic where the ASM surrounding the tussocks of MSM is grazed to a very low level.

The species assemblage of the MSM is typical of this vegetation type. There is some zonation of the MSM into different communities. The gentle gradients between the saltmarsh and sand dunes means that a relatively wide transitional zone containing features of both habitats is present along the upper MSM boundary on the sand spit. There is some transition from MSM to other saltmarsh vegetation dominated by Common Reed and wet grassland in the section located behind the old berm. The structure of the MSM habitat along the dunes is typical of this habitat. However the structure of the MSM found behind the old berm has been significantly modified by the attempted reclamation in the past.

Common Cordgrass is present within some of the MSM and has formed mosaic areas in places behind the berm where its cover is relatively high (20-40%). The impact of its spread is assessed as neutral as there is no evidence to suggest it has spread in this area during the current monitoring period, mainly due to the lack of accurate baseline data.

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 such as grazing continue in the near future. This habitat is not currently being affected by grazing or by the other negatively impacting activities to the same extent as the ASM. The MSM is also less vulnerable to erosion compared to the ASM, generally because most of the MSM is protected to some extent by the ASM or by the old berm. Erosion of the western section of saltmarsh along the shoreline may eventually threaten the extent of MSM in the long-term, but there are prospects for natural retreat of saltmarsh towards the east into the low-lying area containing wet grassland.

There is some MSM present behind the old berm that contains an unusual vegetation type with Sea Rush mixed with Common Cordgrass. This species is an invasive species. However, it is unlikely to continue to spread significantly in this vegetation to form dense swards of *Spartina* swards. The presence of this species is likely to be related to the development of saltmarsh and colonisation of bare mud in this area after the failed reclamation attempts. Continued erosion in the area behind the berm may increase the potential for the spread of *Spartina* sward at the expense of MSM.

6 MANAGEMENT RECOMMENDATIONS

Kerry County Council should consider restricting vehicle access to the sand dune complex to reduced damage to the saltmarsh and the saltmarsh/sand dune interface.

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.

Goodwillie, R. (1972). A Preliminary Report on Areas of Scientific Interest in County Kerry. Dublin, An Foras Forbartha.

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

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)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats	0.002	0.002				
2	Spartina swards	0.143					0.143
3	1330 Atlantic salt meadow	7.009		7.009			
4	1410 Mediterranean salt meadow	15.792			15.792		
5	ASM/MSM mosaic (50/50)	0.560		0.28	0.28		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	12.131					
10	*Spartina* clump/mudflat mosaic (50/50)						
11	Isolated *Spartina* clumps on mud (5%)	0.059					0.004
12	pioneer 1330/1310/*Spartina* mosaic						
13	1410/other SM (CM2) mosaic	0.047			0.02		
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)	1.134					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**36.911**	**0.002**	**7.286**	**16.096**		**0.147**

Legend

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

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

Saltmarsh Monitoring Project 2007-2008

Rossbehy

Castlemaine Harbour SAC (000343)

SMP code: SMP0072

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

0 60 120 180 240 300 Meters

N

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:5000

Tahilla

1 SITE DETAILS

SMP site name: **Tahilla**		SMP site code: **SMP0070**	
Date of site visit **05/08/2008**		CMP site code: **N/A**	
SM inventory site name: **Tahilla**		SM inventory site code: **173**	
NPWS Site Name: **Kenmare River & Drongawn Lough**			
NPWS designation	cSAC: **2158/2187**	MPSU Plan: **x**	
	pNHA: **N/A**	SPA: **N/A**	
County: **Kerry**		Discovery Map: **84**	Grid Ref: **073000, 064375**
Aerial photos (2000 series): **O 6446-C; O 6485-A**		6 inch Map No: **Ke 100**	

Annex I habitats currently listed as qualifying interests for Kenmare River cSAC:

H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

H1410 Mediterranean salt meadows (Juncetalia maritimi)

Annex I habitats currently listed as qualifying interests for Drongawn Lough cSAC:

None

Other SMP sites within this SAC/NHA: **West Cove, Dinish, Dereen House**

Saltmarsh type: **Fringe** Substrate type: **Peat Humus, Stumps**

2 SITE DESCRIPTION

Tahilla saltmarsh is located in south-west Co. Kerry along the northern shore of Kenmare River and 4.8 km south-east of Sneem. The survey site is located in a small enclosed bay that is connected to Conngar Harbour to the east and is sheltered from the main bay by a small outcrop of land. This small outcrop of land also encloses Drongawn Lough to the south-west, which is an enclosed lagoon. There is a rocky ridge separating Drondawn Lough from the outer channel. The landscape of this area is dominated by semi-natural habitats with hilly knoll and hollows mainly covered with wet heath, wet grassland, exposed rock and some blanket bog. There are also some small lakes and wetland areas in hollows. This area is quite remote and accessed by some minor roads and there are some scattered houses in the area. The survey site includes the part of the shoreline west of a small bridge that crosses the very narrow channel and divides the enclosed bay into two sections.

Drongawn Lough is known as a coastal lagoon and has been included in some national surveys of Irish lagoons for NPWS (Healy *et al.* 1997, Oliver 2005, NPWS 2007). Oliver (2005) classified Drongawn Lough as a 'saline lake' lagoon type, which generally has a rock barrier. The vegetation of this lagoon was classified a '*Ruppia/Zostera'* type lagoon by Oliver (2005), which generally have a high salinity. Healy *et al.* (1997) surveyed the marginal vegetation around the lough. There is a very narrow tidal connection between the outer bay and Drongawn Lough.

Saltmarsh has developed in several small sheltered patches around the shoreline and there are also several small 'islands' within the bay containing saltmarsh. The patches of saltmarsh

are fragmented and other habitats are found along the shoreline including exposed rock. The saltmarsh fringe extends along the shoreline and into Drongawn Lough.

This saltmarsh is one of the few saltmarsh sites that is found in two different cSACs that are located adjacent to each other. The outer section is located within the Kenmare River cSAC (0002158) while the inner section is located in Drongawn Lough cSAC. Kenmare River SAC covers most of the marine parts of Kenmare River and it contains a diverse range of marine habitats. Some sections of coast have also been included such as the sand dune and saltmarsh complex at Derrynane. Dongawn Lough was designated as a cSAC chiefly for the presence of a coastal lagoon. Two Annex I saltmarsh habitats are found at this saltmarsh, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Both these habitats are listed as qualifying interests for Kenmare River but are not listed for Drongawn Lough.

Three other saltmarshes sites listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and located within this cSAC were surveyed during this project. These include Dereen House and Dinish along the southern side of Kenmare River, and West Cove located further west of Dinish along the northern side. Two other saltmarsh sites listed on the SM inventory along the northern side of Kenmare River, Sneen and Derrynane, were not surveyed during the SMP. There is additional minor saltmarsh development in many of the small indentations along the shoreline.

Most of the saltmarsh habitat found at this site is positioned inside the digital SAC boundaries of both SACs. There are several small fragments of habitat found outside the SAC boundary where the lower shoreline was used to mark the SAC boundary and the saltmarsh extends above this mark in several instances.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh at this site is dominated by Mediterranean salt meadows (MSM) (Table 3.1). There are only several small patches of Atlantic salt meadows (ASM) around the site. The saltmarsh is generally not well developed and is mainly represented as a narrow fringe of habitat along the shoreline. The saltmarsh habitat is fragmented into different sections and some of the shoreline around the outer bay section is marked by exposed bedrock where the shoreline is too steep to allow development of saltmarsh. Much of the saltmarsh has developed on peat, particularly in the outer bay and this is typical of a ‘fringe’ type saltmarsh. Some of the saltmarsh is perched on quite deep peat with tall peat face-banks along the lower saltmarsh boundary. The saltmarsh around the margins of Drongawn Lough can be classified as a ‘lagoon’ type saltmarsh. Curtis and Sheehy-Skeffington (1998) classified this site as a ‘fringe’ type saltmarsh although their classification probably does not include Dromgawn Lough.

There is some development of transitional brackish vegetation along the upper saltmarsh boundary in places where saltmarsh has developed in low-lying narrow inlets. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. Saltmarsh transitions to stands of Common Reed (*Phragmites australis*) and some Sea Club-rush (*Bolboschoenus maritimus*) in these low-lying areas and there are also further transitions to wet grassland along a gentle landward gradient. These types of vegetation succession are rarely seen around the site as most of the

saltmarsh is found on quite steeply sloped land so the upper saltmarsh boundary is quite distinct. The saltmarsh is mainly found adjacent to wet or dry heath with Heather (*Calluna vulgaris*), Purple Moor-grass (*Molinia caerulea*), Deergrass (*Trichophorum cespitosum*) Bell Heather (*Erica cinerea*), Bog Cottons (*Eriophorum* spp.) and Gorse (*Ulex europaeus*) most prominent. Some of the saltmarsh found in the outer bay is found adjacent to broad-leaved woodland.

There is also some transitional brackish vegetation developing along a channel that connects to a small lough to the east called Drongaun Lough Little. This area contains a mosaic of more typical peat-influenced wet grassland and heath vegetation dominated by Purple Moor-grass (*Molinia caerulea*) and also containing terrestrial species such as Black-Bog-rush (*Schoenus nigricans*), Bog Cottons, Creeping Bent (*Agrostis stolonifera*) and brackish species such as Brookweed (*Samolus valerandi*). This area has been disturbed by drainage in past and the natural channel connecting the small lough to the larger lagoon has been deepened in the past. The emergent and marginal vegetation in the Drongaun Lough Little is dominated by Common Reed beds and wet grassland is prominent around the east sides of this lough. A transitional type vegetation zone with a mixture of Sea Rush and Purple Moor-grass is also found along the upper boundary of the saltmarsh around the south side of Dongawn Lough.

The marginal saltmarsh vegetation transitions to open water in the lagoon at the lower saltmarsh boundary and there is no significant intertidal zone. The outer section has a more typical intertidal zone and there is bare peat exposed along the lower saltmarsh boundary and some patches of mud and mixed substrate are exposed at low tide along the lower saltmarsh boundary.

The marginal vegetation around Drongawn Lough is typical MSM saltmarsh vegetation. This is an indication of the high salinity and tidal influence on this lough and saltmarsh vegetation was more extensive and there were fewer brackish indicators in the saltmarsh vegetation around this lagoon compared to other lagoons examined during the SMP. There are some sections along the south-east margin of Drongaun Lough where the upper saltmarsh boundary is quite difficult to map because the marginal habitats are quite heterogeneous and wet grassland and Gorse-dominated scrub may extend to the margin of the lough.

Table 3.1. Area of saltmarsh habitats mapped at Tahillia.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.073
1410	Mediterranean salt meadows (Juncetalia maritimi)	2.066
	Total	**2.139**

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

3.2 Atlantic salt meadows (H1330)

There are few patches of ASM at this site. These patches are mainly dominated by Red Fescue (*Festuca rubra*) and Sea Plantain (*Plantago maritima*). Other species present include Sea Pink (*Armeria maritima*), Sea Arrowgrass (*Triglochin maritimum*) and Common Scurvy-grass (*Cochlearia officinalis*). Some of these patches are poached. This habitat is quite poorly developed at this site and there are only several ASM vegetation communities found at this site.

3.3 Mediterranean salt meadows (H1410)

This habitat was typically dominated by dense Sea Rush (*Juncus maritimus*). Some of the vegetation is quite dense with almost complete Sea Rush cover and has few other species. Other sections are typically dominated by tussocks of Sea Rush and also contain frequent cover of Red Fescue and Creeping Bent. Other species noted in this habitat include Sea Pink, Sea Plantain, Lax-flowered Sea Lavender (*Limonium humile*), Sea Spurrey (*Spergularia media*), Common Scurvy-grass, Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*), Autumn Hawkbit (*Leontodon autumnalis*), White Clover (*Trifolium repens*), Long-bracted Sedge (*Carex extensa*), Distant Sedge (*Carex distans*), Brookweed and Sea Arrowgrass.

There is no significant zonation within the MSM vegetation. The main indication of zonation is the appearance of Purple Moor-grass and other terrestrial species, which may also be found within this vegetation along the upper boundary in places. Common Reed also spreads into the MSM in places around the lagoon. Small patches of ASM vegetation may also be found within the MSM vegetation.

The saltmarsh topography at this site is poorly developed. Much of the habitat is quite narrow (1-3 m wide) along the shoreline, although there are several sections where there is more extensive MSM about 50 m wide. There are few salt pans and creeks within the vegetation at this site.

4 IMPACTS AND ACTIVITIES

There are few impacts and activities affecting the saltmarsh habitat at this site (Table 4.1). The main impact affecting this site is cattle grazing (140) and some of the saltmarsh is damaged somewhat by poaching (143).

There is no sign of significant erosion (900) at this site even though some erosion features are present. A comparison of the OSI 6 inch map to the current extent of saltmarsh shows that there has been no significant loss of saltmarsh at this site during this period. Most of the saltmarsh is quite sheltered within the lagoon. Erosion is assessed as having a neutral impact on the saltmarsh of this site

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	C	0	0.073	Inside
1410	140	C	0	1.566	Inside
1410	143	C	-1	0.05	Inside

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

There are few impacts and activities around this site. The main impact is cattle grazing with some cattle roaming over the heath and wet grassland found around the site. Farming is not intensive around this site. Other impacts and activities include scattered dwellings (403) and minor roads and tracks accessing land around this area (502). 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 was no specific information available for this site from the NHA survey. There is more detailed information available from the Drongawn Lough lagoon survey (Healy *et al.* 1997).

Tahillia saltmarsh is a small site with few features of particular conservation interest in the saltmarsh habitat. One key point of interest is the development of MSM around the margins of Drongaun Lough lagoon. The overall conservation status of the site is *favourable*. The saltmarsh is in good condition. NPWS (2007) assessed the conservation status of lagoons around the county and assessed Drongaun Lough lagoon as having a favourable conservation status. The lagoon is not considered to be affected by any damaging activities.

This site is located within Drongaun Lough and Kenmare River cSAC. A NPWS Conservation management plan is not available for this cSAC.

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

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

5.2 Atlantic salt meadows (H1330)

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

5.2.1 Habitat structure and functions

The structure and functions of this habitat were assessed as *favourable*. Due to the relatively small extent of habitat no monitoring stops were recorded. However, a visual assessment indicated that the ASM habitat was in generally good condition. There was some damage from poaching in places although this affected a minor area.

5.2.2 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 grazing continue in the near future. The habitat is not affected by any significantly damaging impacts or activities at present.

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, 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 *favourable*. Five monitoring stops were carried out in this habitat and they all passed. All the attributes required for favourable conservation status reached their targets. The structure and functions of the MSM are in generally good condition. There are no significant negative indicators within this habitat. Some minor poaching was noted.

The species assemblage of the MSM is typical of this vegetation type. There is no zonation of the MSM into different communities although some zonation of different species was noted and there is some development of a transitional brackish zone along the upper boundary of the saltmarsh with a mixture of Purple Moor-grass and Sea Rush. The saltmarsh topography within this habitat is poorly developed due to its relatively small size and most of the habitat is quite narrow (< 5m wide).

Healy *et al.* (1997) described and mapped the marginal vegetation around the lagoon. A comparison to this survey shows that the vegetation around the site has not changed significantly.

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 such as grazing continue in the near future. The habitat is not affected by any significantly damaging impacts or activities at present.

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.

Healy, B., Hatch, P., Oliver, G., & Good, J. (1997). Coastal lagoons in the Republic of Ireland. Vol III. Lissagriffin Lake. Unpublished report for NPWS. www.npws.ie

NPWS (2007). *Conservation Assessment of Coastal lagoons in Ireland*. NPWS. www.npws.ie.

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)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	0.064		0.064			
4	1410 Mediterranean salt meadow	2.066			2.066		
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)	2.892					
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)	0.117					
19	1330/rocky shore mosaic	0.018		0.009			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**5.157**		**0.073**	**2.066**		

Legend

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

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

Saltmarsh Monitoring Project 2007-2008

Tahilla

SMP code: SMP0070

0 60 120 180 240 300 Meters

N

Drongawn Lough SAC (002187) & Kenmare River SAC (002158)

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:4000

West Cove

1 SITE DETAILS

SMP site name: **West Cove**	SMP site code: **SMP0071**
Date of site visit **06/08/2008**	CMP site code: **N/A**
SM inventory site name: **West Cove**	SM inventory site code: **171**
NPWS Site Name: **Kenmare River**	
NPWS designation cSAC: **2158**	MPSU Plan: **N/A**
pNHA: **N/A**	SPA: **N/A**
County: **Kerry**	Discovery Map: **84** Grid Ref: **057330, 059005**
Aerial photos (2000 series): **O 6520-C,D**	6 inch Map No: **Ke 106**

Annex I habitats currently listed as qualifying interests for Kenmare River cSAC:

H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

H1410 Mediterranean salt meadows (Juncetalia maritimi)

Other SMP sites within this SAC/NHA: **Dinish, Tahillia, Dereen House**

Saltmarsh type: **Fringe** Substrate type: **Phragmites**: **Peat**

2 SITE DESCRIPTION

West Cove saltmarsh is located in south-west Co. Kerry, 2.5 km east of Caherdaniel. The site is located near the mouth of Kenmare River and along the northern shoreline. The site is located in a small sheltered bay called Cove Harbour. This small bay is sheltered by a small headland called Knocknasullig. The bay contains several small rocky islands. The landscape of this area is dominated by upland habitats with hills and mountains the main landscape feature close the shoreline. The main habitats are wet heath, exposed rock and wet grassland. There is some development of improved grassland and woodland on the lower slopes close to the shoreline. The N70 road or part of the Ring of Kerry passes close to the site. There are scattered dwellings along this road and along a minor road that accesses Knocknasullig.

Saltmarsh has developed at the head of this small bay. The site is divided by a bridge/embankment that carries the minor road and some saltmarsh is found west of the road and cut off from the main bay. There is also a small amount of saltmarsh found in an adjacent small inlet further along the northern shoreline. The shoreline along the bay is quite irregular with frequent indentations and small knolls of exposed bedrock. Saltmarsh development is variable and discontinuous along both the northern and southern shorelines. The variable topography along the shoreline divides the saltmarsh into sections divided by exposed bedrock, which forms part of the shoreline in places. The small bay partially empties at low tide to expose intertidal mud and mixed sediment.

The site is located within the Kenmare River cSAC (0002158). This cSAC covers most of the marine parts of Kenmare River and it contains a diverse range of marine habitats. Some sections of coast have also been included such as the Sand dune and saltmarsh complex at Derrynane. Two Annex I saltmarsh habitats are found at this site, Atlantic salt meadows

(ASM) and Mediterranean salt meadows (MSM). Both these habitats are listed as qualifying interests for this cSAC. Three other saltmarshes sites listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and located within this cSAC were surveyed during this project. These include Dereen House and Dinish along the southern side, and Tahillia located along the northern side of Kenmare River. Two other saltmarsh sites listed on the SM inventory along the northern side of Kenmare River, Sneen and Derrynane, were not surveyed during the SMP. There is additional minor saltmarsh development in many of the small indentations along the shoreline.

A substantial part of the saltmarsh habitat found at this site is positioned outside the digital cSAC boundary. This is mainly because the lower shoreline boundary on the OSI 6 inch map was used as the cSAC boundary along this part of the shoreline and some saltmarsh habitat is positioned above this boundary. Several fields also containing saltmarsh have also been excluded from the cSAC.

The site was easily accesses via the minor road in this area. The shoreline was accessed at the bridge and at several sites around the bay after crossing adjacent land. The saltmarsh west of the bridge was not surveyed in detail due to the presence of cattle.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh development is quite variable at this site due to the variable shoreline topography. The saltmarsh is dominated by Mediterranean salt meadows (Table 3.1). Large Flat uniform stands of MSM are located in several sections on both sides of the bridge and minor road accessing Knocknasullig. Some of this MSM is found on small isolated ‘islands’ and these also contain terrestrial mounds with wet grassland, scrub and rocky knolls. These sections of MSM have developed on peat and there are steep bare face-banks about 0.5-1 m high along the lower saltmarsh boundary. There are several grassy patches of ASM around the main bay shoreline.

Further MSM is distributed as a band of habitat along the shoreline and is poorly developed being only several metres wide in places on a moderately sloped shoreline. There is greater saltmarsh development in some of the lower-lying sheltered indentations along the shoreline. The band of habitat is discontinuous and much of the shoreline is marked by exposed bedrock, which is covered with brown algae below the shoreline. The lower saltmarsh boundary is generally marked by a typical saltmarsh cliff < 0.5 m high. Some old tree stumps are being exposed along the lower saltmarsh shoreline.

There is a second smaller inlet towards the north-eastern part of the bay. This inlet was partially enclosed in the past by an old seawall. This inlet leads into a low-lying area now containing wet grassland, but which previously was covered by spring tides. There is some typical MSM and ASM along the shoreline of this small inlet and there are natural transitions to other saltmarsh vegetation dominated by Common Reed (*Phragmites australis*) and Sea Club-rush (*Bolboschoenus maritimus*) along the deep drains draining this area and flowing into the inlet. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification.

Wet grassland is usually found adjacent to the upper boundary of the saltmarsh around the site, with some exposed rock and scrub along the upper boundary in places.

Table 3.1. Area of saltmarsh habitats mapped at West Cove.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.246
1410	Mediterranean salt meadows (Juncetalia maritimi)	1.952
	Total	**2.198**

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

3.2 Atlantic salt meadows (H1330)

The ASM at this site is poorly developed and confined to several small patches. The ASM at this site is dominated by mid-upper grassy vegetation. The ASM has developed on peat in most instances, with some of the habitat developed on mud. This community is dominated by Red Fescue (*Festuca rubra*) and contains small amounts of other species such as Sea Plantain (*Plantago maritima*), Common Scurvygrass (*Cochlearia officinalis*), Saltmarsh Rush (*Juncus gerardii*), Buck's-horn Plantain (*Plantago coronopus*), Sea Arrowgrass (*Triglochin maritimum*), Sea Milkwort (*Glaux maritima*), White Clover (*Trifolium repens*), Creeping Bent (*Agrostis stolonifera*), Curled Dock (*Rumex crispus*) and Autumn Hawkbit (*Leontodon autumnalis*). This section also contains small tussocks of Sea Rush but at low densities. There is some natural saltmarsh zonation within this vegetation and the upper saltmarsh boundary is marked by the appearance of species such as Glaucous Sedge (*Carex flacca*), Soft Rush (*Juncus effusus*) and Jointed Rush (*Juncus articulatus*).

A second mid marsh community was noted at another location and this community was dominated by a combination of Sea Plantain and Red Fescue. Lower marsh communities are poorly developed at this site but Common Saltmarsh-grass, Lax-flowered Sea Lavender (*Limonium humile*) and Sea Aster (*Aster tripolium*) were noted along the lower saltmarsh boundary in places. The saltmarsh topography was poorly developed within the ASM but this is typical of these small patches of habitat. One patch near the bridge is not grazed and has a tall sward while a second section along the southern boundary is grazed with light to moderate levels.

3.3 Mediterranean salt meadows (H1410)

This habitat was typically dominated by a dense sward of Sea Rush that covered the shoreline with an irregular topography. The cover of this species varies between dense cover of > 75% to patchier sward with frequent cover of Red Fescue and smaller amounts of Creeping Bent and Saltmarsh Rush. Other species typically found within this habitat include Sea Pink, Common Scurvy-grass, Autumn Hawkbit, Sea Arrowgrass, Sea Aster, Sea Milkwort and White Clover. Lax-flowered Sea Lavender was noted in this habitat where Sea Rush had spread into the secondary inlet, marking a lower zone habitat type.

The saltmarsh topography was generally poorly developed in this habitat and only small salt pans were present in places, which is typical of these relatively small saltmarshes. The sward height was generally quite high between 0.5-1 m high.

Common Reed and Sea Club-rush were noted spreading within the MSM near the landward boundary in the secondary inlet. There was a natural vegetation succession along a landward gradient from typical MSM to patches of Common Reed and Sea Club Rush along the drains and then to a brackish wet grassland community dominated by Purple Moorgrass (*Molinia caerulea*) but containing hollows with saltmarsh species such as Sea Plantain, Saltmarsh Rush and Common Scurvygrass.

4 IMPACTS AND ACTIVITIES

The main impact and activity around the site is grazing (Table 4.1). Some saltmarsh along the southern side of the bay is grazed by cattle (140), as is the saltmarsh west of the bridge. There is some localised heavy poaching in places but this only affects a minor area. Much of the other saltmarsh was not been regularly grazed but may have been grazed in the past.

Some of the shoreline north-west of the bridge has been modified by infilling (803) during the current monitoring period and an embankment has been created along the shoreline. However, this infilling has probably only affected a very small patch of MSM. Some of the low-lying land located adjacent to the secondary inlet has been modified by drainage in the recent past (810) with the drains cleaned and deepened at some time during the current monitoring period.

The site has been modified in the past with some of the largest sections of saltmarsh located west of the bridge and in the secondary inlet modified by drainage. The main section of saltmarsh has also been modified by the construction of the embankment and bridge in the past 100 years where there was formerly a ford. Attempts have also been made to reclaim land in the area within the secondary inlet with the construction of the seawall in the past. These impacts are not assessed as they occurred outside the current monitoring period, although some are still having a residual impact. The construction of the bridge and embankment has had the most significant impact on this saltmarsh.

There is no sign of significant erosion (900) at this site even though some erosion features are present. A comparison of the OSI 6 inch map to the current extent of saltmarsh shows that there has been no significant loss of saltmarsh at this site during this period. The impact of erosion is assessed as neutral on a relatively small proportion of the saltmarsh face.

The main Impacts and activities around the site include farming, which is not very intensive and includes mowing (120) and grazing (140). Other impacts include dispersed habitation (403) and minor roads (502). These activities have little or no measurable impact on the saltmarsh habitats.

Table 4.1. Intensity of various activities on saltmarsh habitats at West Cove.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	C	0	0.05	Inside
1330	900	C	0	0.01	Inside
1410	140	C	-1	0.5	Inside
1410	803	A	-2	0.001	Inside
1410	900	C	0	0.05	Inside

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

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.

West Cove is a relatively small saltmarsh, with few features of significant conservation interest. Most of the saltmarsh is in good condition with few negative impacts. The vegetation communities found at this site are similar to the other saltmarshes found in Kenmare River. The site has been affected by the construction of the road bridge and by attempted reclamation in a secondary inlet in the past. This attempted reclamation has reduced the area of saltmarsh with brackish wet grassland found in an area formerly covered by spring tides. The presence of this wet grassland area with some brackish features along the drains is one notable feature about this site.

This site is located within Kenmare River cSAC. A NPWS Conservation management plan is not available for this cSAC.

Table 5.1. Conservation status of Annex I saltmarsh habitats at West Cove.

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

5.2 Atlantic salt meadows (H1330)

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

5.2.1 Habitat structure and functions

The structure and functions of this habitat were assessed as *favourable*. Two monitoring stops were carried out in this habitat and they all passed. All the attributes required for favourable conservation status reached their targets. There was some damage from poaching in places although this only affected a minor area. The ASM only covers a very small area and is generally poorly developed.

Several typical ASM communities are present and the diversity is typical of this habitat. Some zonation was noted between different ASM communities at one location. There are some natural successional communities to terrestrial vegetation present but these are generally poorly developed due to the relatively steep shoreline topography. The saltmarsh topography is relatively poorly developed but this is typical of these relatively small fragments of ASM. Turf fucoids were recorded in this habitat but these are fairly typical of heavily grazed fringe type saltmarshes along the west coast of Ireland.

5.2.2 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 grazing continue in the near future. The habitat is not affected by any significantly damaging impacts or activities at present.

5.3 Mediterranean salt meadows (H1410)

The extent of this habitat is assessed as *favourable*. There are no indications of any significant loss of habitat due to land use changes, development or erosion within the current

monitoring period. A very small area of MSM was lost due to the construction of an embankment, but was only a minor loss.

5.3.1 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 the attributes required for favourable conservation status reached their targets. The structure and functions of the MSM are in generally good condition. Most of the MSM is not grazed at all and there is no significant overgrazing in sections that were grazed. There are no significant negative indicators within this habitat. Some minor poaching was noted.

The species assemblage of the MSM is typical of this vegetation type. There is some zonation of the MSM into different communities and some zonation of different species was noted. There is some development of a transitional brackish zone along the upper boundary of the saltmarsh in places with a mixture of Purple Moor-grass and Sea Rush. The saltmarsh topography within this habitat is poorly developed due to its relatively small size although some sections contain small salt pans and natural drainage channels. Most of the saltmarsh has been modified in the past by drainage, although this drainage occurred outside the current monitoring period.

5.3.2 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 grazing continue in the near future. The habitat is not affected by any significantly damaging impacts or activities at present. Some of the saltmarsh habitat is located outside the cSAC.

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.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats						
2	Spartina swards						
3	1330 Atlantic salt meadow	0.239		0.239			
4	1410 Mediterranean salt meadow	1.945			1.945		
5	ASM/MSM mosaic (50/50)	0.014		0.007	0.007		
6	ASM/*Spartina* mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	10.536					
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)	0.102					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**12.836**		**0.246**	**1.952**		

Legend

- SAC Boundary
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- 1330/1410 mosaic
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stops
- 1410 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

West Cove

Kenmare River SAC (002158)

SMP code: SMP0071

0 40 80 120 160 200 Meters

N

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

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:2500

Whitegate-Fybagh

1 SITE DETAILS

SMP site name: **Whitegate-Fybagh**		SMP site code: **SMP0074**	
Date of site visit **08/05/2008**		CMP site code: **N/A**	
SM inventory site name: **Whitegate-Fybagh**		SM inventory site code: **164**	
NPWS Site Name: **Castlemaine Harbour**			
NPWS designation	cSAC: **343**	MPSU Plan: **old format draft 2 plan available**	
	pNHA: **343**	SPA: **4029**	
County: **Kerry**		Discovery Map: **71**	Grid Ref: **075550, 101985**
Aerial photos (2000 series): **O 5869-A,B; O 5870-A, B,C,D**		6 inch Map No: **Ke 46**	

Annex I habitats currently listed as qualifying interests for Castlemaine Harbour cSAC:

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

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

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

Other SMP sites within this SAC/NHA: **Inch, Rossbehy, Cromane**

Saltmarsh type: **Fringe** Substrate type: **Peat, Sand, Mud**

2 SITE DESCRIPTION

Fybagh-Whitegate saltmarsh is located in south-west Co. Kerry in Castlemaine Harbour. This survey site incorporates about 5 km of indented shoreline along the north-east corner of Castlemaine Harbour. The site is located about 7 km from Castlemaine. The River Maine enters Castlemaine Harbour at the eastern end of the survey site and the starting point for the surrey was a small quay used as a ferry across the river. The shoreline of this area has been significantly modified by reclamation in the 19th Century and high berms line the shoreline. The landscape of this area is dominated by lowland habitats including wet grassland and improved grassland and land adjacent to this part of the estuary is quite flat. Much of the land behind the embankments contains low-lying wet grassland that was formerly saltmarsh and freshwater marshland. There are some signs of brackish influence on vegetation in the drainage channels that drain these areas with some stands of Sea Club-rush (*Bolboschoenus maritimus*) but there was no vegetation that could be classified as saltmarsh.

Fragmented saltmarsh is found along the shoreline along the seaward side of the embankment. Some saltmarsh is found on small isolated 'islands' of habitat separated from the embankment. This part of Castlemaine Harbour is quite shallow and empties at low tide to expose a wide area of intertidal flats between the shoreline and the estuarine river channel of the River Maine.

This site is part of Castlemaine Harbour cSAC (Site Code 000343). This cSAC covers most of the intertidal and sub-tidal parts of Castlemaine Harbour east of Rossbehy and Inch spits. The cSAC also includes the sand dune complexes at Inch and Rossbehy and the shingle spit at Cromane. The cSAC also includes some of the catchments of the Rivers Laune and

Maine, which both flow into the head of the bay and forms the estuary of these rivers. Two Annex I saltmarsh habitats are found at this site, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Both habitats are listed as qualifying interests for this cSAC, along with *Salicornia* flats, which was not found at this site. *Spartina* swards are also found on the intertidal flats at this site, although this habitat is not now considered to qualify as an Annex I habitat.

Three other saltmarshes sites listed on the SM inventory (Curtis and Sheehy-Skeffington 1998) and located within this cSAC were surveyed during this project, Inch, Cromane and Whitegate-Fybagh. There is additional saltmarsh development in many of the small indentations along the shoreline, including significant areas of unsurveyed saltmarsh located between Cromane and the mouth of the River Laune.

Turf fucoids are the only species of local distinctiveness recorded at this site and these are typical of saltmarsh found along the western coast of Ireland.

Nearly all the saltmarsh habitat is found within the digital cSAC boundary. The berm is used as the cSAC boundary and a significant part of the reclaimed wet grassland behind the berm has also been included in the cSAC.

The shoreline was accessed at various points from minor roads or private lanes that access adjacent farmland.

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh at this site is quite fragmented and spread along the shoreline in small patches. The embankments are generally quite straight and undulate around the site, following the gross shape of the shoreline. This has created some more sheltered sections in some of the indentations along the shoreline. There are sections where there is no saltmarsh along the steep sided embankments.

There are similar amounts of Mediterranean salt meadows and Atlantic salt meadows along the shoreline, generally forming a heterogeneous mosaic along with stands of Common Reed (*Phragmites australis*) and Sea Club-rush (Table 3.1). There is no typical zonation between these habitats. The marshland habitat along this shoreline is actually dominated by brackish vegetation types and non-Annex I saltmarsh vegetation types such as stands of Common Reed and Sea Club-rush. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. Both these species also form mosaics with other saltmarsh vegetation. These mosaics along with Common Reed dominate the vegetation of some large relic patches of marshland on mud and peat along the shore near Caherfealane Marsh and Gortaleen towards the west of the site. This reflects the estuarine influence on the saltmarsh along this shoreline.

It is unusual to observe stands dominated by Common Reed at the seaward boundary of some of these marshland areas in a bay of this type, although this type of zonation was also seen in larger estuaries such as the Shannon. The stands of Common Reed also contain Red Fescue (*Festuca rubra*), Twitch (*Elymus repens*), Silverweed (*Potentilla erecta*), Curled Dock (*Rumex crispus*), Creeping Bentgrass (*Agrostis stolonifera*) and Sea Club-rush. The

ASM or MSM may be found in sheltered sections landward of small stands of Common Reed or Sea Club-rush, but on lower ground that probably is inundated more frequently. Curtis and Sheehy-Skeffington (1998) classified this site as a fringe type marsh but it is probably more typical of an estuarine type site. Some of the saltmarsh has developed on peat but there is also a significant amount of saltmarsh on peat and sandy substrates.

Both MSM and ASM are found in small eroded relic saltmarsh patches along the seaward side of the berm. There is also a narrow strip of saltmarsh vegetation where the embankment is inundated by tides. There is also some saltmarsh development in the mouths of several streams that flow into the bay along this shoreline. Some of the saltmarsh is quite patchy and found on thin layers of eroding muddy substrate that overlay rocky pebble and stony material, possibly laid down to form the embankment. Further west there are some patches where the saltmarsh overlays glacial deposits that form the beach material.

The lower saltmarsh boundary is generally marked by a saltmarsh cliff adjacent to soft intertidal flats. There are also some transitions to sandflats in places and further west there is some transition to pebble and mixed mud substrate along the lower boundary. Further west there is a small area of relic MSM saltmarsh that has developed behind a small shingle spit at Roscullen Island. This small area contains typical saltmarsh zonation and ASM communities. The saltmarsh vegetation generally transitions to wet grassland along the upper boundary on the embankment.

There is some diverse saltmarsh at the west side of the site at Gortaleen. This saltmarsh has developed on a fairly high platform along the shoreline and there is a steep saltmarsh cliff down to the intertidal flats. There are natural vegetation succession from small patches of MSM to brackish communities dominated by Sea Club-rush and also other non-Annex I saltmarsh vegetation dominated by Twitch. This community also contains Silverweed, Bindweed, Sea Rush (*Juncus maritimus*), Sea Milkwort (*Glaux maritima*) and Curled Dock. This community appears along the upper boundary of some of the saltmarsh.

One notable feature of this site is the appearance of fairly large patches of Sea Rush colonising the intertidal flats at the seaward side of the more established saltmarsh and forming pioneer communities. These are usually mono-specific swards or mosaic of clumps and bare mudflats and do not contain other saltmarsh species. These patches may not be colonising mud adjacent to other saltmarsh but are sometimes isolated from the other relic saltmarsh or the embankment. Vegetation dominated by Sea Rush is most commonly seen in the upper saltmarsh but is frequently distributed along the lower saltmarsh boundary in saltmarshes along the west coast of Ireland. The spread of Sea Rush on intertidal mud is an unusual feature but it was also observed at some other sites in Castlemaine Harbour including Inch and was observed in the River Blackwater Estuary (Cork/Waterford) and to a lesser extent in many small sites in Galway and Mayo. This feature may also be related to the estuarine influence on the site. The appearance of these stands may also be an indicator of saltmarsh growth and expansion even though there are many signs of erosion around the site.

Common Cordgrass (*Spartina anglica*) is distributed along most of the survey site but is most frequent towards the eastern side of the site. This species has formed some patches of *Spartina* swards in an area of intertidal mudflats partially sheltered by an old eroded berm at Caherfealane Marsh. Large clumps are scattered on the intertidal flats along the shoreline and there are few large areas of *Spartina* sward along the rest of the site.

Table 3.1. Area of saltmarsh habitats mapped at Whitegate.

EU Code	Habitat	Area (ha)
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	2.553
1410	Mediterranean salt meadows (Juncetalia maritimi)	2.605
non-Annex	*Spartina* swards	0.147
	Total	**5.305**

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

3.2 Atlantic salt meadows (H1330)

Several typical ASM communities are found at this site. Mid marsh and mid-upper marsh communities dominate the ASM vegetation. There is very little lower marsh ASM vegetation at this site. There are few sections with typical zonation because most sections are quite small, but overall diversity is quite high due to the varied topography and varied substrates along the shoreline. The most typical community found along the embankment is dominated by one of Red Fescue, Saltmarsh Rush (*Juncus gerardii*) and Creeping Bent. There may also be frequent or abundant cover of Buck's-horn Plantain in this community. Other species present include Sea Milkwort, Sea Plantain (*Plantago maritima*), Sea Arrowgrass (*Triglochin maritimum*), White Clover (*Trifolium repens*), Common Scurvygrass (*Cochlearia officinalis*) and Sea Pink (*Armeria maritima*). The ASM also contains scattered clumps of Sea Rush in places but at low densities. Some sections of the saltmarsh are mapped as a mosaic between ASM and MSM. Sea Club-rush also spreads into the ASM at some locations.

Some of the narrow saltmarsh fringe on the embankment is dominated by Saltmarsh Rush. This habitat is only several metres wide. This community also contains Sea Plantain, Buck's-horn Plantain (*Plantago coronopus*), Sea Arrowgrass and Sea Milkwort. Even in this relatively narrow band of saltmarsh there are some signs of zonation with a band of vegetation dominated by Creeping Bentgrass appearing on the landward side of this zone, higher up the embankment.

There is some minor development of low-mid ASM community along the seaward edge of some of the eroding fragments of ASM and on some of the lower patches of relic saltmarsh. This community is dominated by Sea Pink, Sea Plantain and Common Saltmarsh-grass (*Puccinellia martima*) and also contains species such as Sea Milkwort and Sea Aster (*Aster tripolium*). Common Cordgrass is also found in the ASM but generally at low densities (1-5%).

Further west there is an upper marsh community that has developed adjacent to a stand of Common Reed. This stand is dominated by Creeping Bent and contains some Sea Club-rush. Other species found in small amounts include Sea Milkwort and Spear-leaved Orache (*Atriplex prostrata*). This area may be influenced by freshwater flow off the adjacent reclaimed land.

The saltmarsh topography overall is generally quite poor and there are few relic patches with typical features such as salt pans and creeks. Few of the relic patches of saltmarsh are large enough to require creeks. Some of the ASM that has developed on the relic patches and the old berm at Caherfealane Marsh contains typical small salt pans.

3.3 Mediterranean salt meadows (H1410)

This habitat is generally characterised by the frequent presence of clumps of Sea Rush on established saltmarsh. The vegetation is quite diverse due to the varied topography along a relatively long stretch of shoreline. This species is usually found in association with other mid-upper species such as Red Fescue, Saltmarsh Rush and Creeping Bentgrass. Common Reed spreads into MSM along the upper habitat boundary in places, as does Sea Club-rush where there are adjacent stands of these species.

The largest intact area of MSM is found at Roscullen Island. This section has some typical zonation and contains small salt pans. Saltmarsh has developed along the back of a small shingle spit and there is some zonation related to the height of the marsh along a gradient from the spit to the seaward end of the saltmarsh. The lower MSM is dominated by Sea Rush and also contains Saltmarsh Rush, Common Scurvygrass and Sea Milkwort. The upper MSM contains more frequent grass cover with Red Fescue more prominent and Creeping Bent also appearing. This community also contains Autumn Hawkbit (*Leontodon autumnalis*) and Brookweed (*Samolus valerandi*). Species such as Birdsfoot (*Lotus corniculatus*) and Silverweed also appear in the MSM vegetation near the upper boundary.

One notable feature of this site is the appearance of stands of Sea Rush colonising bare intertidal mud, sometimes some distance seaward of established saltmarsh on higher mud or the embankment. Sea Rush is creating a pioneer community in this situation. These stands are generally mono-specific and are quite open with frequent bare mud cover. Some of these stands consist of small clumps of Sea Rush in a mosaic with bare mud cover. These small clumps of Sea Rush may also be found in association with occasional clumps of Common Cordgrass, with Sea Rush being much more numerous.

Some diverse MSM with several zones present is found at Gortaleen. Typical Sea Rush dominated stands are found more on established saltmarsh that also contain Wild Celery (*Apium graveolens*) near the upper boundary and also Parsley Water-dropwort (*Oenanthe lachenalii*). There are vegetation successions at the upper boundary to vegetation dominated by Twitch and to stands dominated by Common Reed. Sea Rush is also colonising mudflats forming a dense zone of MSM adjacent to the more established saltmarsh. This community has species such as Common Saltmarsh-grass and Sea Milkwort spreading into the upper zone and this may be taken as evidence of saltmarsh growth and continuing succession, even though there are many signs of erosion around the site.

There is some development of a transitional MSM community along the drift line or upper boundary in places where clumps of Sea Rush are found in association with other terrestrial species such as Jointed Rush (*Juncus articulatus*), Purple Moor-grass (*Molinia caerulea*) and Curled Dock.

3.4 *Spartina* swards

There are small fragmented patches of *Spartina* swards developed at this site. These generally occur where several large clumps of Common Cordgrass have coalesced. There are also small patches with a mosaic of spare clumps of Common Cordgrass and mudflats. Most of the isolated clumps are quite large and there are few signs of any recent recruitment of new clumps to the population. The overall cover of *Spartina* sward is quite low at this site.

The main patches of *Spartina* sward are found in a small intertidal area sheltered by an old eroding berm at Caherfealane Marsh. This is one of the locations where the position berm

has retreated in the past 100 years, probably in response to a breach. The sheltered position probably increased the prospects of the colonisation of Common Cordgrass, especially along a shoreline that is under some erosional pressure.

Many patches of *Spartina* sward are generally quite isolated and there is no typical natural transition from MSM or ASM habitat into *Spartina* sward. There are some patches that have colonised bare mud adjacent to some of the relic patches of saltmarsh habitat. Common Cordgrass has not colonised existing saltmarsh to create *Spartina* sward.

There are also several sections where there has been some development of mixed swards of Common Cordgrass and Sea Rush. These have already been described. Similar vegetation where Common Cordgrass and Sea Club-rush are found mixed together is also present. Both these communities are unusual vegetation types.

4 IMPACTS AND ACTIVITIES

This site is affected by several impacts and activities (Table 4.1). The main impact is grazing (140). Cattle and sheep roam along the high embankment/berm and graze the embankment and adjacent saltmarsh. The survey site is divided up into different management units as it extends along land with different owners and sections are grazed with different intensities, with some sections not grazed at all. Horses graze one section. The overall grazing intensity is light/moderate. There is some localised damage from poaching and overgrazing, mainly at some access points onto saltmarsh and in patches where drainage is impede (143). Grazing animals have also created tracks on saltmarsh in places.

There have been some recent repairs to the embankment in places by the OPW (801). The embankment was partially breached for a short period during the current monitoring period and this may have allowed brackish vegetation to develop behind the embankment at one location. This breach has now been repaired. These repairs have caused some damage to the saltmarsh in places where vehicles crossed the saltmarsh, removed substrate from the saltmarsh or re-profiled the seaward side of the embankment, removing saltmarsh vegetation. These damaged areas are likely to revegetated with saltmarsh in the long-term.

Common Cordgrass is present at this site. This is an invasive species of saltmarsh (954) and is widely distributed in Castlemaine Harbour. This is its most southerly limit along the western Irish shoreline and it is only found again in Clonikilty Bay, Co. Cork. It is not known when it was planted in Castlemaine Harbour although it is known from this area since the 1960's (Nairn 1986). Common Cordgrass is only very rarely found within the established ASM or MSM vegetation and the overall cover is less than 1%. Therefore the impact of its presence is assessed as neutral. However, large clumps are widely distributed along the site on the adjacent intertidal mudflats, forming some patches of *Spartina* swards habitat in places. Common Cordgrass has also colonised mudflats with Sea Rush and with Sea Club-rush in places, creating unusual vegetation communities. There are no indications of any recent recruitment and small clumps are rare. 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 frequent indicators of erosion on the saltmarsh along this site (900). There are eroded mud platforms with saltmarsh cliffs present along the seaward side of the saltmarsh fragments and cliff toppling was also noted in places. The lower saltmarsh has a quite

convoluted boundary in places from the impacts of erosion. The sward surface of the ASM also shows signs of erosion in places, particularly towards the west side of the site. This saltmarsh is more vulnerable to erosion as it has developed on thinner substrate and there are isolated patches of saltmarsh and bare mud located further down a mixed rocky beach shoreline. A comparison of the OSI 2nd edition 6 inch map to the OSI 2005 series aerial photos shows that many of the relic saltmarsh patches have got smaller during this period and some patches have disappeared altogether. However some of these patches are likely to have been removed to provide material to repair the berms in places. Erosion is assessed as having a low negative impact.

The appearance of Sea Rush colonising intertidal flats at the seaward side of the more established saltmarsh could be taken as an indicator of some local saltmarsh growth and expansion. However, erosion seems to be the greater trend acting on the site.

The saltmarsh at this site has been significantly modified by the construction of a berm and reclamation of land along the shoreline of this part of Castlemaine Harbour (801). The berms begin at the west side of the survey site and extend eastwards along the banks of the River Maine. The majority of this reclamation and the construction of the berms occurred during the 19th century and a comparison of the 1st edition and 2nd edition shows significant changes to the shoreline during this period. However the reclamation was carried out in stages. Some of the berm construction and reclamation predates the drawing of the 1st edition six inch map and subsequent construction of the embankment enclosed increasing amounts of saltmarsh. The former marshland behind the berms has also been drained intensively and divided into new field enclosures. Old intertidal channels between former saltmarsh are still visible on the topography of these reclaimed areas and many of these are filled with Reedbeds.

A significant amount of former saltmarsh, brackish marsh and Reedbeds has been trapped behind the berm with small fragments of relic saltmarsh left on the seaward side of the berm that form the current saltmarsh habitat. Parts of the shoreline have also been modified in the past 100 years and the position of the berm has retreated in one section. These impacts are not assessed as they occurred outside the current monitoring period but have had a very significant impact on the structure of this site.

The main impacts and activities around the site are related to farming of the land behind the embankment. Much of this land has not been improved significantly and the enclosures are still dominated by Reedbeds and wet grassland. It is likely that the status of this land has deteriorated in recent times and was probably more intensively managed in the past. Some of the former saltmarsh has been improved significantly and some of the new enclosures now contain improved grassland. Farming activities such as mowing/cutting (102), fertilization (120) and grazing (140) all occur in some of the adjacent low-lying land behind the embankments. The intensity of the farming varies in this area. The shoreline can also be accessed by several tracks and roads (501) and there is some scattered habitation (403) in the area, but on higher ground some distance from the shoreline. These activities have little or no measurable impact on the saltmarsh habitats.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1330	140	C	0	1.5	Inside
1330	143	C	-1	0.25	Inside
1330	801	A	-1	0.1	Inside
1330	900	B	-2	0.25	Inside
1330	954	C	0	0.05	Inside
1410	140	C	0	2.0	Inside
1410	143	C	-1	0.25	Inside
1410	801	A	-1	0.1	Inside
1410	900	B	-2	0.26	Inside
1410	954	C	0	0.2	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

Whitegate-Fybagh is a relatively small saltmarsh with few features of notable interest. The original saltmarsh was significant modified by reclamation in the 19th century and the remaining saltmarsh is quite fragmentary. The remaining saltmarsh shows frequent indicators of erosion. The overall conservation status of this site is *unfavourable-bad*. There have been measurable losses of saltmarsh in the past 100 years (although no measurable loss during the current monitoring period) and this saltmarsh is vulnerable to continued erosion in the future. One feature of interest is the unusual pioneer saltmarsh community consisting of Sea Rush colonising intertidal mud.

It can be assumed that this erosion is a 'natural' process and is part of the natural geo-morphological patterns in Castlemaine Harbour. The erosion may also be a response to the land reclamation along this part of the shoreline. Another factor to take into account is that this site is only one of four located in Castlemaine Harbour. Erosion is not as significant at Inch were pioneer saltmarsh vegetation is much more evident whereas signs of erosion were

also seen at Cromane. Erosion of saltmarsh at Rossbehy is neutral with some erosion and accretion at this site. It seems that overall there is a trend of erosion acting on saltmarsh in the inner part of Castlemaine Harbour. This erosional pressure is also indicated by the status of the embankments that protect low-lying land around much of Castlemaine Harbour including at Cromane. Many of these berms show signs of erosion and some have been recently breached while other are being repaired.

This site is located within Castlemaine Harbour cSAC. An old format NPWS management plan is available for this cSAC but is now out of date.

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

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

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any significant loss of habitat due to land use changes, development or erosion within the current monitoring period. A small amount of habitat has been disturbed by repairs to one part of the embankment and associated reproofing. However, this area is likely to re-vegetate. There are frequent indicators of erosion of saltmarsh at this site and there are measurable losses of saltmarsh when considering a longer period between the drawing of the 2nd edition OSI 6 inch map and the OSI aerial photos 2005 series.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-bad*. Six stops monitoring stops were carried out in this habitat and one stop failed due to poaching damage. Most of the current saltmarsh is in fairly good condition. There is some localised poaching and overgrazing damage in places but the overall grazing level is considered to be light-moderate. The sward height is quite variable across the site and some sections are not grazed at all. There are also frequent signs of erosion acting on the saltmarsh at this site. This is the main reason for the re-assessment of the conservation status as *unfavourable-bad* rather than *unfavourable-inadequate*.

The ASM saltmarsh has been significantly modified in the past by reclamation and the construction of the tall embankment. This has had a huge impact on the structure and function of the habitat at this site, although these impacts are not assessed. The remaining patches of saltmarsh are fragmentary and have a poor saltmarsh topography. The diversity

of vegetation is relatively high but there are few patches with extensive intact zonation. There are some notable transitions with brackish saltmarsh communities. Common Cordgrass is present at this site but does not form a significant part of the ASM vegetation. The impact of its spread on species composition is assessed as neutral.

5.2.3 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 such as grazing continue in the near future. Grazing is not having a significant impact on the remaining ASM at this site. However, there are frequent signs of erosion at this site and the remaining saltmarsh is vulnerable to continued erosion. Much of the ASM saltmarsh at this site is not vulnerable to further colonisation by Common Cordgrass in the future as most of the ASM saltmarsh habitat is in the mid-upper zone.

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 significant loss of habitat due to land use changes, development or erosion within the current monitoring period. A small amount of habitat has been disturbed by repairs to one part of the embankment and associated reproofing. However, this area is likely to re-vegetate. There are frequent indicators of erosion of saltmarsh at this site and there are measurable losses of saltmarsh when considering a longer period between the drawing of the 2nd edition OSI 6 inch map and the OSI aerial photos 2005 series.

5.3.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-bad*. Eight stops monitoring stops were carried out in this habitat and two stops failed due to a combination of poaching damage and indicators of erosion. Most of the current saltmarsh is in fairly good condition. There is some localised poaching and overgrazing damage in places but the overall grazing level is considered to be light-moderate. The MSM has a typical species assemblage and is somewhat more diverse compared to other site. The diversity reflects notable transitions to other brackish vegetation communities at the upper habitat boundary. It also reflects the presence of a pioneer saltmarsh community dominated by Sea Rush where clumps are colonising saltmarsh. Common Cordgrass is also present in this pioneer community.

There are also frequent signs of erosion acting on the saltmarsh at this site. Erosion acts on both the ASM and MSM because these habitats are distributed in a heterogeneous mosaic. This is the main reason for the re-assessment of the conservation status as *unfavourable-bad* rather than *unfavourable-inadequate*.

The MSM saltmarsh has been significantly modified in the past by reclamation and the construction of the tall embankment. This has had a huge impact on the structure and function of the habitat at this site, although these impacts are not assessed. The remaining patches of saltmarsh are fragmentary and have a poor saltmarsh topography.

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 such as grazing continue in the near future. Grazing is not having a significant impact on the remaining MSM at this site. However, there are frequent signs of erosion at this site and the remaining saltmarsh is vulnerable to continued erosion.

The assessment of the future prospects as *unfavourable-bad* takes account of the frequent indicators of erosion around the site. The remaining saltmarsh is vulnerable to further erosion but the development of pioneer Sea Rush stands on the mudflats could be taken as evidence of possible MSM expansion in the future. These pioneer stands of MSM may be vulnerable to future colonisation by Common Cordgrass. While this species has not spread at this site in the recent past it is expanding at a nearby saltmarsh at Inch. MSM found on more established saltmarsh is not vulnerable to colonisation by this species.

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.

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)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats						
2	Spartina swards	0.145					0.145
3	1330 Atlantic salt meadow	2.419		2.419			
4	1410 Mediterranean salt meadow	2.394			2.394		
5	ASM/MSM mosaic (50/50)	0.184		0.092	0.092		
6	ASM/*Spartina* mosaic	0.003		0.001			0.002
7	1330/other SM (CM2) mosaic	0.081		0.041			
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	4.975					
10	*Spartina* clump/mudflat mosaic (50/50)	0.000					0.000
11	Isolated *Spartina* clumps on mud (5%)	0.006					0.000
12	pioneer 1330/1310/*Spartina* mosaic						
13	1410/other SM (CM2) mosaic	0.237			0.118		
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)	12.463					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**22.907**		**2.553**	**2.605**		**0.147**

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

Saltmarsh Monitoring Project 2007-2008

Whitegates, Fybagh (Map 3 of 3)

Castlemaine Harbour SAC (000343)

SMP code: SMP0074

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

0 80 160 240 320 400 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:5000

N

Legend

- SAC Boundary
- Spartina swards
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- 1330/1410 mosaic
- Atlantic/Spartina mosaic
- 1330/other SM (CM2) mosaic
- Spartina clump/mudflat mosaic
- Isolated Spartina clumps
- 1410/other SM (CM2) mosaic
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stops
- 1410 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

Whitegate, Fybagh (Map 1 of 3)

Castlemaine Harbour SAC (000343)

SMP code: SMP0074

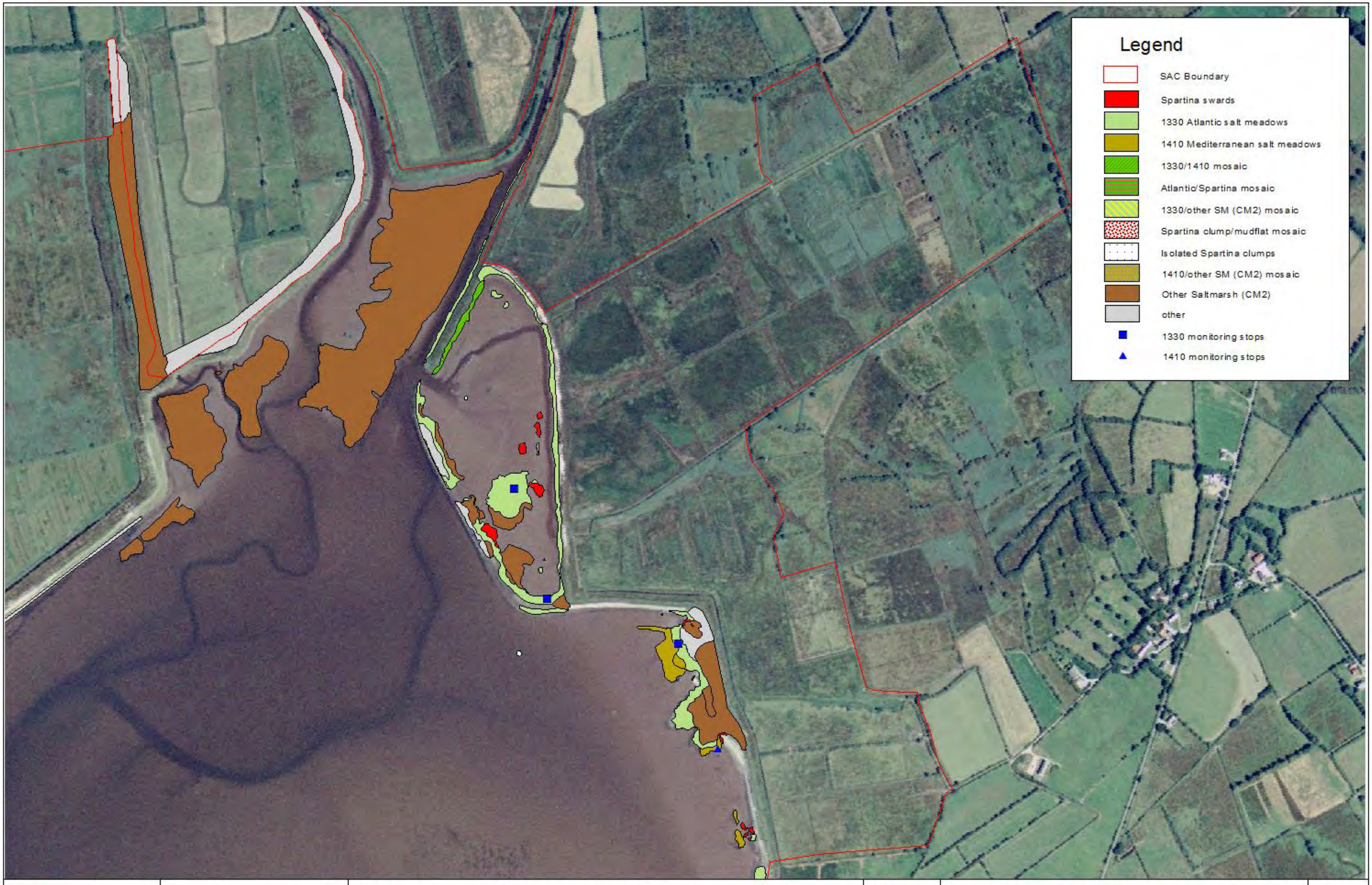
This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953)

0 80 160 240 320 400 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:5000

N



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

Saltmarsh Monitoring Project 2007-2008

Whitegates, Fybagh (Map 2 of 3)

Castlemaine Harbour SAC (000343)

SMP code: SMP0074

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

0 80 160 240 320 400 Meters

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

Original Drawing Size: 297 x 420 (A3)
Scale 1:5000

N

Ringville

1 SITE DETAILS

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

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

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

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

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

Other SMP sites within this SAC: **Kilowen, Rochestown, Dunbrody**

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

2 SITE DESCRIPTION

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

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

The site is located within the River Barrow and Nore cSAC (002168) and the River Barrow Estuary (698). This site was initially designated as an individual pNHA Ballinlaw Ferry (822) and was then subsumed into the River Barrow Estuary pNHA (698). One Annex I habitats are present at this site, *Salicornia* flats, Atlantic salt meadows (ASM) All these habitats are listed as qualifying interests for the River Barrow and Nore cSAC. The entire saltmarsh habitat mapped at this site is located within the cSAC boundary. The cSAC boundary is offset from the actual shoreline boundaries on the ground due to offset between the 2nd edition 6 inch map and the aerial photos. This could actually works to the sites advantage as this means much of the transitional zone between the saltmarsh and the adjacent farmland is also

included within the cSAC. However, for management purposes, the 6 inch map excludes some of these transitional zones.

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

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

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

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

3 SALTMARSH HABITATS

3.1 General description

The saltmarsh at Ringville is dominated by ASM (Table 3.1). The saltmarsh is shaped like a long cigar and is orientated NE-SW parallel to the shoreline. The saltmarsh has developed on deep mud. The saltmarsh is divided into two sections, the main section and a smaller southern section at Ballinlaw Ferry crossing. These two sections are separated by a man-made channel. The southern section is actually an old intake that contained reclaimed land and is surrounded by an embankment, but has now reverted to intertidal habitats. Part of the larger area of saltmarsh at Ballinlaw Castle was also protected by an embankment, but this does not extend along the whole of the site.

There are several patches of *Spartina* sward within the main saltmarsh area. The estuary influence on the site is shown by the presence of patches of Sea Club-rush at several locations along the saltmarsh. There are also some bands of Twitch-dominated grassland

along some of the major creeks that drain the saltmarsh. This vegetation has been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. There is a steep tall saltmarsh cliff about 1 m high along the seaward boundary of the saltmarsh. Mudflats are situated along the seaward edge. The river channel shelves deeply away from close to the edge of the saltmarsh to create a deep river channel. There is an old seawall or embankment along the seaward edge of the saltmarsh at the southern end near Ballinlaw Castle.

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

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

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

The southern section at the Ballinlaw Ferry crossing is surrounded by an old seawall. The landowner indicated that this area once contained improved land, but once the seawall was breached, the area reverted to intertidal habitats. It seems that the tidal influence has deepened this area somewhat. This seawall is vegetated by Twitch-dominated grassland. There are several openings at the northern and southern ends to allow tidal inundation. The interior of this area contains *Spartina* swards, some ASM and stands of brackish vegetation (CM2) with Common Reed and Sea Club-rush. There is still an extensive area of bare mudflats present. There is a very narrow band of saltmarsh along the interior side of the old seawall. Divided Sedge was previously recorded along the interior edge of this seawall and on saltmarsh along the north-western corner.

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

There is a narrow band of *Spartina* sward along the northern seawall. This vegetation develops into a mosaic towards the seawall with more frequent cover of ASM species such as Sea Aster, Common Saltmarsh-grass, Lax-flowered Sea Lavender, Sea Pink, Sea Plantain,

Sea Arrowgrass and Lesser Sea Spurrey. The higher sections of the seawall (not affected by the tide) is dominated by Sea Couch (*Elytrigia pycnanthus*) and also contains Spear-leaved Orache, Smooth Sow-thistle, Twitch, Red Fescue, White Clover, Wild Carrot, False Oat-grass, Bindweed, Frosted Orache, Sea Beet, Creeping Thistle, Curled Dock. Some of the top of the seawall has Bramble and a Blackthorn bush.

Table 3.1. Area of saltmarsh habitats mapped at Ringville.

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

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

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

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

3.3 Atlantic salt meadows (H1330)

There are several typical vegetation communities present at this site. Much of the main saltmarsh section is level or with a low slope from the landward to the seaward side. This means that zonation is particularly well-developed and several different communities are quite extensive.

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

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

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

A classical upper zone is not extensive at this site. A narrow band dominated by Red Fescue is found in places along the back of the marsh and along some of the larger drainage channels. Saltmarsh Rush and Long-bracted Sedge is found in this community. It is also

found along the seaward boundary at the southern end of the main saltmarsh section. Several clumps of Sea rush are also present near the southern end of the main saltmarsh, but they are not extensive enough to be classified as Mediterranean salt meadows.

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

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

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

3.4 Mediterranean salt meadows (H1410)

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

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

older descriptions. This species may not have been recorded due to the timing of the survey (September) which is probably too late to easily record sedges.

3.5 *Spartina* swards

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

There are several small patches of typical *Spartina* sward development along the seaward edge of the main saltmarsh, where Common Cordgrass has colonised the soft mud. This sward development is only 5-10 m wide at the northern end of the saltmarsh. There are also several minor patches towards the southern end of the main section. There is no indication that Common Cordgrass is spreading on the mudflats adjacent to the saltmarsh.

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

4 IMPACTS AND ACTIVITIES

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

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

natural and also related to adjacent farming practises (120 & 140) such as run-off of nutrients and some eutrophication.

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

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

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

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

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

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

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

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

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

The main saltmarsh is generally in good condition. The site used to be grazed and this was causing some damage. However, grazing has ceased and there are no indications of grazing damage now on the site. Common Cordgrass is present on the site but is not a significant feature of most of this site. The main saltmarsh is being eroded, although probably at a slow rate. This may be natural realignment, although it may be related to dredging within the main river channel. It is not known how dredging affects water flow along the saltmarsh.

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

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

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

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

5.2.1 Extent

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

5.2.2 Habitat structure and functions

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

5.2.3 Future prospects

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

mud and sandflats at a suitable elevation for this habitat, apart from within the area enclosed by the old embankment.

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

5.3 Atlantic salt meadows (H1330)

5.3.1 Extent

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

5.3.2 Habitat structure and functions

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

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

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

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

5.3.3 Future prospects

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

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

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

The site is currently not being grazed, although it was grazed in the past. Currently there is no evidence that the lack of grazing is affecting the structure and functions of the saltmarsh. However the absence of grazing over a long period may have a negative affect and lower overall diversity on the site. Some of the changes within the area enclosed by the old embankment can be attributed to the lack of grazing allowing the spread of Common Reed and Sea Club-rush to the detriment of saltmarsh containing Divided Sedge in the recent past.

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

5.4 Mediterranean salt meadows (H1410)

5.4.1 Extent

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

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

5.4.2 Habitat structure and functions

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

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

5.4.3 Future prospects

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

6 MANAGEMENT RECOMMENDATIONS

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

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

7 REFERENCES

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

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.

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

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

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

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

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

Rare Plant Survey (1990). Series of NPWS surveys 1990-1994 of rare plant sites. Information held by NPWS.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats	0.028	0.028				
2	*Spartina* swards	0.322					0.322
3	1330 Atlantic salt meadow	5.965		5.965			
4	1410 Mediterranean salt meadow						
5	ASM/MSM mosaic (50/50)						
6	ASM/*Spartina* mosaic	0.739		0.370			0.370
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	3.814					
10	*Spartina* clump/mudflat mosaic (50/50)	0.076					0.038
11	Isolated *Spartina* clumps on mud (5%)	0.618					0.031
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)	1.501					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**13.063**	**0.028**	**6.335**			**0.760**

Legend

- SAC Boundary
- 1310 Salicornia flats
- Spartina swards
- 1330 Atlantic salt meadows
- Atlantic/Spartina mosaic
- Spartina clump/mudflat mosaic
- Isolated Spartina clumps
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

Ringville

River Barrow and River Nore SAC (002162)

SMP code: SMP0051

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

0 90 180 270 360 Meters

N

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:5250

Rochestown

1 SITE DETAILS

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

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

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

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

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

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

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

2 SITE DESCRIPTION

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

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

The site is located within the River Barrow and Nore cSAC (002168). The site was formerly designated as Rochestown Marsh pNHA (000848) before being subsumed into and the River Barrow Estuary pNHA (698). Two Annex I habitats are located at this site, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Both these habitats are listed as qualifying interests for the River Barrow and Nore cSAC. The entire saltmarsh habitat mapped at this site is located within the cSAC boundary.

One notable species recorded at this site is Meadow Barley (*Hordeum secalinum).* This species is listed on the Flora Protection Order and is also listed in the Red Data Book (Curtis

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

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

3 SALTMARSH HABITATS

3.1 General description

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

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

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

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

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

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

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

Table 3.1. Area of saltmarsh habitats mapped at Rochestown.

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

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

3.2 Atlantic salt meadows (H1330)

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

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

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

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

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

The northern section contains ASM along the back of the stands of the Sea Club-rush. The ASM area is unusual as it is quite flat and uniform with no significant topography. This area is divided by several drains that cross the marsh. The vegetation is dominated by Red Fescue. The CM2 area contains creeks and pans but this ASM does not and it may be an indication of some modification in the past.

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

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

3.3 Mediterranean salt meadows (H1410)

A small patch of this habitat is present in the southern section of the marsh in the mid-upper zone of the saltmarsh. This habitat is dominated by Sea Rush. Other species that are frequent in this habitat are Creeping Bent, Red Fescue and Saltmarsh Rush. Other species occasionally or rarely found in this habitat include Sea Aster, Common Scurvygrass, Autumn Hawkbit, Sea Arrowgrass, Wild Celery, Spear-leaved Orache and Sea Club-rush. Sea Rush is also distributed within the ASM surrounding this area but at lower cover values. The MSM

area is somewhat poached and tussocky with small amounts of bare ground, although this seems to be damage from previous grazing seasons, rather than the current year. This area of habitat is too small to have developed any significant topography.

3.4 *Spartina* swards

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

4 IMPACTS AND ACTIVITIES

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

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

Erosion of the saltmarsh is not significant (900). In fact, the saltmarsh is accreting and has expanded significantly in the past 100 years. A comparison of the OSI 2nd edition 6 inch map to the OSI 2000 series aerial photos indicates that saltmarsh has expanded mainly in the northern section. There are also signs that the saltmarsh is still actively accreting and expanding, although the geo-morphological cycles are likely to have varied in the past 100 years. Most of the saltmarsh growth has occurred prior to the current monitoring period.

There is a tall saltmarsh cliff along the seaward edge of the saltmarsh with some signs of recent erosion in places along the southern section. However Sea Club-rush is spreading on intertidal mud at the seaward side of the marsh and saltmarsh cliff at the northern end, indicating accretion (910) within the current monitoring period. There has been 3-5 metres growth of the Sea Club Rush stands into the river channel between 2000-2007, as indicated from a comparison of the aerial photos.

Accretion at this site may be related to changes along the river channel due to dredging. The river channel is still an important navigation route to New Ross port. There has been a long history of dredging and modification of the Barrow river channel (and reclamation of adjacent shoreline using the dredged material). Dredging of the river channel may affect water flow along the marsh or change to the course of the river channel, leading to favourable conditions for the growth of the saltmarsh. However, these impacts can not be assessed without more detailed information.

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

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

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

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

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

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

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

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

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

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

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

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

5.2.2 Habitat structure and functions

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

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

5.2.3 Future prospects

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

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

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

5.3 Mediterranean salt meadows (H1410)

5.3.1 Extent

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

5.3.2 Habitat structure and functions

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

5.3.3 Future prospects

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

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for this site.

7 REFERENCES

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

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.

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

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

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

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

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

Rare Plant Survey (1990). Series of NPWS surveys 1990-1994 of rare plant sites. Information held by NPWS.

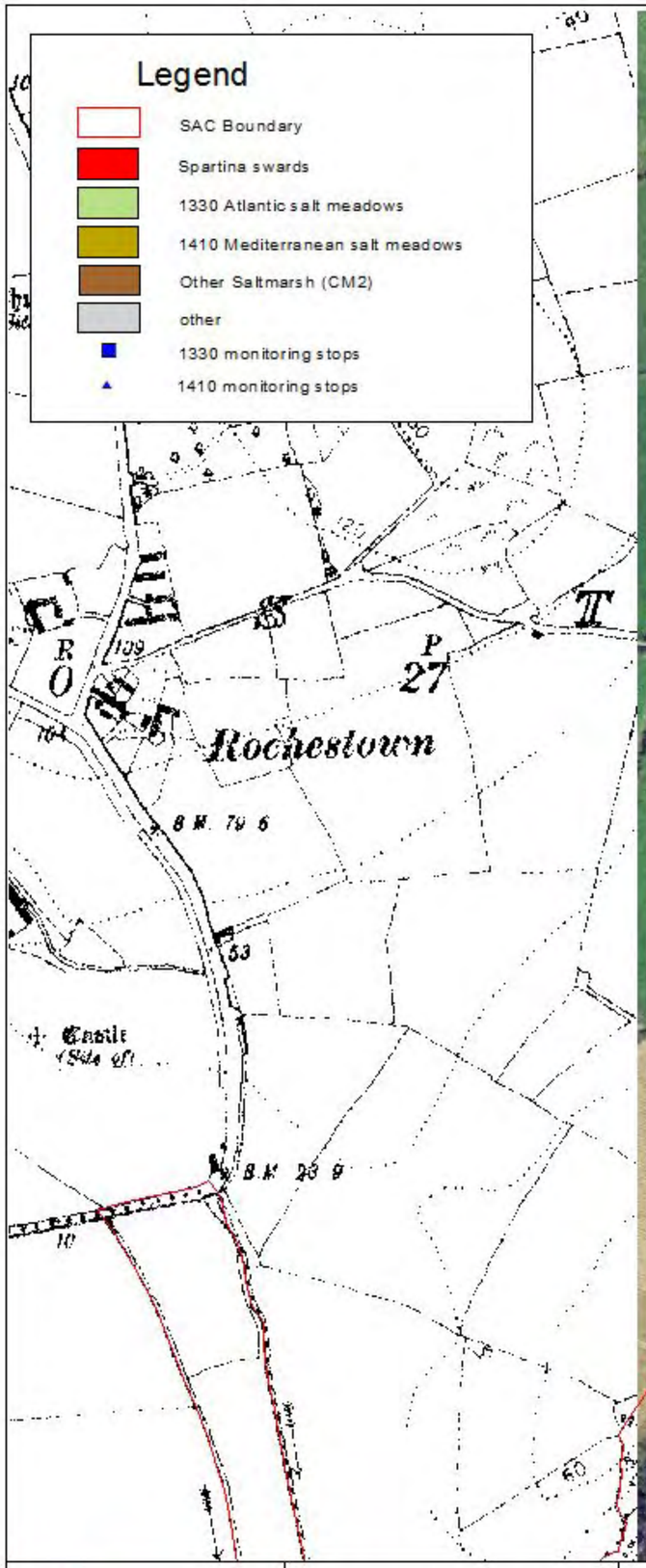
8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			1310	1330	1410	1420	Spartina swards
1	1310 *Salicornia* flats						
2	Spartina swards	0.049					0.049
3	1330 Atlantic salt meadow	17.499		17.499			
4	1410 Mediterranean salt meadow	0.040			0.040		
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)	5.033					
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)	8.877					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**31.498**		**17.499**	**0.040**		

Legend

- SAC Boundary
- Spartina swards
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stops
- 1410 monitoring stops



Oifig na Seirbhíse Páirce Náisiúnta agus Fiadhúlra
Environment, Heritage and Local Government
National Parks and Wildlife Service

Saltmarsh Monitoring Project 2007-2008

Rochestown

River Barrow and River Nore SAC (002162)

SMP code: SMP0050

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

0 90 180 270 360 Meters

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:5250

N

Barrigone, Aughinish

1 SITE DETAILS

SMP site name: **Barrigone/ Aughinish**		SMP site code: **0079**
Dates of site visit: **21 & 22 May 2008**		CMP site code: **N/A**
SM inventory site name: **Barrigone, Aughinish**		SM inventory site code: **150**
NPWS Site Name: **Lower River Shannon**		
NPWS designation	cSAC: **2165**	MPSU Plan: **Old Format – Draft 2: Consultation**
	pNHA: **0435**	SPA: **4077**
County: **Limerick**		Discovery Map: **64** Grid Ref: **127710, 150670**
Aerial photos (2000 series): **O 4858-B; O 4859-A**		6 inch Map No: **Li 010**

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 **Mediterranean salt meadows (Juncetalia maritimi)**

Other SMP sites within this SAC/NHA: **Carrigafoyle, Beagh, Bunratty, Shepperton/Fergus Estuary, Inishdea/Owenshere, Killadysart/Inishcorker, Knock, Querin, Rinevilla Bay**

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

2 SITE DESCRIPTION

This site is located along the south side of the River Shannon Estuary, near the village of Barrigone. It is located approximately 25 kilometres north-west of Limerick City along the N69 road leading to Foynes. Although the area is largely characterised by its farming background, mostly livestock, the Alumina plant directly to the north of Barrigone is the most noticeable landmark and occupies all of Aughinish Island. The survey site includes a small inlet off the main estuary. This inlet widens out south of Aughinish Island to form a large intertidal area. This area is connected to the main estuary by the narrow Robertstown River Channel. The landscape around this area is mainly low-lying and one of the main features of the site are the tall embankments along much of the shoreline of the intertidal area.

Saltmarsh is found along the seaward side of many of these embankments. The seaward boundary of the survey site is marked by the abandoned railway track that crosses the narrow river channel. A narrow fringe of saltmarsh extends southwards along either side of this narrow creek before opening up into two separate inlets, where it occurs on the mudflats and extends around a large part most of the coastal fringe. The eastern inlet extends in the direction of Barrigone, whilst the larger western inlet extends into the town known as Churchfield. It should be noted that saltmarsh habitat extends outside the survey site along the Robertstown River Channel and north of the railway bridge, but this was not surveyed.

Barrigone/Aughinish 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 like 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*). However, none of these species is known from Barrigone/Aughinish area. 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.

Barrigone/Aughinish is one of two sites in County Limerick that were surveyed as part of the SMP project, Beagh being the other site. Curtis and Sheehy-Skeffington (1998) however, recognised five saltmarsh sites along Limericks relatively small coastline. In total, twenty one separate saltmarsh sites are listed for the lower reaches of the River Shannon, occurring in counties Limerick, Kerry and Clare.

In terms of accessibility, most of the saltmarsh is located on the seaward side of the extensive coastal embankments that were installed to prevent flooding and in an effort to reclaim agriculturally useful land. However, there is little public access onto the marsh and the only right of way onto the mudflats is located at a gate 130metres north-west of the church car-park. Elsewhere the saltmarsh was accessed at a number of locations by crossing over private property with the permission of local landowners. However, it was not always possible to identify landowners and it is possible that once on the saltmarsh, some privately owned saltmarsh were crossed as part of the survey.

3 SALTMARSH HABITATS

3.1 General description

This site and the development of the saltmarsh is largely characterised by earlier anthropogenic management regime. The narrow Robertstown River inlet which leads into this sheltered intertidal zone has been greatly modified through the construction of an extensive embankment, with the result that a considerable area of ground has been reclaimed. The intertidal inlet may at one time have consisted of a single larger area, but now comprises two

smaller inlets. The saltmarsh vegetation occurs throughout the site and while it is regarded as a single contiguous unit, there are differences in the distribution of some habitats. Indeed, gaps are not uncommon in the vegetation and these often occur along the narrower part of the inlet and around less sheltered parts of the site fronting the embankment.

Barrigone/Aughinish is listed as an estuarine marsh that has developed over mud (Curtis and Sheehy-Skeffington 1998). Whilst the site is characterised by extensive mudflats, other substrates that were noted include consolidated clays, peats and occasional glacial deposits. In terms of Annex I saltmarsh habitats, this site is characterised by the extensive development of *Spartina* swards on the mudflats and features Atlantic salt meadows (ASM) and Mediterranean Salt meadows (MSM), along with a negligible amount of *Salicornia* and other annuals colonizing mud and sand (*Salicornia* flats). These latter habitats are generally located to the landward side of the *Spartina* swards, although this is not always the case. The total area mapped for each of these habitats is shown in Table 3.1. The majority of the saltmarsh vegetation that was mapped at this site is located inside the cSAC. The only notable discrepancy is almost 2ha of ASM that extends beyond the cSAC boundary. Part of the north-eastern boundary of the site, follows the edge of a creek, in part, as shown on the 6inch map. However, a large part of the boundary was arbitrarily drawn along a fence-line that has since been removed.

It should be noted that additional saltmarsh vegetation occurs to the north or seaward side of the site beyond the abandoned Foynes railway. It was not possible to continue surveying beyond this point as much of the land is in private ownership of Aughinish Alumina plant and would entail crossing around the extensive tailings pond that is situated in this area.

Much of the western or Churchfield inlet is characterised by extensive sward development on the mudflats. This part of the saltmarsh is not as diverse as other parts of the marsh. There is no development of MSM here and the *Salicornia* flats were only recorded from recently excavated soil along the front of the embankment. The ASM is widely distributed throughout this half of the site, although it is fragmented and often consists of narrow fringe, particularly along the embankment. For the most part, mosaics between the two main habitats were not a feature of the western half of the site. The embankment greatly influences this part of the marsh and forms a definite upper boundary with the ASM. The remaining low-lying land that is associated with the marsh, here, is mapped as transitional or non saltmarsh. They are mostly characterised by derelict grasslands of varying composition.

Towards Barrigone and the eastern inlet, a greater diversity of habitats and structural composition of the saltmarsh was recorded. Again the *Spartina* sward is extensive, but it occurs along much of the frontline, except towards the most inner parts of the inlet. However, the extent of the ASM is more substantial, occurring as a relatively large plain, particularly towards the north-eastern corner of the site. A considerable amount of MSM was also

recorded here. The distribution of these three habitats in this area is controlled by a network of creeks.

Continuing southwards into the upper reaches of this inlet, there is a gradual diminution in the extent of the *Spartina* sward further south. Indeed a considerable amount of it is mapped as mosaic with ASM. Both the ASM and MSM are more fragmented around this area. The gradation between saltmarsh and other habitats is usually distinct, although occasionally the development of transitional wet grassland was noted.

Table 3.1. Area of saltmarsh habitats mapped at Barrigone, Aughinish.

EU Code	Habitat	Area (ha)
H1310	*Salicornia* and other annuals colonizing mud and sand	0.0001
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	10.2
H1410	Mediterranean salt meadows (Juncetalia maritimi)	2.41
non-Annex	*Spartina* swards	12.67
	Total	**25.28**

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

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

A single, almost negligible patch of Glasswort (*Salicornia europaea* agg.) vegetation was recorded along the northern part of the site. The annual vegetation was recorded on perched ASM fringe at the foot of the recently regarded berm. During the enhancement of the flood defences, long areas of ground at the foot of the berm were mechanically scraped and the soil was deposited atop the berm to increase its height. The disturbance, which resulted in the loss of ASM, created a niche in which the patchy annual vegetation became established.

3.3 Atlantic salt meadows (H1330)

The ASM deceptively occupies almost as much territory as the *Spartina* sward (Table 5.1). Totalling approximately 10ha in extent, however, the ASM is more widely distributed. And unlike the *Spartina* sward which is characterised by dense Common Cordgrass, the ASM is mostly comprises a narrow fringe, some of it discontinuous, along with a number of discrete saltmarsh plains, most noticeably along the eastern half of the site.

The majority of ASM vegetation occurs as pure marsh, but it is also mapped separately, occurring variously in mosaic with MSM, *Spartina* sward or rocky shore mosaic. A final category, has a small patch (0.25ha) dominated by ASM, but in which there is a definite presence of Common Cordgrass (5%). It is possible to distinguish zonation from this site, although, they rarely occur as a continuous sequence.

Bare ground in the lower marsh is typically up to 10%, but can account for up 40% of a monitoring stop. The vegetation is dominated by Common Saltmarsh Grass (*Puccinellia maritima*) along with occasional contributions from species such as Sea Aster (*Aster tripolium*), Sea Milkwort (*Glaux maritima*) and Greater Sea-spurrey (*Spergularia media*). Unsurprisingly, Common Cordgrass is a frequent component of the lower marsh and can account for up to 40% of the area.

The transition from low to low/mid and mid marsh is typified by the presence of species such as Thrift (*Armeria maritima*), Common Scurvy Grass (*Cochlearia officinalis*), Sea Plantain (*Plantago maritima*) and Sea Arrow-grass (*Triglochin maritimum*). Common Saltmarsh-grass is commonly recorded in the lower transition and typically accounts for between 50 and 75% ground cover. There is a considerable decrease in the amount of Common Cordgrass that is recorded in this part of the marsh and it is generally found as small isolated tufts along creeks or in pans.

The mid/upper and upper marsh is the most extensively developed community of the ASM vegetation. It is characterised by a graminoid sward in which saltmarsh herbs also occur. Dominated by Red Fescue (*Festuca rubra*), other constantly occurring species include Saltmarsh Rush (*Juncus gerardii*) whilst Creeping Bent (*Agrostis stolonifera*) is commonly abundant in wetter conditions. Herbaceous species that were constantly recorded included Sea Aster, Sea Milkwort, Sea Plantain and Sea Arrow-grass. The floristic diversity of the upper marsh is characterised by the presence of a large number of occasionally occurring species such as White Clover (*Trifolium repens*), Autumns Hawksbill (*Leontodon autumnalis*), Curled Dock (*Rumex crispus*), Common Scurvy Grass and Thrift. The occurrence of Common Cordgrass was very much reduced in the upper marsh. Where it was recorded, this was usually due to drainage channels such as creeks or shallow wet runnels. Sea Wormwood (*Artemisia maritima*) was a notable species that was occasionally recorded in the upper marsh. However, its greatest extent was found along the berms, in unpointed gaps between the blocks and boulders.

A number of separate habitats are recorded, in the transition from saline to brackish or terrestrial zone. In some situation the ASM has developed against the embankment and so is not backed by another habitat, rather by an assemblage of mixed species. Mostly, however, the ASM grades into wet grassland which, depending on the drainage, has varying degrees of As the drainage improves upslope, the wet grassland transition, dominated by Twitch (*Elymus repens*) is replaced by grassland species. On drier soils underlain by glacial till or in situations where the density of livestock is reduced, species-rich calcareous grasslands are recorded. Elsewhere, the transition is towards agriculturally-improved pasture, although occasionally it is demarcated by hedgerow or patches of scrub.

3.4 Mediterranean salt meadows (H1410)

The majority of the 2.41ha of MSM is located on the eastern inlet and is largely recorded from within the boundary of the cSAC. The vegetation is characteristically dominated by Sea Rush (*Juncus maritimus*) which is distinctive in its appearance. And although it may at times be as tall Common Cordgrass, it is unlikely to be misdiagnosed.

The lower boundary of the MSM is generally demarcated by the *Spartina* sward, although occasional patches of ASM vegetation were also noted. Where the MSM is fronted by, or occurs directly on the mudflats, it is characterised almost entirely by Sea Rush. This usually occurs in small patches or as a narrow or linear band along the mudflats. Unlike the ASM vegetation, in which a certain degree of zonation was evident, the majority of the MSM is classified as upper marsh. It is generally found on level peaty plain that is perched anywhere from 30cm to 1 metre above the mudflats. The area although level can be treacherous underfoot due to drainage features that bisect the site as well as localised damage including trampling.

In addition to the Sea Rush, other regularly occurring species include: Red Fescue, Sea Milkwort, Saltmarsh Rush, Sea Plantain, Sea Arrow Grass and occasionally, White Clover, Common Scurvy Grass, Autumn Hawksbill, Sea Aster and Thrift. Given that a large part of the MSM habitat occurs on saturated peat soils, Creeping Bent is common and in many instances, is more abundant than Red Fescue. Sedges such as Distant and Long-Bracted Sedges (*Carex distans* and *C. extensa*) were also infrequently recorded in the MSM and it is interesting that they were not noted in the ASM. In one location, the freshwater influence on pans resulted in the occurrence of Brookweed (*Samolus valerandi*). Most of the vegetation occurs as pure MSM. A small amount of the MSM vegetation occurs as a mosaic with ASM.

Common Cordgrass is found within the MSM, particularly in the north-east corner of the site. The distribution of Common Cordgrass is generally related to the underlying topography and is found in lower lying parts of this habitat, including along the creeks and channels in this area. A habitat mosaic with *Spartina* swards and MSM has developed in this area. However, Common Cordgrass does not form a significant part of the MSM vegetation overall. The saltmarsh topography within the MSM is well-developed, particularly in the north-east corner of the site where there is an intricate network of creeks. Salt pans and depressions are also present.

The upper boundaries of the MSM are characterised by a number of different habitats, mostly *Spartina* sward and ASM communities, although transitional vegetation including wet or agricultural grassland and hedgerow.

3.5 *Spartina* swards

This habitat is widely distributed around this site and it is extensively characterised by pure sward which occurs on the mudflats throughout the two inlets. Although the sward might appear to dominate the saltmarsh and occupy a considerable portion of the site, in terms of total area (12.67ha), it is only slightly greater in extent than the ASM. Apart from a negligible 0.219ha, the remainder of the Spartinion is located within the cSAC boundary.

Large tracts of the mudflats have been colonised by Common Cordgrass (*Spartina anglica*) and the majority of the this habitat occurs as pure sward. It is interesting that isolated tufts or small patches of developing *Spartina* sward vegetation were not a feature at this site. Asides from pure sward, however, the Common Cordgrass commonly transitions into ASM and it has been mapped as an ASM/*Spartina* mosaic, although occasionally, the sward can extend in behind the saltmarsh habitats, particularly around the north-eastern inlet of the site, where the sward is often found behind both MSM and ASM communities. This is due to the network of deep creeks that bisect this area.

4 IMPACTS AND ACTIVITIES

Several impacts and activities affect this site (Table 4.1), although many of them are localised in extent or impact. Historically, much of this site has been considerably remodelled and large areas of land have been reclaimed from within the sheltered intertidal inlet through the construction of an embankment. The embankment is extensive and is found along a large part of the western perimeter of the site as well the central townland landmass known as Oorla. It has obviously had an impact on the development of the saltmarsh and its various communities, including the sedimentation patterns and the spread of Common Cordgrass. These impacts are not assessed, as these activities and impacts commenced some time ago, they are only assessed in terms of any current or recognisable impact.

Common Cordgrass is present at this site. It is an invasive species of saltmarsh (954). First planted in the Shannon region in 1928, (Nairn 1986), it has since flourished and is widely distributed. It is not known when this invasive species first took hold at this site, but it has thrived on the extensively sheltered mudflats in the Shannon Estuary. It has developed extensive swards at several locations around this site. This sward development has been at the expense of both intertidal mudflats and established saltmarsh that was likely to contain ASM and MSM. There has also been significant creation of *Spartina* sward mosaic areas, mainly in areas of former established saltmarsh. This indicates that the spread of Common Cordgrass has had a negative impact on the extent of both ASM and MSM. The impact of its presence is assessed as a medium negative impact on these mosaic areas. However, due to the lack of baseline data it is difficult to judge if Common Cordgrass has spread significantly within the current monitoring period. It is likely that much of this sward development has

occurred prior to this current monitoring period as Common Cordgrass has been established in the Shannon Estuary for a relatively long time.

In terms of agricultural management, grazing is the most prevalent activity (140). Many of the larger areas of saltmarsh are grazed in the summer months and possibly the winter months. Trampling was evident throughout much of the ASM and tracks (501) are not uncommon. These were rarely significant except around pinch-points such as gates or crossing points. Other damaging activities (143) included poaching and vegetation denudation. Despite the inclement summer and the fact that large parts of the saltmarsh were waterlogged, it was apparent that some parts of the marsh had an unsustainable level of livestock.

Not all of the tracks, however, were as a result of livestock or the occasional pedestrian. Some tracks are man-made, or at least have been improved upon, through the incorporation of hard core and rubble. The majority of these tracks are associated with the embankment, where tracked excavators have recently been working, making repairs and the like (810). Another impact associated with this maintenance regime has resulted in the loss of saltmarsh habitat. Soil is excavated (820), in places up to 0.5metres deep and the scraped material is then placed atop the embankment, both to increase its height and also to make a level surface along its ridge. This disturbance has lead to the development of the small patches of *Salicornia* flats at the site. It is also likely to encourage the spread of Common Cordgrass into the ASM.

There have been some small scale attempts at reclamation of land from the sea (800). Rubble and clay have been imported in a limited number of places and dumped atop presumably what was saltmarsh. Where encountered, this was often of recent origin, given that these areas were largely unvegetated and the nature of the foreign, organic soil was apparent. Elsewhere agricultural improvement including scrubbing out of hedges and the levelling of rubble downhill over the saltmarsh (803). The hedging, which is inside the cSAC boundary around a number of fields outside of the designated site, is located in an isolated patch of land above the saltmarsh at IslandMcTeige, below the old railway line. This activity happened some time after the series 2005 photographs were taken, as the hedges are still visible.

There are some indicators of erosion (900) at this site. While large parts of the site are bounded on their seaward side by *Spartina* sward, this is not always the case. Both ASM and MSM communities have some frontline exposure. Much of the fragmented saltmarsh fringe, largely dominated by ASM community, on the seaward boundary of the embankment is characterised by a tall cliff face, which in places is undercut or slumped. Elsewhere, the frontline of the saltmarsh varies in height from a gentle slope from the mudflats to a distinct terrace. Often the terracing has a convoluted frontline, which is indicative of erosion. And although indicators of erosion were apparent, it is not possible to detect any measurable loss

of saltmarsh habitat between the year 2000 and series 2005 ortho-photographs. Erosion is assessed as having a low negative impact on a portion of the saltmarsh.

The small patches of saltmarsh vegetation that occur outside are similarly affected by impacts and activities that are listed from within the cSAC. The hinterland is predominantly agricultural, with much of the lower-lying ground consisting of reclaimed land. There are some areas of dispersed settlement or even individual residences, but most of these have been in existence for some time and so are not considered in this monitoring period. The fragments of both ASM and MSM are moistly affected by grazing (140), and damage associated with it (143), tracks (501), some minor dumping of garden and household waste (700), along with some land reclamation (803) although it is contiguous with that described from one area inside the cSAC boundary. These activities have little measurable impact on the saltmarsh habitats, other than those that have already been assessed.

Table 4.1. Intensity of various activities on saltmarsh habitats at Barrigone, Aughinish.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	820	A	1	0.0001	Inside
H1330	140	C	0	6.0	Inside
H1330	143	B	-1	3.5	Inside
H1330	501	C	0	0.5	Inside
H1330	803	A	-2	0.1	Inside
H1330	820	A	-2	0.15	Inside
H1330	900	C	0	0.2	Inside
H1330	954	B	-1	2.5	Inside
H1410	140	C	0	1.85	Inside
H1410	143	C	-1	0.15	Inside
H1410	501	B	-1	0.15	Inside
H1410	803	A	-2	0.005	Inside
H1410	900	C	0	0.05	Inside
H1410	954	B	-1	1.2	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the NHA survey, the

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

Barrigone saltmarsh has some notable features. Sea Wormwood, a species of local distinctiveness, is found and this site. The saltmarsh has been considerably modified in the past through drainage and reclamation works including the construction of considerable lengths of embankment and berms. However, these operations were finished a long time ago and are shown on the 2nd edition 6inch map. Since the publication of that map, there is an indication of an overall increase in the area of saltmarsh vegetation at this site over the past century mainly as a result of the development of *Spartina* swards.

The overall conservation status of the saltmarsh at Barrigone/Aughinish is rated as *unfavourable-bad* (Table 5.1). The assessment is largely based on the condition of the ASM. Most of the site has been affected in some form either through grazing or repair works along the berm. These works have created trenches at the base of the embankments within the ASM that now contain bare mud and they are likely to encourage the spread of the Common Cordgrass 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 it is now out of date.

Table 5.1. Conservation status of Annex I saltmarsh habitats at Barrigone, Aughinish.

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

While Glasswort is occasionally recorded as a minor component in the both the ASM and MSM vegetation at this site, there is no information as to this habitat's occurrence let alone its

distribution at this site. That a single patch was recorded on recently disturbed ground suggests that the extent of this habitat is assessed as *favourable*.

5.2.2 Habitat structure and functions

A *favourable* rating is based on a visual assessment, given that monitoring stops were not carried out. The single small patch of this habitat which was recorded occurs on recently excavated clay is typical of establishing annual vegetation. Given the extent of the *Spartina* sward, it might be suggested that this annual habitat has suffered in terms of its extent.

5.2.3 Future prospects

There is no information as to its previous distribution at this site. The presence of the habitat on bare, perched ground, although negligible, at the site is solely due to the excavation in parts of the saltmarsh to reinforce the berm. It is uncertain as to its persistence and it may be that as the vegetation cover develops, that it may be replaced by ASM which is the predominant vegetation surrounding it. For this reason, the future prospects are assessed as *unfavourable-bad*, as the habitat may not be recorded during the next monitoring period.

5.3 Atlantic salt meadows (H1330)

5.3.1 Extent

The extent of the ASM is assessed as *unfavourable-inadequate*. The occurrence of ASM along many of the inlets of the Lower Shannon is well documented and is shown on early NPWS maps. However, it is recognised that given the size of this cSAC, that the earlier vegetation maps are inaccurate. Notwithstanding this difficulty it is clear that the ASM is long established at this site and a large area is characterised by mature upper marsh vegetation.

Common Cordgrass has spread into the former established ASM at various locations around the site and has formed some ASM/*Spartina* sward mosaic. However this colonisation has largely occurred prior to the current monitoring period and is therefore not assessed as a negative impact on the extent of ASM.

Analysis of the recent year 2000 and the more recent 2005 series aerial photographs does not reveal any discernible change in the extent of the saltmarsh. However, there is a confirmed loss of ASM habitat in the north-eastern half of the site. Recent field improvement of a number of sloping fields included scrubbing out 200 metres of hedgerow and regrading the ground so that excessive water from the fields would more freely drain into the marsh. Approximately 0.1ha of ASM habitat has been lost as earth was piled onto the saltmarsh. Some habitat has also been lost due to the removal of sediment from trenches in the ASM along the embankments. This represents a loss of about 2% of habitat.

5.3.2 Habitat structure and functions

The structure and functions are rated as *unfavourable-bad*. Twenty monitoring stops were carried out across the site, covering all zones and differences in the management. Of those, eight stops failed, which was largely due to the levels of damage associated with livestock. Within each separate farming unit, much of the larger portions of ASM are freely accessible to livestock density is such that trampling and overgrazing are a common feature of the habitat. Elsewhere some of the damage and loss of habitat is attributable to the recent engineering works where tracked diggers were brought onto the site to repair or improve the flood defences/coastal protection works. This operation has affected the structure of the marsh in places and the imprint of the heavy machinery was still visible 2 years after its completion. The ruts in the soft ground were common along much of the seaward side of the berm, and the vegetation denuded where soil had been excavated.

Several typical ASM communities are found at this site and there are some examples of zonation between these communities in places. Sea Wormwood, a species of local distinctiveness is found in the upper saltmarsh zone at this site. These are positive indicators. Common Cordgrass has spread into the ASM at locations around the site and has formed some ASM/*Spartina* sward mosaic. However, the impact of its spread on species composition is assessed as neutral, mainly due to the lack of accurate baseline data. The structure of this saltmarsh has also been modified in the past by reclamation and construction of embankments in the past. These are negative indicators.

5.3.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-bad* (Table 5.1). This assessment assumes that the current management activities and levels of impacts continue in the near future. There are a small number of activities that are significantly affecting this habitat at present. While there are a number of different landowners associated with this, the overall land management practices in the area are likely to have a serious impact on the quality and extent of the ASM habitat in the future. Grazing is allowed on all available and accessible parts of the saltmarsh. The levels of grazing are such that large areas of the ASM have been suffered damage which includes trampling, poaching and overgrazing and it is unlikely that there will be any change in the condition of the ASM in the foreseeable future. It should be noted that the high levels of damage that are associated with the stocking density were compounded by the unseasonably wet summer, which resulted in much of the site being waterlogged for most of 2008.

Another issue which has a localised impact, but is nonetheless of some importance is the cyclical repair works of the berm. Until the operation is rethought, the excavation of saltmarsh soils will recur in the near future.

There is unlikely to be significant further spread of Common Cordgrass into this ASM, as it is

already well established at this site and has already established in to those low-mid zones that were vulnerable to its colonisation. However, excavation and disturbance to the ASM that are related to berm repairs leaves it vulnerable to continued colonisation by Common Cordgrass at this site.

5.4 Mediterranean salt meadows (H1330)

5.4.1 Extent

The extent of this habitat is assessed as *favourable* (Table 5.1). There is no reliable information as to the previous distribution of the vegetation. Although nowhere near as extensive as the either the ASM or *Spartina* sward, it is fair to assume that it has occurred at this site for some time, given that it generally occurs as large swards in the eastern inlet. Rarely is the MSM found on the mudflats as it is usually fronted by *Spartina* sward, although one relatively large patch occurs directly on mud.

There would appear to be few impacts which affect this habitat. There are no indications that the extent of MSM has been affected by erosion, land-use changes or colonisation by Common Cordgrass within the current monitoring period. MSM does form a mosaic with *Spartina* sward in the north-east corner of the site and Common Cordgrass has spread into this area. However, this colonisation is likely to have occurred prior to the current monitoring period and it was therefore not assessed as a negative impact on species composition.

5.4.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Four monitoring stops were carried out in the MSM, all of which passed. There are few impacts and activities acting on this habitat, apart from grazing. Although the MSM is freely accessible to livestock, the grazing intensity is low, resulting in vegetation that is relatively uniform and rank. And unlike much of the adjacent ASM habitat which is heavily damaged by livestock, the only evidence of their impact on the MSM includes trails or localised poaching such as at crossing points. The MSM has a species typical species assemblage. Common Cordgrass is found in this habitat but does not form a significant part of the vegetation.

5.4.3 Future prospects

The future prospects of this habitat are assessed as *favourable*. This assessment assumes that the current management regime and levels of impacts including grazing continue in the near future. Although heavy grazing levels are negatively affecting the ASM, the MSM is not affected to the same extent. There is unlikely to be significant further spread of Common Cordgrass into this MSM as it is already well established at this site and has already established into those low-mid zones that were vulnerable to its colonisation.

6 MANAGEMENT RECOMMENDATIONS

The berms are long established at Barrigone/Aughinish and are likely to require upkeep in the future, particularly in areas that are undermined during exceptional storm periods. The repair of the berms is an ongoing programme and most similar large coastal protection works are revisited periodically. In planning these operations, it would be prudent to suggest to the relevant authorities that greater consideration should be given towards the impact of excavating the topsod. It has had an impact on the Annex I habitat, which might be avoided if soil were excavated from inside the berm. Continued disturbance could encourage colonisation by Common Cordgrass.

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.

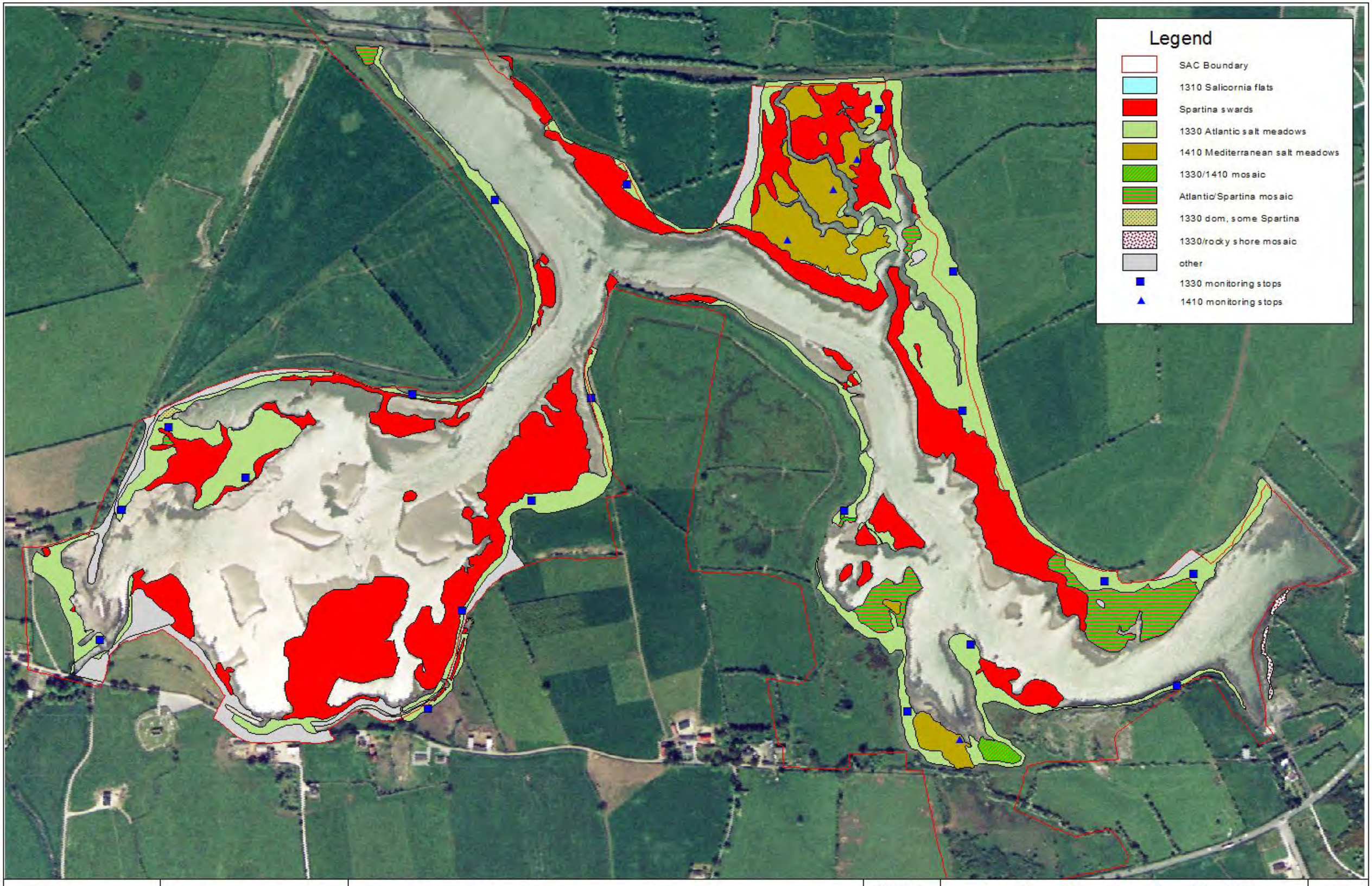
MPSU (?).*Draft Conservation Plan for Lower River Shannon cSAC*. Government of Ireland, Unpublished.

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	*Spartina* swards
1	1310 *Salicornia* flats						
2	*Spartina* swards	11.880					11.880
3	1330 Atlantic salt meadow	9.274		9.274			
4	1410 Mediterranean salt meadow	2.339			2.339		
5	ASM/MSM mosaic (50/50)	0.137		0.0685	0.0685		
6	ASM/*Spartina* mosaic	1.579		0.7895			0.7895
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	2.056					
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*	0.025		0.0235			0.00125
17	1330/sand dune mosaic						
18	Other SM (CM2)						
19	1330/rocky shore mosaic	0.081		0.0405			
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**27.371**		**10.196**	**2.408**		**12.671**



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

Saltmarsh Monitoring Project 2007-2008

Barrigone, Aughinish

SMP code: SMP0079

0 60 120 180 240 300 Meters

N

Lower River Shannon SAC (002165)

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

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:4750

Beagh

1 SITE DETAILS

SMP site name: **Beagh**		SMP site code: **0080**
Dates of site visit: **21 May 2008**		CMP site code: **N/A**
SM inventory site name: **Beagh**		SM inventory site code: **148**
NPWS Site Name: **Lower River Shannon**		
NPWS designation	cSAC: **2165**	MPSU Plan: **Old Format – Draft 2: Consultation**
	pNHA: **0435**	SPA: **4077**
County: **Limerick**		Discovery Map: **64** Grid Ref: **136745, 156340**
Aerial photos (2000 series): **O 4737-B; O 4738-A**		6 inch Map No: **Li 003**

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 **Mediterranean salt meadows (Juncetalia maritimi)**

Other SMP sites within this SAC/NHA: **Carrigafoyle, Barrigone/Aughinish, Bunratty, Shepperton/Fergus Estuary, Inishdea,/Owenshere, Killadysart/Inishcorker, Knock, Querin, Rinevilla Bay**

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

2 SITE DESCRIPTION

Beagh is a rural site in west Limerick on the southern banks of the River Shannon. It is situated directly opposite Rineanna Point. This saltmarsh is located 1 kilometre north of the small village of Ballysteen, which is itself 4.5 kilometres north east of Askeaton.

The saltmarsh is relatively small and is confined to a narrow coastal fringe along the southern shores of the River Shannon. The site extends southwards from the small quay that once served Beagh Castle towards the old farming estate known locally as Castle View before gradually petering out. The 6inch map indicates the presence of a small quay here but there was no evidence of its existence and indeed, it is unlikely that boats have been landed here in some time given the nature of the mudflats in this part of the site. The southern most extent of the saltmarsh is easily recognised by the presence of a man-made concrete berm that extends in a north-easterly direction towards Bushy Island.

Beagh 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 like 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. Beagh is one of the smallest of twenty-one separate saltmarsh systems that are included in the National Inventory as occurring along the River Shannon (Curtis and Sheehy-Skeffington 1998). Of those, eleven were included in the current survey, although Barrigone/Aughinish was the only other saltmarsh site from County Limerick that was surveyed. Several of these other saltmarshes in Co. Clare were surveyed during the SMP project (see above table).

It is possible to access the fringing marsh from the small quay beside Ballinvoher Castle. However, this fringing saltmarsh occurs over outcropping limestone which is in places treacherous. The saltmarsh can be accessed from a number of other locations, although all of them require crossing private land. A landowner was approached and permission was granted to cross onto the saltmarsh.

3 SALTMARSH HABITATS

3.1 General description

Relative to other saltmarsh systems that are known from the Lower River Shannon, Beagh is one of the smallest, if not the smallest. It is not extensive and is confined to a narrow fringe for most of its length. The saltmarsh is characterised by the presence of a single Annex I habitat, namely Atlantic salt meadow – H1330 (ASM) along with the non-annexed *Spartina* sward, which occupy a roughly similar area (Table 3.1).

The site is largely characterised by a narrow band of discontinuous vegetation along the terrestrial/intertidal transition. Much of the saltmarsh vegetation is fragmented and its distribution is controlled by the outcropping bedded limestone. Remnant patches of vegetation develop in sediment in-filled hollows and as occasional patches on the extensive riverine mudflats that line the front of the site. The only considerable development of saltmarsh is in the southern-most point of the site, where there has been a considerable accumulation of mud in this sheltered cove.

Although both ASM and *Spartina* sward habitats are recorded throughout the site, there are distinct differences in the extent and distribution of each. The ASM, although fragmented is more consistent in its distribution. It is largely confined to a narrow, albeit discontinuous, fringe that extends southwards from the castle towards the southern most point of the site, where it peters out. In contrast, the majority of the Common Cordgrass (*Spartina anglica*) was recorded as a mono-specific sward in the southern-most part of the site. The sward largely found seaward of a similarly sized sward of Sea Club-rush (*Bolboschoenus maritimus*); although in places it transitions into ASM. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. The zonation within this cover is somewhat unusual as Sea Club-rush has spread in part of the intertidal mud seaward of ASM and forms a zone between the ASM and the *Spartina* sward. This may be due to freshwater outflow from adjacent drainage channels. This type of zonation was also recorded further east towards the head of the estuary and is also likely to be related to the estuarine influence of the river. Elsewhere, it was only recorded as individual small tufts, usually fronting the ASM.

The distribution of the saltmarsh vegetation is controlled by the occurrence of outcropping limestone, although historical land modifications along this part of the river are important also. The transition from saltmarsh to terrestrial habitats is characterised by a number of other communities. Progressing southwards from the Beagh Castle, the patchy saltmarsh is often overshadowed by trees and scrub which occur on shallow soils that develop on the bedded limestone. A local road runs a considerable distance parallel to this. Further south towards the small quay at Castleview, the saltmarsh disappears. Much of this land has been remodelled and boulders brought and placed atop of the mud or outcropping rock to prevent flooding. The diversity of transition and habitat are found in the southern part of the site. Much of the low-lying ground behind the saltmarsh is agricultural, although some of it is characterised as transitional wet grassland.

The majority of the saltmarsh vegetation occurs inside the boundary of the cSAC. Of the small number of patches, which are mapped outside of the current boundary, this is related to cartographical differences between the boundary as shown on the statutory 6inch maps with what is actually observed on the ground.

Table 3.1. Area of saltmarsh habitats mapped at Beagh.

EU Code	Habitat	Area (ha)
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	0.538
non-Annex	*Spartina* swards	0.521
	Total	**1.059**

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

3.2 Atlantic salt meadows (H1330)

At approximately 0.6ha, the ASM is not extensive and is roughly similar in area to the *Spartina* swards (Table 3.1). Its distribution is dissimilar however. The ASM vegetation is fragmented in its distribution and its development is often controlled by the occurrence of outcropping bedded limestone. Most of the ASM is perched above the mudflats and there is little development of lower marsh vegetation. It is not surprising, then that all of the ASM is characterised by mid and upper marsh vegetation.

In general, the vegetation is not diverse and often consists of the same species, but in differing ratios. The ASM is characterised by regularly occurring species such as Red Fescue (*Festuca rubra*), Sea Milkwort (*Glaux maritima*) and Thrift (*Armeria maritima*). Other species which were recorded, but less abundantly included: Sea Aster (*Aster tripolium*), Saltmarsh Rush (*Juncus gerardii*), Common Scurvy Grass (*Cochlearia officinalis*), Sea Plantain (*Plantago maritima*) and Common Saltmarsh Grass (*Puccinellia maritima*). Another species of limited distribution was Common Sea Spurrey (*Spergularia media*).

In wetter situations, particularly in transitional and flushed ground, Creeping Bent (*Agrostis stolonifera*) was notable and in places surpassed Red Fescue in terms of ground cover. Towards the southern half of the site, Twitch (*Elymus repens*) was commonly recorded along the landward boundary, whilst a relatively large sward of Sea Club-rush was recorded between the ASM and *Spartina* sward. The landward gradation from ASM was not always distinct, which may reflect the diluting influence of freshwater draining off the agricultural land onto the saltmarsh. Occasionally, small patches or individual shoots of Common Cordgrass were noted in the ASM, but these were often confined to the transitional zone between the ASM and *Spartina* sward.

3.3 *Spartina* swards

The first record of Common Cordgrass in the Shannon River is from the opposite shore to Beagh, at Poulnasherry Bay, where it was planted in 1928 as a means of stabilising the shifting muds (Nairn 1986). It has spread rapidly throughout the lower reaches of the Shannon and is now well established in many of the saltmarshes. Unlike other saltmarsh systems, however, Common Cordgrass is not as well developed at Beagh as elsewhere. The Shannon is tidal at this point and there is a considerable exposure of mudflats at low tides, the conditions appear not to favour the large scale development of the sward.

There are several Common Cordgrass patches of varying size at Beagh. Most are small patches or clumps that are found at the seaward side of the fragmented ASM habitat. There is only one significant area of sward which is found on the mudflats fronting the ASM in the southern most part of the site. Typically, Common Cordgrass occurs as a monoculture, whether in the sward or in the isolated tufts that were recorded along the saltmarsh fringe towards the castle.

4 IMPACTS AND ACTIVITIES

A list of impacts and activities that were considered to affect the saltmarsh at this site are listed in Table 4.1. The list is not extensive, and only a small number few direct impacts (that could be quantified) were noted. Much of the landscape around this part of Limerick is characterised by farmland, with some scattered pockets of habitation. The area is quite rural and apart from the presence of the ruined Beagh Castle, would not be subject to large numbers of visitors or tourists.

Extensive mudflats are a feature along the entire front of the saltmarsh. These are diurnally flooded. Most of the land around this site has been modified in the past in some form or another. This may have consisted of the construction of the old quays and retaining walls, to more recent improvements in the embankment marking the southern boundary of this site. Much of the improvement was done to improve access and prevent flooding. The construction of the concrete berm was done in order to reclaim land from the Shannon Estuary. Most of this reclaimed land is still rather wet as characterised by the extensive rushy pastures and is given over to grazing. It is not known if there was any saltmarsh present along the stretch of the site, but it is not assessed as it did not occur during the current monitoring period.

The principal land use in this area is grazing (140), although silage is also cut in some areas (102). All of the agricultural influence occurs outside of the saltmarsh proper. There is some evidence of cattle getting (140) onto the marsh through gaps in the hedgerow and damaged fencing. However, given the treacherous nature of the mudflats, the impact of livestock is negligible.

Another impact which is mentioned in NPWS documentation is the effects of waterborne pollution (700). With several large industrial and chemical plants along the Shannon, including the LNG terminal across the river, there is always the danger of a pollution incident occurring in the River Shannon. Asides from driftwood and other debris which has been brought in by the tide, there is little evidence of this

It is likely that there is some degree of erosion (900) of the ASM at Beagh, particularly along the fringe that is found on the mudflats. And while there were some indications of erosion such as small remnant tufts of ASM, erosion is a natural feature of coastal systems, particularly in a situation where the tidal range is so extensive and fast. There was no discernible difference in the extent of the saltmarsh when the recent aerial photographs are compared hence, the erosion is not considered to be significant. The impact of erosion is assessed as neutral.

Common Cordgrass is present at this site. It is an invasive species of saltmarsh (954). First planted in the Shannon region in 1928, (Nairn 1986), it has since flourished and is widely

distributed. It is not known when this invasive species first took hold at this site, but it has thrived on the extensively sheltered mudflats in the Shannon Estuary. The presence of the mature sward at the southern end of the site is facilitating the build up of mud. The sward does not appear to be invading ASM territory. The cover of Common Cordgrass within the ASM is low (< 5%) so the impact of its presence is assessed as neutral. Indeed, the gradual consolidation of the mudflats may at some point in the future favour to spread of ASM (990).

Outside of the site, there are few direct impacts or activities influencing the condition or extent of the saltmarsh vegetation. Most of these impacts have been in existence for some time. Dispersed habitation (403) relates to a single farm holding at Castle View, as well as a small number of houses that run along the small road that runs parallel to the river from the ruins of Beagh Castle. These activities doe not have any measurable impact on the saltmarsh vegetation.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	C	-1	0.217	Inside
H1330	900	C	0	0.01	Inside
H1330	954	C	0	0.001	Inside
H1330	990	C	0	0.001	Inside

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

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.

In light of the fact that this is a relatively small saltmarsh, the overall conservation status of the site is *favourable* (Table 5.1). The saltmarsh is mostly discontinuous and has largely developed on remnant patches of mud that have accumulated atop the outcropping limestone pavement. Indeed so small is the site, that ASM is the only Annex I habitat that was recorded from the site. Given its exposed location on the lower part of the River Shannon and the land

modification that has been carried out here, it is difficult to know if saltmarsh vegetation at site was ever extensive.

There is little historical or baseline data with which to make a comprehensive assessment of this site. It is difficult to establish the extent of saltmarsh from earlier NPWS maps and the vegetation descriptions cover a large number of saltmarsh systems, without making any reference to Beagh. A comparison of the historical and more recent aerial photographs (year 2000 and 2005 series) does not reveal much additional information. Much of the river fringe shown on the 2nd edition 6 inch map covering Beagh is marked with rocky shoreline. There is some indication of wet ground towards the southern section, but nothing to clarify the extent of any saltmarsh. There is a considerable shadow from overhanging trees obscuring the 2005 series photographs. This makes it difficult to see changes in the fringing saltmarsh and compare it against the earlier year 2000 photograph.

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.

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

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

5.2 Atlantic salt meadows (H1330)

5.2.1 Extent

The extent of the ASM is rated as *favourable* (Table 5.1). The saltmarsh at Beagh is not extensive and is largely confined to a narrow fringe along much of its exposure to the River Shannon. The single largest area of ASM is recorded behind the Common Cordgrass and Sea Club Rush swards that have developed on the mudflats in the most southerly point of the site.

Earlier reports note the presence of the saltmarsh vegetation at this site. However, there is no reliable information with which to compare changes in ASM distribution during the current monitoring period. The rocky shoreline indicated on the 6 inch map suggests that this was never a large saltmarsh. An analysis of the recent year 2000 and series 2005 aerial

photographs does not reveal any changes although, this is obscured somewhat both by the quality of the aerials and also reflections from the exposed mud.

5.2.2 Habitat structure and functions

Four monitoring stops were carried out in the habitat, all of which satisfied the target criteria. The habitat structure and functions are thus assessed as *favourable*. Despite the relative paucity of the habitat and the absence of pioneer and lower marsh communities, it is still possible to recognise a certain degree of zonation among the outcropping limestone pavement and in the sheltered southern section of the site. There are few impacts or activities of concern affecting the vegetation.

Common Cordgrass is present in this habitat but its overall cover is low. The impact of its spread on species composition is assessed as neutral, mainly due to the lack of accurate baseline data.

5.2.3 Future prospects

The future prospects are assessed as *favourable*. The assessment assumes that there will be no major change in the management regime at this site. It is unlikely that saltmarsh vegetation was ever a considerable component of the coastal area around Beagh. There are few impacts or activities which are considered to be affecting this site. There is some indication of the seaward expansion of the *Spartina* sward onto the accumulating mudflats. However, the *Spartina* sward in the southern half of the site is relatively mature and it is unlikely to result in any change in the extent or condition of the ASM.

6 MANAGEMENT RECOMMENDATIONS

In light of the limited extent of saltmarsh that is recorded from this site, there are no specific recommendations for the management of the 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 (?).*Conservation Plan for Lower River Shannon cSAC 2005-2010*. 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	*Spartina* swards
1	1310 *Salicornia* flats						
2	*Spartina* swards	0.521					0.521
3	1330 Atlantic salt meadow	0.538		0.538			
4	1410 Mediterranean salt meadow						
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)	0.109					
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)	0.259					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**1.43**		**0.538**			**0.521**

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

Saltmarsh Monitoring Project 2007-2008

Beagh

Lower River Shannon SAC (002165)

SMP code: SMP0080

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

0 50 100 150 200 250 Meters

N

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:3500

Baltray

1 SITE DETAILS

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

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

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

Other SMP sites within this SAC/NHA: **Mornington**
Saltmarsh type: **Estuary** Substrate type: **Mud/Sand**

2 SITE DESCRIPTION

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

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

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

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

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

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

3 SALTMARSH HABITATS

3.1 General description

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

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

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

The west side of the site adjacent to Drogheda Port is notable for some extensive recent development of ASM. A large area of the intertidal zone was infilled to aid the construction of this part of Drogheda Port. The saltmarsh in this area is expanding at present. There is some development of *Spartina* sward at the seaward side of the ASM. This section also has some development of more brackish vegetation along the landward side of the ASM. This zone contains stands Twitch (*Elytrigia repens*)-dominated grassland and some Sea Club-rush and is mapped as non-Annex I saltmarsh (CM2) in accordance with the SMP project classification. These communities add to the overall diversity of the site.

Table 3.1. Area of saltmarsh habitats mapped at Baltray.

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

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

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

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

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

This habitat is also found within the more established saltmarsh at Baltray. This saltmarsh contains an intricate network of deep creeks. Some bare sand banks have developed on places in these creeks where accretion is allowed to occur. These banks are vegetated by

Glasswort in places. There is also some natural transition from *Salicornia* flats to pioneer ASM in places where Common Saltmarsh-grass increases in abundance at the upper boundary.

3.3 Atlantic salt meadows (H1330)

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

The saltmarsh at Baltray is found in two main sections. The eastern section is part of the relic saltmarsh that originally developed as part of the sand dune system and spit. Saltmarsh has probably been found at this location for a long time. However, it has been modified by the infilling to create the reservoir. This area is dominated by low-mid saltmarsh. Much of this zone is dominated by dense stand of Sea Purslane (*Atriplex portulacoides*). Low depression and salt pans are dominated by Common Cordgrass. Other species present include Common Saltmarsh-grass, Sea Aster (*Aster tripolium*), Greater Sea-spurrey, Glasswort, Lax-flowered Sea Lavender, Annual Sea-blite and Sea Plantain (*Plantago maritima*), which are found in small amounts. There is some development of pioneer ASM at the south-east corner of this section, which is dominated by a sward of Common Saltmarsh-grass and contains other low marsh species listed above. The low-marsh zone also has other habitats adjacent to the lower saltmarsh boundary, including *Salicornia* flats and *Spartina* sward of various densities. Some of the Sea Purslane seems to be spreading seaward into the *Spartina* sward zone and into the *Salicornia* flats. This is an example of current expansion of this saltmarsh.

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

Further west there has also been significant ASM development at Bankstown. This ASM has developed more recently. Nevertheless it is well-developed and there is an intricate network of channels through this ASM and the associated *Spartina* sward and ASM/*Spartina* sward mosaic. A track has been created along the central ridge of this section and divides the marsh into two main sections. The northern section has been modified by disturbance from

attempted Common Cordgrass control. This species has infilled a large are of intertidal mudflats around the ASM. Much of the ASM is dominated by low marsh vegetation with Sea Purslane prominent. A large mosaic area has also developed with significant cover of Common Cordgrass (30-60% cover) in association with Common Saltmarsh-grass, Sea Aster, Lax-flowered Sea Lavender, Annual Sea-blite and Glasswort. Much of this saltmarsh has the appearance of being recently formed and it is likely to be quite dynamic. Open patches in the sward are dominated by Common Saltmarsh-grass that are surrounded by Sea Purslane plants. There is some typical saltmarsh zonation on both sides to the landward side of the central ridge where there is some development of mid marsh and mid-upper marsh vegetation. A notable community dominated by Hard-grass (*Parapholis strigosa*) is found toward the landward side and this community contains small amounts of Sea Plantain, Sea Pink, Red Fescue and rarer Sea Aster, Sea Purslane, Common Scurvy-grass and Greater Sea-spurrey. This community is not commonly found on saltmarshes.

The western side of the site contains similar ASM development. A narrow band of mainly low marsh saltmarsh dominated by Common Saltmarsh-grass and Sea Purslane extends along the shoreline and there is much more extensive ASM development at the western end, adjacent to the infilled area. Some zonation is noted along the shoreline where the saltmarsh has developed on a moderate slope with the appearance of a zone dominated by Red Fescue and Sea Plantain along the upper boundary. Several scattered clumps of Sea Rush (*Juncus maritimus*) appear in this zone in places but these are not frequent enough to map as MSM. There are several areas where there is some freshwater flow into the saltmarsh from adjacent streams and there is some development of Common Reed (*Phragmites australis*) in these areas at the landward side of the saltmarsh. Other rarer species like Parsley Water-dropwort (*Oenanthe lachenalii*) and Wild Celery (*Apium graveolens*) appear in places along the upper zone where there is also increased cover of Creeping Bent-grass (*Agrostis stolonifera*). Long-bracted Sedge (*Carex extensa*) is also present.

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

3.4 *Spartina* swards

This habitat is well established in some areas and seems likely to continue to expand over some parts of the intertidal mudflats. It is widespread and is distributed along the whole of the survey site. Extensive dense swards on soft mud have developed with few other saltmarsh

species. Other sections contain sparse cover of scattered clumps of Common Cordgrass on intertidal mud and sand. It has mainly infilled intertidal mudflats to form dense swards seaward of other ASM vegetation. There are several areas where a mosaic of *Spartina* sward and ASM has developed. This habitat contains a mixture of lower sward marsh species including Sea Purslane, Common Saltmarsh-grass, Annual Sea-blite and Glasswort. Some of these species may be occasionally frequent or may dominate patches within the *Spartina* sward and they may also be found mixed with *Spartina* sward.

4 IMPACTS AND ACTIVITIES

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

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

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

The site has also been disturbed by a failed attempt to reduce the extent of *Spartina* sward and create new unvegetated intertidal mudflats at Banktown (890). This impact was related to a capital project by Drogheda Port Company to improve the navigation of the channel. Material dredged from the channel was deposited on an intertidal area called Stagrennan Polder along the southern side of the estuary. To compensate for the loss of intertidal

mudflats in this area it was decided to attempt to control *Spartina* sward in a different part of the estuary at Baltray. A bulldozer was used to attempt to remove the vegetation from the mudflats. This ultimately failed but the disturbance from this work has created a large mosaic area of ASM and *Spartina* sward and probably promoted colonisation of *Spartina* sward into the ASM. There were further plans to spray extensive *Spartina* sward with herbicides but these plans were the subject of long-running court cases due to objections from Coastwatch in relation to mitigation of the development at Stagrennan Polder.

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

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

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

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

Impacts and activities around the site are mainly related to farming (100, 102, 120, 140) and to industry in Drogheda Port. Other information in NPWS files related to this SAC refers to water pollution from runoff related to this industry (700). There is ongoing development in the port with the possible threat of infilling to create new land. Dredging of the main channel has

occurred during the monitoring period (850, 860). However, no impact to the saltmarsh from this dredging was noted. A golf course (601) is located at the north-east corner of the site as is a reservoir. These activities have had no measurable impact at this site. Extensive green algal mats were noted on the mudflats but this was not excessive.

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

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

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

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.

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

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

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

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

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

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

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

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

5.2.1 Extent

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

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

5.2.2 Habitat structure and functions

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

Common Cordgrass in one section, which was thought to have colonised significantly in one section.

Much of the *Salicornia* flats are found on the unvegetated flats in patches isolated from the rest of the saltmarsh. Some of this habitat contains scattered clumps of Common Cordgrass (< 1% cover). There are several small areas mapped as a mosaic of *Salicornia* flats and *Spartina* sward where there are scattered clumps of Common Cordgrass within the sward. Some of the *Salicornia* flats are found within more established saltmarsh along the edges of creeks where accretion has created sand and mud-banks. This is an example of this habitat acting as a pioneer saltmarsh habitat.

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 the spread of Common Cordgrass continue in the near future. Common Cordgrass is found within this habitat, especially where it is found on the intertidal flats. *Salicornia* flats may be vulnerable to further colonisation by Common Cordgrass in the future and may limit their extent. The *Salicornia* flats found within the more established saltmarsh are likely to persist as these habitats are dependant on natural sedimentation patterns within the creek network.

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 ASM habitat due to erosion, land-use changes or the spread of Common Cordgrass during the current monitoring period. Disturbance caused by the attempts at *Spartina* sward control may have increased the extent of ASM/*Spartina* sward mosaic at the expense of some ASM, but this can not be quantified. There are some indicators around the site that the saltmarsh is at a relatively young stage of development and that the ASM is expanding seawards in places.

5.3.2 Habitat structure and functions

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

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

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

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

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for this site.

7 REFERENCES

Carrothers, E.N. (1960). *Spartina townsendii* H & J Groves in counties Louth and Down. *Irish Naturalists' Journal*, **13**, 188.

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.

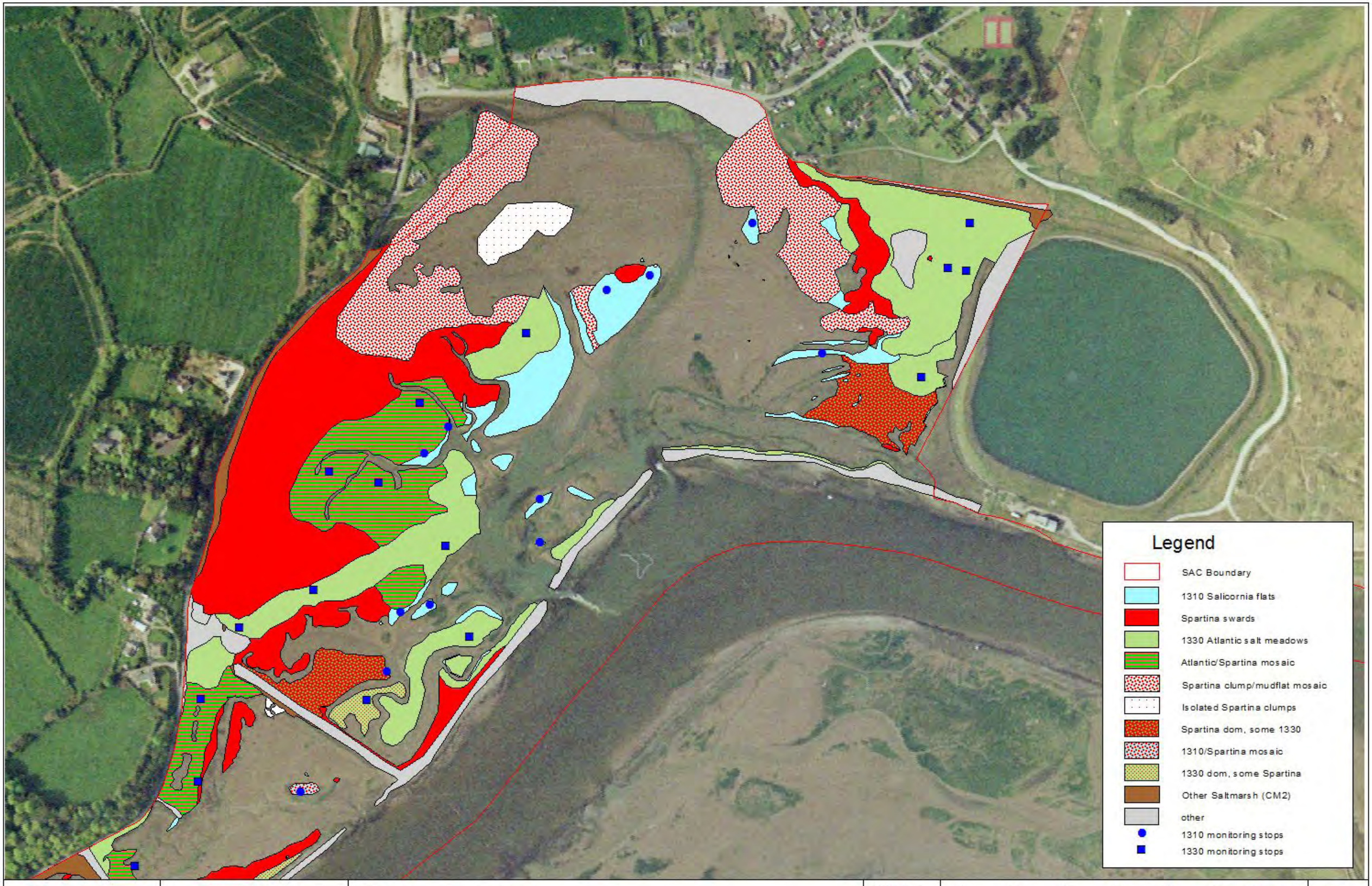
Nairn, R.G.W. (1986). *Spartina anglica* in Ireland and its potential impact on wildfowl and waders – a review. *Irish Birds*. **3**, 215-258.

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

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

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



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

Saltmarsh Monitoring Project 2007-2008

Baltray (Map 1 of 3)

Boyne Coast and Estuary SAC (001957)

SMP code: SMP0033

0 60 120 180 240 300 Meters

N

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

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:4000

Legend

- SAC Boundary
- 1310 Salicornia flats
- Spartina swards
- 1330 Atlantic salt meadows
- Atlantic/Spartina mosaic
- Spartina clump/mudflat mosaic
- Isolated Spartina clumps
- Spartina dom, some 1330
- 1310/Spartina mosaic
- 1330 dom, some Spartina
- Other Saltmarsh (CM2)
- other
- 1310 monitoring stops
- 1330 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

Baltray (Map 2 of 3)

Boyne Coast and Estaury SAC (001957)

SMP code: SMP0033

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

0 60 120 180 240 300 Meters

Date of production: 22/021/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:4000

N

Legend

- SAC Boundary
- 1310 Salicornia flats
- Spartina swards
- 1330 Atlantic salt meadows
- Atlantic/Spartina mosaic
- Spartina clump/mudflat mosaic
- Isolated Spartina clumps
- Spartina dom, some 1330
- 1310/Spartina mosaic
- 1330 dom, some Spartina
- Other Saltmarsh (CM2)
- other
- 1310 monitoring stops
- 1330 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

Baltray (Map 3 of 3)

SMP code: SMP0033

0 60 120 180 240 300 Meters

N

Boyne Coast and Estuary SAC (001957)

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

Date of production: 22/02/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:4000

Dundalk

1 SITE DETAILS

SMP site name: **Dundalk**	SMP site code: **0032**
Dates of site visit: **28/08, 3&4&5/10/2007, 03/03/2008**	CMP site code: **N/A**
SM inventory site name: **Dundalk Marshes**	SM inventory site code: **237**
NPWS Site Name: **Dundalk Bay**	
NPWS designation cSAC: **455**	MPSU Plan: **New Format – Draft 2: 2005-2010**
pNHA: **455**	SPA: **4026**
County: **Louth**	Discovery Map: **36** Grid Ref: **307000, 300000**
Aerial photos (2000 series): **O 1632-C,D; O 1633-C,D; O 1702-B,D; O 1771-B,D; O 1832-B,D; O 1893-B**	6 inch Map No: **Lh 004, 007, 008, 012, 015, 016**

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

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

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

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

Other SMP sites within this SAC/NHA: **N/A**

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

2 SITE DESCRIPTION

Dundalk Bay is located in north-east Co. Louth along the east coast of Ireland. This was the largest site surveyed during the SMP project. This large bay extends for 15 km from Annagassan in the south to Dundalk Harbour in the north and extends along the Cooley Peninsula for 5 km. The bay is quite shallow and open to the Irish Sea, being partially sheltered by the Cooley Peninsula along the northern side and Dunany Point to the south. The site includes the estuarine sections of the Castletown River (Dundalk Harbour) and Ballymascanlan River estuary at the northern end of the site. Several other rivers flow into the site.

The landscape around this bay is mostly quite low-lying and flat. As the site is so large the adjacent habitats vary somewhat. Most of the land adjacent to the shore is dominated by farmland including significant areas located behind tall berms in low-lying areas. These areas contain a variety of habitats including wet grassland in unmanaged areas and large areas of tillage in some more intensively managed sections. There is also some extensive urban development with Dundalk Town adjacent to northern section.

Dundalk Bay contains the most extensive saltmarshes found in Ireland. These saltmarshes are more easily described as several sub-sites and there are four main saltmarshes. The

southern section is found north of Castlebellingham and extends to the River Fane. There is a significant gap in saltmarsh development along the Blackrock shoreline, which is mainly exposed bedrock. Saltmarsh develops again north of Blackrock and extends to the main estuary channel. Saltmarsh has also developed within Dundalk Harbour in the main estuary channel, east of the main bridge over the channel. A large saltmarsh has also developed along the northern shoreline adjacent to Bellurgan and Jenkinstown. Each of the saltmarshes have developed adjacent to extensive sand or mudflats. Sandflats predominate at the other parts of the bay with soft mudflats found within the main estuary channel. Saltmarsh is also found within the Ballymascanlan Estuary. However, as this is classified as a separate saltmarsh site on the saltmarsh inventory (Curtis and Sheehy-Skeffington 1998), it was not surveyed.

This site is part of the Dundalk Bay candidate Special Area of Conservation (cSAC 455). This large cSAC covers most of the bay and includes extensive intertidal and sub-tidal areas seaward of the saltmarsh and some adjacent wet grassland adjacent to the Castletown and Ballymascanlan River estuaries. This site is also internationally important for wintering waders and wildfowl that are attracted to these intertidal habitats. Three Annex I saltmarsh habitats are found at this site including *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). There is also extensive development of *Spartina* swards, which is not now considered to qualify as an Annex I habitat.

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

The various sub-sites were reached from easily accessible access points around the bay. It should be noted that part of the saltmarsh lies in front of the army Firing Range. Anecdotally, some of the bullets have strayed over the berm and into the marsh. The saltmarsh developing within the Castletown Estuary is developing adjacent to very soft and treacherous mudflats.

3 SALTMARSH HABITATS

3.1 General description

This site has been split into several sub-sites, which are described in more detail below. Most of the sub-sites are dominated by Atlantic salt meadows (ASM) (Table 3.1). *Spartina* swards are also quite extensive in each of the sub-sites. There is only a very small area of Mediterranean salt meadows (MSM) at this site. Some of the saltmarsh is also made of

brackish vegetation types including stands of Sea Club-rush (*Bolboschoenus maritimus*) and bands of upper saltmarsh dominated by Twitch (*Elytrigia repens*). These are mapped as other saltmarsh (CM2) or non-Annex vegetation in accordance with the SMP project classification.

Castlebellingham marsh

This large saltmarsh is found in the southern part of the bay and extends from the shoreline adjacent to Dromiskin Village north to the southern side of Blackrock Town. This saltmarsh has developed in a fairly uniform elongated block adjacent to the shoreline that is 3.7 km long and between 500-600 m wide at the widest section. The extent of saltmarsh tapers off at both the northern and southern ends of the saltmarsh. The upper boundary is marked by a tall berm along most of the shoreline that divides the saltmarsh from adjacent low-lying farmland. This farmland has developed in previously reclaimed saltmarsh behind the berm, which is now drained and improved. Drains on the landward side of the berm occasionally contain elements of brackish vegetation but there is no development of saltmarsh. Some Twitch-dominated vegetation has developed along the base of the berm in places. This zone also contains species such as Sow-Thistle (*Sonchus* sp.), Sea Beet (*Beta maritima*) and Curled Dock (*Rumex crispus*).

The saltmarsh displays excellent zonation with extensive generally flat ASM extending seawards from the berm. Cover of Common Cordgrass (*Spartina anglica*) increases towards the seawards end and there is extensive development of large patches of *Spartina* sward/ASM mosaic and *Spartina* sward. Common Cordgrass has spread into the established saltmarsh. Of note there are locations where young and pioneer ASM is developing seaward of *Spartina* sward. Seaward of this established saltmarsh there is a band of *Salicornia* flats that extends along most of the marsh and extends seaward for up to 70 m. The saltmarsh has developed adjacent to intertidal sandflats. The mud content of the intertidal flats decreases towards the southern end. The creek network is also very well developed with some major creeks flowing from the interior to the northern and southern ends of the saltmarsh.

The northern end of this marsh contains some typical zonation at both sides of the mouth of the River Fane, with extensive swards of *Spartina* sward developed seaward of a relatively narrow band of ASM. There is some development of brackish stands of Sea Club-rush at the landward side of the marsh at the southern end of the site.

The majority of this saltmarsh is grazed by sheep. Small parts have been fenced off and are not grazed. It should be noted that this saltmarsh has grown extensively since it was surveyed during the drawing of the 2nd edition 6 inch maps. The saltmarsh has more than doubled in width and tripled in size since this period. Most of the saltmarsh has only developed in the past 200 years. The berm was constructed in the 19th century and post-

dates the drawing of the OSI 1st edition 6 inch map. There are indications of continued accretion along the seaward side of the marsh with the development of relatively extensive *Salicornia* flats and pioneer ASM towards the southern end. The saltmarsh is likely to grow further south in the future.

Dundalk marsh

This sub-site is probably the largest single unit of saltmarsh in the country. The saltmarsh extends from north of Blackrock Town to the main estuary channel in Dundalk Harbour. It is under 4 km long and over 1 km wide in the widest section. Its structure is similar to that of Castlebellingham Marsh. This saltmarsh is also dominated by ASM with extensive patches of *Spartina* sward and *Spartina* sward/ASM mosaic towards the seaward boundary. A narrow band of *Salicornia* flats is found along the seaward side of the more established saltmarsh and further seaward there are scattered clumps of Common Cordgrass spreading on the adjacent mud and sandflats.

The marsh has developed on a quite flat plain with a gentle seaward slope. The zonation and creek structure within the marsh is particularly well-developed with some very wide and deep creeks draining the marsh. There are several mounds within the marsh that are likely to be man-made and are covered by mainly Twitch-dominated grassland and contain other species such as Spear-leaved Orache (*Atriplex prostrata*), Sea Beet and Red Fescue (*Festuca rubra*).

The landward boundary of the main marsh is marked by a tall berm that separates the marsh from adjacent low-lying farmland. There is some urban development adjacent to the marsh at the northern end of the site. There is some development of brackish vegetation in large drainage channels behind the berm at the northern end of the site. A long band of Twitch-dominated grassland (CM2) has developed at the base of the berm and is quite extensive in places, being up to 70 m wide. The saltmarsh has also extended south to Blackrock Town, which has been developed on a rocky outcrop. The upper boundary is characterised by the more natural shoreline in this area and there is some minor development of Common Reed (*Phragmites australis*) stands along the upper boundary.

Like the Castlebellingham Marsh, this marsh has also grown extensively since it was surveyed during the drawing of the 2nd edition 6 inch maps. The saltmarsh has more than doubled in width and tripled in size since this period. The construction of the landward berm pre-dates the drawing of the OSI 1st edition 6 inch map. The more established sections of this saltmarsh are also likely to be much older compared to the other sub-sites. This marsh is also still accreting and there is extensive pioneer marsh towards the southern end of the marsh and along most of the seaward boundary.

Castletown Estuary

This saltmarsh is the most typical estuarine saltmarsh in the site, being found within the Castletown River estuary. Much of this saltmarsh is also relatively young and has only developed in the past 200 years. Its development is related to reclamation works mainly on the north side of the estuary and the construction of a railway bridge and embankment to carry the Dundalk to Carlingford Railway. The railway bridge/embankment was constructed across the largest area of established saltmarsh in the estuary. The railway is now dismantled and this embankment and bridge now carries the main Belfast-Dundalk road.

The current saltmarsh is found east of this bridge. Saltmarsh to the west of the bridge in the estuary has been infilled by a large landfill site. Most of the saltmarsh has developed in part of the estuary that is quite sheltered by a breakwater further east and behind old seawall along the main river channel that was constructed to maintain navigation to Dundalk port, which is located on the south side of the estuary. This saltmarsh is quite fragmented and divided into several portions. It is a mosaic of ASM, *Spartina* swards, ASM/*Spartina* sward mosaic and scattered clumps of Common Cordgrass spreading on the soft mudflats. The saltmarsh fragments are separated by deep channels with very soft and treacherous mud. Some of the mudflats around the west side of the breakwater contains frequent Common Cordgrass seedlings and is an indication that this species is spreading in this area. Some of this saltmarsh is relic marsh that was present before the development of the railway embankment and seawall but most of the marsh post-dates these developments.

Further east of the main breakwater there is extensive development of *Spartina* swards with complex creek topography. These swards extend eastwards to the mouth of the Ballymascanlan Estuary. There are some small patches of ASM along the upper saltmarsh boundary and adjacent to the berm that marks the upper boundary. The berm divides the saltmarsh from adjacent wet grassland and extends westwards to the main road. There is some brackish influence behind the berm, probably in areas where one-way sluices have probably become partially stuck open. There is some ASM and brackish marsh development in the formerly reclaimed wet grassland behind the berm. Original saltmarsh drainage channels are still present in this area.

Bellurgan-Jenkinstown

This saltmarsh is found along the northern shoreline of Dundalk Bay. It has developed adjacent to a fairly open part of the shoreline. This is a relatively young saltmarsh and most of the marsh has only developed since the drawing of the OSI 2nd edition six inch map. The

saltmarsh is dominated by *Spartina* swards and there is an extensive zone of mudflats with scattered clumps of Common Cordgrass seaward of the more established sward. It is not known if the development of the marsh pre-dated colonisation by Common Cordgrass. However, this is the likeliest scenario and colonisation by common Cordgrass is likely to have further promoted the expansion of this marsh. Common Cordgrass seems to be spreading vigorously on the mudflats in this area. It should also be noted that there is some development of ASM at the seaward edge of the *Spartina* sward in places, which is an indicator of quite rapid habitat succession probably related to accretion along the estuarine channel.

Further landward there is some development of patches of ASM and ASM/*Spartina* mosaic. Much of the ASM has some element of Common Cordgrass cover. There is an extensive patch of *Salicornia* flats at the eastern end of the main section where a large drainage creek flows into the bay. A narrow band of ASM vegetation continues eastward, where it peters out along the shoreline.

There is some development of brackish marsh along the upper boundary of this marsh, represented by stands of Sea Club-rush. This zone also contains Sea Aster (*Aster tripolium*), Creeping Bentgrass (*Agrostis stolonifera*), Red Fescue and Spear-leaved Orache (*Atriplex prostrata*). Some of the upper boundary is marked by the old railway embankment with some low-lying pasture occurring between the embankment and the saltmarsh in places along the site.

Table 3.1. Area of saltmarsh habitats mapped at Dundalk.

EU Code	Habitat	Area (ha)
H1310	*Salicornia* and other annuals colonizing mud and sand	34.84
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	330.15
H1410	Mediterranean salt meadows (Juncetalia maritimi)	0.04
non-Annex	*Spartina* swards	163.01
	Total	**528.04**

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

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

This habitat is particularly well-developed and widely distributed at this site. The overall extent of *Salicornia* flats at this site ranks it second in sites surveyed during the SMP project, with only the *Salicornia* flats found at North Bull Island being greater in extent. It is characterised by a band of usually dense cover of Glasswort (*Salicornia europaea* agg.) with few other saltmarsh species. It may also contain small amounts of Common Saltmarsh-grass (*Puccinellia martima*), Lax-flowered Sea Lavender (*Limonium humile*), Annual Sea-blite (*Suaeda maritima*) and Greater Sea-spurrey (*Spergularia media*). The cover of Common

Cordgrass is variable within this habitat. It is generally less than 5% but may reach 40% in places.

Salicornia flats are found typically at the seaward side of the more established marsh including ASM and *Spartina* sward and also seaward of pioneer ASM. It has developed on an accretion ramp, which has developed along the Dundalk and Castlebellingham Marshes. An almost continuous band of this habitat is found along both these marshes and it varies in width, though it is generally 20-30m wide but can be up to 70m wide. This zone is almost continuous along the Castlebellingham Marsh but is fragmented along the Dundalk Marsh. The cover of Glasswort becomes sparser further seaward.

Zonation between *Salicornia* flats and adjacent pioneer ASM is particularly well-developed as much of the Dundalk and Castlebellingham saltmarshes have developed on a very gentle slope. A distinction was made between pioneer ASM, which also contains frequent or abundant Glasswort cover, and *Salicornia* flats with the frequent cover of Common Saltmarsh-grass and other species such as Lax-flowered Sea Lavender within pioneer ASM. *Salicornia* flats are the most seaward saltmarsh zone found along the Castlebellingham Marsh. However there are scattered clumps of Common Cordgrass through this habitat and also seaward of the *Salicornia* flats along the Dundalk Marshes. Common Cordgrass is generally between 1-5% in cover within this habitat and seems to be spreading within the *Salicornia* flats in places, particularly at the southern end of both the Castlebellingham and Dundalk Marshes.

Several patches of *Spartina* sward/*Salicornia* flats mosaic have been mapped around the site. This mosaic can be at the northern end of Dundalk Marsh and at the southern end adjacent to Blackrock. It contains clumps of Common Cordgrass with 20-50% cover interspersed on mud vegetated by Glasswort. This habitat type is similar in places to the *Salicornia* flats at North Bull Island.

3.3 Atlantic salt meadows (H1330)

This habitat is particularly well-developed at this site. The Dundalk Marsh and Castlebellingham Marsh probably represent the most complex development of saltmarsh drainage channels in Ireland and this is related to there size. Both marshes contain some very large saltmarsh creeks and a complex creek network. Salt pans are also well developed on both these marshes in the mid and mid-upper zones.

Zonation within this habitat is also very well developing in both these marshes, generally because they have developed as a linear band along the shoreline on a very gentle seaward slope. The upper zone is poorly developed in the southern part of the Castlebellingham marsh and this is probably as a result of the former reclamation and construction of a berm in the past, which probably enclosed much of the upper saltmarsh zone in places. The Dundalk

Marsh displays a full range of typical saltmarsh zones from upper to mid to low and then to pioneer vegetation.

Pioneer vegetation is particularly well-developed at this site. The seaward edge of the Castlebellingham and Dundalk Marshes contain zones with occasional or frequent cover of Common Saltmarsh-grass, Sea Purslane (*Atriplex portulacoides*), Lax-flowered Sea Lavender, Annual Sea-blite, and Common Cordgrass spreading onto bare mud. The bare mud component of the ground cover is high and sometimes abundant. This zone also contains frequent or abundant cover of Glasswort with a further zonation seaward to *Salicornia* flats. The pioneer zone is located seaward of *Spartina* swards, ASM/*Spartina* sward mosaic and established ASM on the Dundalk and Castlebellingham marshes. The cover of Common Cordgrass gradually breaks up and then the vegetation develops into the pioneer zone. The pioneer zone also extends up some of the main creeks within the Castlebellingham and Dundalk Marshes.

The low zone is characterised by dense cover of Sea Purslane that is dominant in places. This species forms a dense cover of woody scrub about 0.3-0.4 m high. This zone dominates large areas of the Castlebellingham Marsh and is an indication of the relatively young age of the southern section of this marsh where it extends almost to the landward berm. It is also a prominent part of the Dundalk Marsh and is well represented in the Bellurgan-Jenkinstown Marsh and Castletown River Estuary marsh. It also extends along the banks of the larger creeks where they extend into the upper zones. Other species present include Common Saltmarsh-grass, Glasswort, Common Scurvy-grass (*Cochlearia officinalis*), Sea Aster, Lax-flowered Sea Lavender and clumps of Common Cordgrass. The cover of Common Cordgrass varies between 1-10%. This zone may grade into the mixed ASM/*Spartina* sward mosaic where there is greater cover of Common Cordgrass. Some sections of the lower zone have a tussocky topography.

Common Saltmarsh-grass may dominate in lower zone along some pans in the mid marsh zone but this vegetation community is not a prominent part of the lower zone around the site. This community does develop along the shoreline at the northern end of the Castlebellingham Marsh near the mouth of the River Fane and there is much less cover of Sea Purslane in this area.

The mid marsh zone is characterised by a typical low sward dominated by Sea Plantain (*Plantago maritima*) and Sea Pink (*Armeria maritima*). There is a gradual reduction of cover of Sea Purslane along the upper section of the lower zone and into this zone where it becomes an occasional part of the vegetation. Other species present include Lax-flowered Sea Lavender, Sea Aster, Sea Arrow-grass (*Triglochin maritimum*), Glasswort, Red Fescue and Common Saltmarsh-grass. This zone also contains large shallow salt pans that form a complex mosaic. Common Cordgrass is present in this zone but is generally confined to scattered clumps mainly in salt pans with cover generally about 1% but sometimes up to 5%.

The surface topography in this zone is quite flat. Lax-flowered Sea Lavender is not frequent in the grazed parts of the Castlebellingham Marsh whereas it is more prominent within the other ungrazed marshes.

Further landward, there are increased cover of higher platforms dominated by Red Fescue and Saltmarsh Rush (*Juncus gerardii*). Red Fescue becomes dominant towards the upper boundary of the northern end of the Castlebellingham and all of the Dundalk Marshes. This zone also contains Sea Milkwort (*Glaux maritima*), Common Scurvygrass, and small amounts of Sea Purslane. The sward height in this zone is high in the ungrazed marshes and is about 0.3m high in general. Both these marshes contain areas in the mid-upper zones and the upper zones where the surface topography is quite irregular with frequent hummocks and hollows. The height difference between these hummocks and hollows may be as much as 0.5m and affect the zonation and plant community structure of the vegetation. The hummocks are covered with Red Fescue while the hollows are vegetated by Sea Purslane or Sea Plantain in places. There are some areas where the mounds are dominated by Creeping Bentgrass (*Agrostis stolonifera*) and also contain White Clover (*Trifolium repens*), Distant Sedge (*Carex distans*), Autumn Hawkbit (*Leontodon autumnalis*) and Spear-leaved Orache. Sea Club-rush also appears in some of the hollows in the northern end of the Castlebellingham Marsh. Common Cordgrass clumps are distributed back to the landward boundary but its cover in this zone is quite low (< 1%). There is some further zonation to Twitch-dominated vegetation at the upper saltmarsh boundary.

Some other ASM communities are present at various locations around the site that are characterised by other less typical species. One such zone includes some Wild Celery (*Apium graveolens*) and this is found at the northern end of the Castlebellingham Marsh in association with Red Fescue, Sea Aster, Sea Plantain and some Twitch. Some Hard-grass (*Parapholis strigosa*) was also noted in the upper zone in this area where the saltmarsh has developed on a steeper shoreline.

Some of the upper ASM zone of the Bellurgan-Jenkinstown Marsh is represented by a band or rank vegetation dominated by Red Fescue and Creeping Bent and containing frequent Sea Club-rush. This vegetation type also contains Sea Aster and Spear-leaved Orache. Much of the ASM in this marsh contains Common Cordgrass and the lower zone is dominated by Common Saltmarsh-grass and Common Cordgrass, and also containing Sea Aster, Annual Sea-blite, Sea Plantain and Sea Milkwort. Sea Purslane is less prominent.

The extent of ASM/*Spartina* sward mosaics at Dundalk Bay is also significant. These areas are represented by frequent cover of both Sea Purslane and Common Cordgrass and the cover of both species in these areas may vary significantly where one or the other becomes dominant. Other species present include Common Saltmarsh-grass, Sea Aster, Sea Milkwort, Sea Plantain, and Lax-flowered Sea Lavender.

3.4 Mediterranean salt meadows (H1410)

There are only several small patches of MSM at this site. One patch is found in the Castletown Estuary marsh and two small patches are found adjacent to Blackrock along the upper boundary in the Dundalk Marsh. Both patches are characterised by frequent cover of Sea Rush. Red Fescue is also abundant in this vegetation type and there is a smaller amount of Creeping Bent, Saltmarsh Rush, Sea Aster, Spear-leaved Orache and Sea Plantain. Common Reed is also present in the MSM found along the Blackrock shore. The MSM in the Castletown Estuary marsh has developed around several small pans. However the other patches are too small to contain any typical saltmarsh structure.

3.5 *Spartina* swards

There has been extensive development of *Spartina* swards at this site. The largest areas are found in the Castletown Estuary and in the Bellurgan-Jenkinstown Marsh. Smaller patches are found within the Dundalk and Castlebellingham Marshes. Scattered clumps of Common Cordgrass mapped as *Spartina* clump/mudflat mosaics are also found seaward of the established sward in the Dundalk Marsh and the Bellurgan-Jenkinstown Marsh. One notable aspect of the *Spartina* swards at this site is that much of the sward has developed in previously established marsh rather than on adjacent bare mudflats. This is mainly seen in the Dundalk and Castlebellingham Marshes. There is no significant development of typical dense *Spartina* swards along the seaward side of the Castlebellingham Marsh. Much of the *Spartina* sward in the Castletown Estuary and in the Bellurgan-Jenkinstown Marshes has developed on previously unvegetated mudflats.

There is also extensive development of ASM/*Spartina* sward mosaics at this site. These can be seen in all the sub-sites. Most of these mosaics are likely to have developed with the colonisation of established saltmarsh by Common Cordgrass. They are characterised by Common Cordgrass with frequent Sea Purslane and Common Saltmarsh-grass. Other species present includes Sea Aster, Annual Sea-blite and Glasswort. The cover of Common Cordgrass can vary considerably and be quite spare in places within these mosaics. There may also be small patches that would be more accurately classified as *Spartina* sward within these areas. The variable cover of Common Cordgrass made mapping and characterisation of these mosaic areas and areas of *Spartina* sward quite difficult.

There are also some small areas where there seems to have been some natural succession of *Spartina* sward to communities with increased cover of Sea Purslane and other lower marsh ASM species. The colonisation of these other species has created areas of ASM/*Spartina* sward and patches of pure ASM in places where there has been previously no established saltmarsh. This type of succession can be seen east of the breakwater in the Castletown Estuary Marsh and along portions of the seaward side of the Bellurgan-Jenkinstown Marsh.

Some dieback of Common Cordgrass was noted along the seaward side of the Bellurgan-Jenkinstown Marshes in places. However, the extent of *Spartina* swards also seems to be increasing in places with frequent scattered clumps spreading over the adjacent mudflats at various locations.

4 IMPACTS AND ACTIVITIES

This large site is affected by several impacts and activities, which would be expected in such a large site that extends over a considerable area (Table 4.1). Most of the Castlebellingham marsh is grazed by sheep (140). Some minor poaching along creeks was noted. Grazing levels are not intensive and increases towards the northern end. However, there was still plenty of foliage available. The livestock have created tracks in places (501). There is no grazing of the Castletown Estuary marsh. A small section of both the Dundalk Marsh and Bellurgan-Jenkinstown marsh has been fenced off and is grazed by cattle.

Recreational activities within the marshes are quite limited. There are some tracks used by walkers along the landward side of the Dundalk Marsh (622). Another recreational activity which is common in the southern part of the site is shooting. The local gun-club, however, have noted that uninvited shooters regularly visit this site with little regard for the number of wildfowl that are bagged. Wheel ruts (623) were noted at one access point onto Dundalk Marsh.

A small infilled area was noted along the northern Blackrock shoreline. This infilling (803) has occurred adjacent to some development on the shoreline and spoil has spread onto the saltmarsh to disturb a very minor area. There has also been some dumping of spoil (803) at the edge of the saltmarsh at the north end of the Dundalk Marsh adjacent to newly built housing estate. This dumping is probably related to this development but has only affected a small area (0.001 ha). Infilling has also been carried out along part of the Bellurgan-Jenkinstown Marsh. This infilling has affected about 0.2ha of ASM and 0.2ha of *Spartina* sward.

Common Cordgrass is present at this site and is an invasive species of saltmarsh and mudflats (954). It is not known when this species was planted in, or colonised this bay. However, it has been known in the estuary since 1960 (Nairn 1986). Carrothers (1960) noted that the spread of Common Cordgrass into Dundalk Bay to the north of this site was thought to be natural. This species created large areas of *Spartina* sward and extensive areas of ASM/*Spartina* sward. The impact of its presence in these mosaic areas is assessed as moderately negative. One notable aspect of the Castlebellingham and Dundalk Marshes is that Common Cordgrass has mainly spread into the established saltmarsh to form these

habitats rather than mainly spreading on the adjacent mudflats. It has also formed extensive swards on the mudflats within the Castletown Estuary.

This species is still colonising bare mudflats adjacent to the Bellurgan-Jenkinstown Marsh, mudflats seaward of the Dundalk Marshes, particularly at the northern and southern ends of the marsh and at the southern end of the Castlebellingham Marsh where the sediment becomes muddier. It is also spreading on the soft intertidal mud between the more established saltmarsh fragments within the Castletown Estuary. Common Cordgrass forms extensive fringes around these fragments within this estuary. The cover of *Spartina* sward is likely to increase in the future at the expense of the lower ASM, *Salicornia* flats and adjacent mud and sandflats.

One notable aspect of the spread of Common Cordgrass at this site is that both ASM and *Salicornia* flats can be found seaward of dense *Spartina* swards. This is an unusual zonation and *Spartina* swards usually form the most seaward saltmarsh community. This may be one indication of the dynamic nature of the Dundalk Bay marshes and the fact that they are still accreting and allowing pioneer ASM and *Salicornia* flats to develop seaward of *Spartina* sward. This can be seen along the seaward edge of the Dundalk and Castlebellingham Marshes. It may also be an indication that the *Spartina* sward is still developing and has not established yet along the seaward edge of the marsh.

ASM has probably developed along the seaward side of parts of the Bellurgan-Jenkinstown Marsh after the development of *Spartina* sward. This is one example of habitat succession from *Spartina* sward to ASM and is seem in other estuaries where there is accretion, raising the height of the edges of the *Spartina* sward to allow invasion by Sea Purslane and Common Saltmarsh-grass. Another example of this succession is east of the breakwater in the Castletown Estuary marsh. There was very little established saltmarsh in this area prior to the development of the *Spartina* sward.

There are extensive areas of the lower saltmarsh in both the Castlebellingham and Dundalk Marshes that contain some element of Common Cordgrass. These areas were difficult to map and where Common Cordgrass became frequent (> 40% cover) the saltmarsh was mapped as an ASM/*Spartina* sward mosaic. The cover of Common Cordgrass can vary within these areas and there are frequent areas with lower or higher cover of this species. The *Spartina* sward also contains areas where there is some development of ASM vegetation.

A comparison of the OSI 2000 and 2005 aerial photo series shows that Common Cordgrass has spread significantly on the mudflats at several locations during this period. It is difficult to assess if Common Cordgrass has spread significantly at the expense of ASM or *Salicornia* flats within the current monitoring period due to the lack of accurate baseline data. There is likely to have been some spread of this species within this period, especially as there is some

much pioneer vegetation along the seaward edge of the marsh. However, this colonisation is unlikely to have been greater than 10% so the spread of Common Cordgrass is not considered as a negative indicator to fail monitoring stops during this monitoring period.

This site has been significantly modified by reclamation and the construction of berms in the past. Berms have been built along the upper boundary of the Castlebellingham, Dundalk and Castletown Estuary marshes and former saltmarsh behind these berms was reclaimed. The construction of these berms may have led to the development of the current saltmarsh seaward of the berms in places. The construction of a seawall and railway embankment has also lead to the development of saltmarsh in the Castletown Estuary marsh. These impacts are not assessed as they occurred prior to the current monitoring period.

There are few indications of erosion (900) around the site. Erosional features can be seen along the seaward side of some parts of the Castlebellingham Marsh where low mud platforms are vegetated by dense Glasswort and are divided by unvegetated bare intertidal channels. The edges of these platforms are eroded. Some of this saltmarsh is likely to be vulnerable to storm erosion as the site is quite open.

There are much more frequent indications of accretion at the site (910). The saltmarsh has expanded significantly in the past 100 years with the Castlebellingham and Dundalk Marshes more than doubling in width in places. The Bellurgan-Jenkinstown Marsh has also developed during this period, although a large part of this development was as a result of the colonisation of Common Cordgrass. The are frequent indictors of accretion along the seaward edge of the Castlebellingham and Dundalk Marshes with development of pioneer ASM and *Salicornia* flats on an accretion ramp along the seaward edge of the established saltmarsh. Both these marshes are expanding at there southern ends. A comparison of the 1995, 2000 and 2005 OSI aerial photo series does not show any significant saltmarsh expansion during this period, although this is mainly due to the fact that the seaward edge of the marsh is not very distinctive on these aerial photos. Accretion is assessed as positive impact on a portion of the ASM and the *Salicornia* flats.

Impacts and activities around the site are mainly related to farming (100, 102, 120, 140) and to urbanisation around Dundalk and at Blackrock (401). There are scattered dwellings around the site in the rural sections (403). These activities have had no measurable impact at this site.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	900	C	0	15.00	Inside
1310	910	C	+1	34.84	Inside
1310	954	B	-1	34.84	Inside
1330	140	C	0	110.00	Inside
1330	230	C	0	150.00	Inside
1330	501	C	0	1.00	Inside
1330	803	A	-2	0.2	Inside
1330	900	C	0	30.00	Inside
1330	910	C	+1	30.00	Inside
1330	954	B	-1	80.00	Inside

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

5 CONSERVATION STATUS

5.1 Overall Conservation Status

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

Dundalk saltmarshes contain some notable features of conservation interest. The actual size of these saltmarshes is notable and includes the largest single unit of saltmarsh mapped during the SMP survey. The marshes also contain well-developed examples of saltmarsh zonation and saltmarsh drainage structure. There has been significant growth of the saltmarsh in the past 100 years and this is related to continued accretion. Pioneer saltmarsh communities including *Salicornia* flats are well-represented and this is one indicator that accretion is continuing. The extent of *Salicornia* flats is also significant and represents the second largest overall area of habitat mapped during the SMP project. There is likely to be further growth of this saltmarsh in the future. Much of the saltmarsh has only developed in the past 100 years and is at a relatively young stage of development. The site has been modified in the past by reclamation, construction of the berms, construction of the seawalls and railway embankment in the Castletown Estuary and the use of the estuary as a landfill.

The overall conservation status of this site is *unfavourable-inadequate* (Table 5.1). This is mainly due to the presence of Common Cordgrass within the *Salicornia* flats habitat, which has the potential to spread in the future to reduce the extent of this habitat. Common Cordgrass is also a prominent part of the site and formed a significant area of *Spartina* sward and ASM/*Spartina* sward, mainly at the expense of ASM. However, there is no evidence that this occurred during the current monitoring period (mainly due to the absence of accurate baseline data). There are few other significantly negative impacts affecting this site. A minor amount of habitat has been damaged or destroyed by infilling and dumping of spoil along the upper saltmarsh boundary. Some of the saltmarsh is grazed but not intensively.

Nearly all of the saltmarsh is found within Dundalk Bay cSAC. A NPWS management plan is available for this cSAC.

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

Habitat	**EU Conservation Status Assessment**			
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**	**Overall EU conservation status assessment**
Salicornia flats (H1310)	Extent	Structure and functions Future prospects		Unfavourable - Inadequate
Atlantic salt meadows (H1330)	Extent Structure and functions Future prospects			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*. There is no detailed information about the previous extent of this habitat. There is a significant area of this habitat present at the site that represents the second largest area mapped during the SMP project. There are no indications that there has been any significant loss of habitat due to natural erosion during the current monitoring period. There are indications of accretion and growth of the saltmarshes in Dundalk Bay and there is a positive indicator for extent of this habitat.

Salicornia flats may have been more extensive in the past in the Castletown Estuary and the Bellurgan-Jenkinstown Marshes, which both now contain substantial areas of *Spartina* sward.

However, there is no detailed information about the previous distribution of this habitat at these locations.

Common Cordgrass is present in this habitat and there are some indications that it is spreading at several locations around the site. However there are no indications that it has spread significantly within the current monitoring period to reduce the extent of this habitat.

5.2.2 Habitat structure and functions

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

Much of the *Salicornia* flats are found along the seaward side of the more established saltmarsh. It forms a natural part of the saltmarsh zonation. Most of this habitat contains scattered clumps of Common Cordgrass, which varies in cover. There are several small areas mapped as a mosaic of *Salicornia* flats and *Spartina* sward where there are more frequent scattered clumps of Common Cordgrass within the *Salicornia* flats habitat. There are indications that this species is spreading, although there is no evidence that its cover and increased significantly (> 10% during the current monitoring period). The overall impact of its spread on species composition is assessed as neutral, mainly due to the lack of accurate baseline data.

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 the spread of Common Cordgrass continue in the near future. *Salicornia* flats are likely to be vulnerable to further colonisation by Common Cordgrass in the future and may limit their extent. However, much of the *Salicornia* flats are likely to persist as long as there is continued accretion. Common Cordgrass has been present at this site for about 50 years but has not completely established along the edge of the Castlebellingham and Dundalk Marshes. The high sandy content of the sediment adjacent to the saltmarsh may be one factor that will limit the spread of Common Cordgrass in this zone and keep some of the zone open to maintain *Salicornia* flats cover.

5.3 Atlantic salt meadows (H1330)

5.3.1 Extent

The extent of the habitat is assessed as *favourable*. There is a significant area of this habitat present at the site that represents the largest overall area mapped during the SMP project.

There are no indications that there has been any significant loss of habitat due to natural erosion, reclamation or infilling during the current monitoring period. There has been a small amount of infilling and dumping of spoil around the site. However, this only represents < 0.001% of the overall ASM area at the site. There is a substantial amount of pioneer saltmarsh at the site and this is a positive indictor for extent. The saltmarsh has grown significantly during the past 100 years and this trend is likely to continue.

Common Cordgrass has formed significant areas of *Spartina* sward and ASM/*Spartina* sward mosaic within the former established ASM. However the impact on extent is assessed as neutral due to the lack of evidence that it has spread significantly during the current monitoring period.

5.3.2 Habitat structure and functions

The habitat structure and functions of this habitat are assessed as *favourable*. Seventy-two monitoring stops were carried out in this habitat and one stop failed. All of the attributes required for favourable conservation status generally reached their targets. This stop failed due to the dominance of Common Cordgrass, although no assessment could be made of the potential spread of Common Cordgrass at this point during the current monitoring period, so it can be ignored. There is substantial cover of Common Cordgrass within the ASM forming patches of *Spartina* sward and ASM/*Spartina* sward mosaic, but there are no indications that it has spread significantly during the current monitoring period (mainly due to lack of baseline data). The impact of its spread on species composition is assessed as neutral, mainly due to the lack of accurate baseline data. There are few other negatively impacting activities affecting this habitat. Some of the saltmarsh is grazed but not intensively.

The structure and functions of the ASM at this site are extremely well-developed. The Dundalk and Castlebellingham Marshes contain some of the best examples of saltmarsh zonation and the development of saltmarsh drainage features in Ireland. All the main vegetation zones are well-represented. There is a substantial area of pioneer ASM at this site, which is a positive indicator and also an indicator of accretion. The sward height varies across the site and depends on the saltmarsh community.

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 such as grazing continue in the near future. There are few impacts that are significantly negatively affecting the ASM at this site. Only part of the marsh is grazed and this activity is not causing any significant damage. Minor areas around the site have been infilled but the overall damage is minor in relation to the whole of the site. The continued spread of Common Cordgrass is likely to be the most significant impact. This species has already spread into the ASM and formed substantial areas of *Spartina* sward and ASM/*Spartina* sward mosaic. There are areas of the ASM,

particularly in the pioneer ASM, that are vulnerable to further spread of this invasive species. However the sandy nature of much of the sediment along the two main saltmarshes may mean that dense *Spartina* sward does not become established.

There are areas where there has been some natural succession of *Spartina* sward to ASM/*Spartina* sward mosaic. This is likely to continue in the future and increase the extent of ASM. Continued accretion along the saltmarsh is also likely to be a positive indicator for the future prospects of this habitat. This saltmarsh has grown significantly in the past 100 years and is likely to increase in extent in the future.

5.4 Mediterranean salt meadows (H1410)

5.4.1 Extent

The extent of the habitat is assessed as *favourable*. There are no indications that there has been any significant loss of habitat due to natural erosion or land-use changes during the current monitoring period. There is only a very small area of MSM found at this site. The MSM is not affected by any of the infilling at this site in the past.

5.4.2 Habitat structure and functions

The habitat structure and functions of this habitat are assessed as *favourable*. One monitoring stop was carried out in this habitat and it passed. The MSM is in good condition and is not affected by any negatively impacting activities. The species assemblage is typical of this habitat. There are natural transitions from this habitat to brackish Reed beds.

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 damaging activities affecting this habitat significantly

6 MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for this site.

7 REFERENCES

Carrothers, E.N. (1960). *Spartina townsendii* H & J Groves in counties Louth and Down. *Irish Naturalists' Journal*, **13**, 188.

Curtis, T.G.C.F. 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.

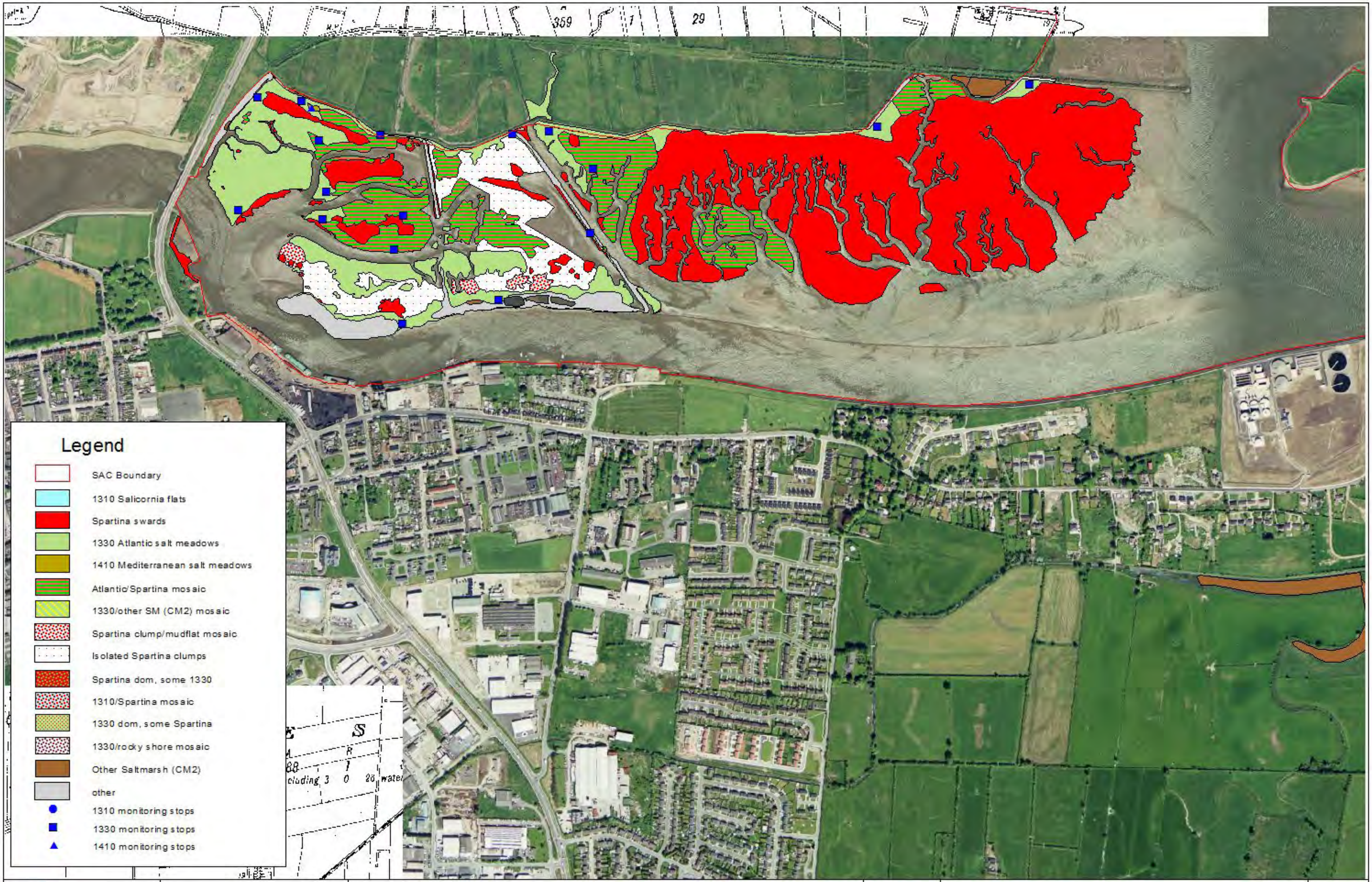
MPSU (?). *Management Plan for Dundalk Bay cSAC*. Government of Ireland.

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	*Spartina* swards
1	1310 *Salicornia* flats	34.667	34.667				
2	*Spartina* swards	122.5					122.5
3	1330 Atlantic salt meadow	299.679		299.679			
4	1410 Mediterranean salt meadow	0.044			0.044		
5	ASM/MSM mosaic (50/50)						
6	ASM/*Spartina* mosaic	57.127		28.564			28.564
7	1330/other SM (CM2) mosaic	0.151		0.076			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	14.366					
10	*Spartina* clump/mudflat mosaic (50/50)	19.093					9.547
11	Isolated *Spartina* clumps on mud (5%)	61.85					1.237
12	pioneer 1330/1310/*Spartina* mosaic						
13	1410/other SM (CM2) mosaic						
14	*Spartina* sward dominated, with some ASM	0.993					0.993
15	1310/*Spartina* mosaic	0.336	0.168				0.168
16	ASM dominated with some *Spartina*	1.821		1.821			
17	1330/sand dune mosaic						
18	Other SM (CM2)	12.011					
19	1330/rocky shore mosaic	0.026					
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	**624.664**	**34.835**	**330.152**	**0.044**		**163.008**



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

Saltmarsh Monitoring Project 2007-2008

Dundalk (Map 1 of 7)

Dundalk Bay SAC (000455)

SMP code: SMP0032

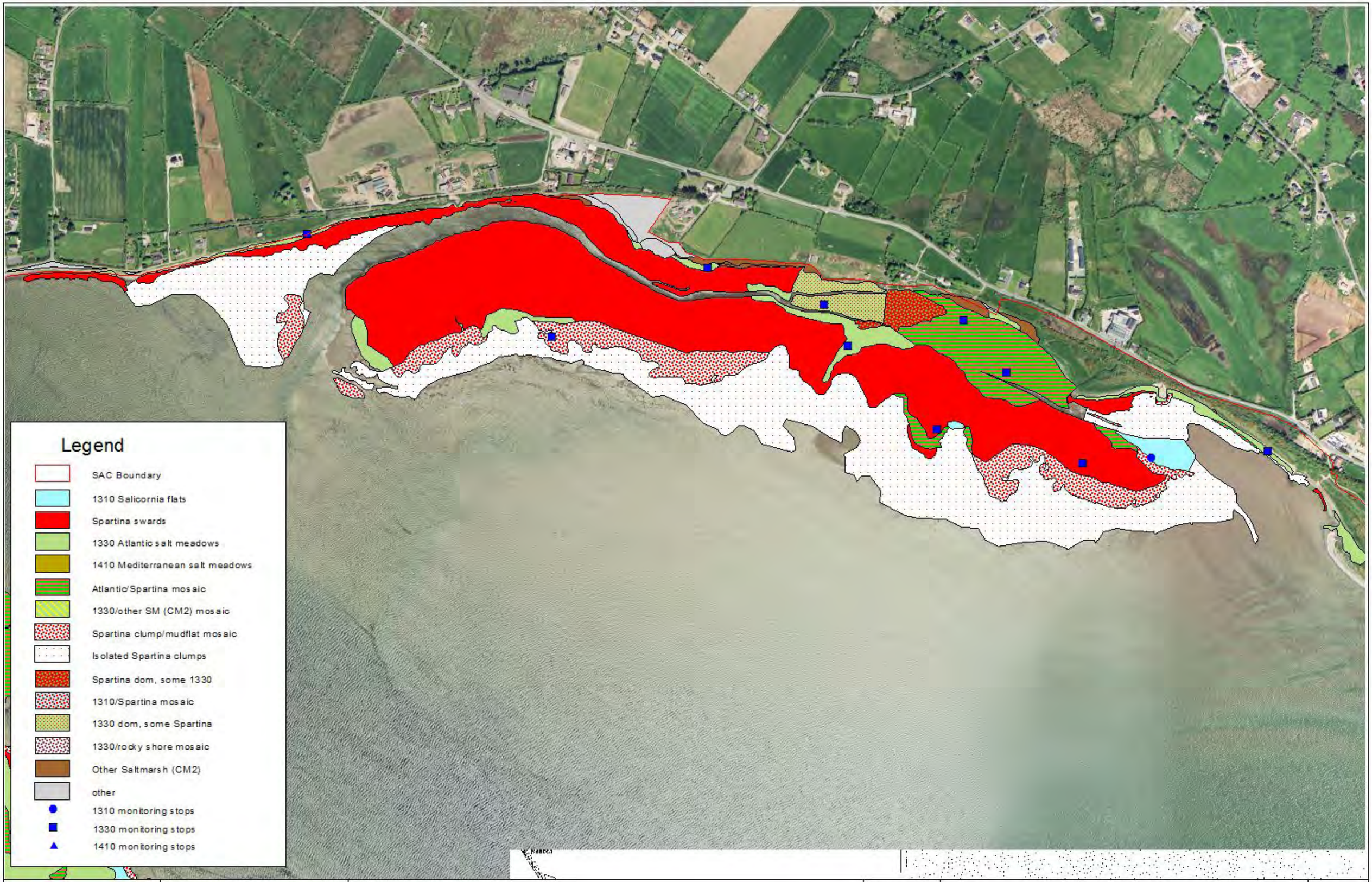
This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953)

0 100 200 300 400 500 Meters

N

Date of production: 01/03/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:8000



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

Saltmarsh Monitoring Project 2007-2008

Dundalk (Map 2 of 7)

Dundalk Bay SAC (000455)

SMP code: SMP0032

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

0 100 200 300 400 500 Meters

Date of production: 01/03/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:8000

N

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

Saltmarsh Monitoring Project 2007-2008

Dundalk (Map 3 of 7)

Dundalk Bay SAC (000455)

SMP code: SMP0032

0 100 200 300 400 500 Meters

N

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

Date of production: 01/03/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:8000

Legend

- SAC Boundary
- 1310 Salicornia flats
- Spartina swards
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- Atlantic/Spartina mosaic
- 1330/other SM (CM2) mosaic
- Spartina clump/mudflat mosaic
- Isolated Spartina clumps
- Spartina dom, some 1330
- 1310/Spartina mosaic
- 1330 dom, some Spartina
- 1330/rocky shore mosaic
- Other Saltmarsh (CM2)
- other
- 1310 monitoring stops
- 1330 monitoring stops
- 1410 monitoring stops

Oifigeach, Oidhreachtaí agus Rialtas Áitiúil
Environment, Heritage and Local Government
National Parks and Wildlife Service

Saltmarsh Monitoring Project 2007-2008

Dundalk (Map 4 of 7)

Dundalk Bay SAC (000455)

SMP code: SMP0032

0 100 200 300 400 500 Meters

N

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

Date of production: 01/03/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:8000

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

Saltmarsh Monitoring Project 2007-2008

Dundalk (Map 5 of 7)

Dundalk Bay SAC (000455)

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

SMP code: SMP0032

0 100 200 300 400 500 Meters

Date of production: 01/03/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:8000

N

Legend

- SAC Boundary
- 1310 Salicornia flats
- Spartina swards
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- Atlantic/Spartina mosaic
- 1330/other SM (CM2) mosaic
- Spartina clump/mudflat mosaic
- Isolated Spartina clumps
- Spartina dom, some 1330
- 1310/Spartina mosaic
- 1330 dom, some Spartina
- 1330/rocky shore mosaic
- Other Saltmarsh (CM2)
- other
- 1310 monitoring stops
- 1330 monitoring stops
- 1410 monitoring stops

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

Saltmarsh Monitoring Project 2007-2008

Dundalk (Map 6 of 7)

Dundalk Bay SAC (000455)

SMP code: SMP0032

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

0 100 200 300 400 500 Meters

Date of production: 01/03/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:8000

N

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

Saltmarsh Monitoring Project 2007-2008

Dundalk (Map 7 of 7)

Dundalk Bay SAC (000455)

SMP code: SMP0032

0 100 200 300 400 500 Meters

N

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

Date of production: 01/03/2009
Map version: 1

Original Drawing Size: 297 x 420 (A3)
Scale 1:8000