

**Bannow Bay SAC (site code 697)
Conservation objectives supporting document
-coastal habitats**

NPWS

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

Please note that this document should be read in conjunction with the following report: NPWS (2012). Conservation Objectives: Bannow Bay SAC 000697. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

1 Introduction

Achieving Favourable Conservation Status (FCS) is the overall objective to be reached for all Annex I habitat types and Annex II species of European Community interest listed in the Habitats Directive 92/43/EEC (Commission of the European Communities, 2003). It is defined in positive terms, such that a habitat type or species must be prospering and have good prospects of continuing to do so.

Bannow Bay SAC is a relatively large estuarine site, approximately 14km long on the south coast of County Wexford. It is a typical coastal estuary with large areas of mud and sand, and restricted access to the sea. Small rivers and streams to the north and south-west flow into the bay and their sub-estuaries form part of the site. The southern end of the bay supports a mosaic of sand dunes, saltmarshes, sea cliffs of clay and rock and extensive sandy beaches. The geology of the site is mainly Ordovician slate rocks with some Cambrian slate east of Bannow Island.

Narrow shingle beaches occur in places along the edge of the estuary, although little is known about their exact distribution or nature. Shingle as a feature has been noted at Grange, Saltmills and Taulaght.

Saltmarshes of exceptional species diversity and rarity are found above the sand and mudflats, particularly at the south of the site. A diverse range of *Salicornia* species has been recorded including *Salicornia pusilla*, *S. ramosissima*, *S. europaea*, *S. fragilis* and *S. dolichostochya*.

Bannow Bay is one of only two coastal sites where Perennial Glasswort (*Sarcocornia perennis*) has been recorded in Ireland (the other being Ballyteige Burrow also in County Wexford). This species is listed on the Flora (Protection) Order 1999 and also is a Red Data Book species (Curtis & Gough 1988). It is the characteristic species for the rarest of Irish saltmarsh habitats – Mediterranean and thermo-Atlantic halophilous scrubs.

There are two areas of sand dunes within the site: Bannow Island and Grange, which occur on either side of the mouth of the estuary – Bannow Island on the east and Grange to the west. The beach at Bannow Island is somewhat sheltered and as a result undergoes less erosion than might be expected at the mouth of a bay or estuary. The beach at Grange is not sheltered and is subject to greater tidal impacts than Bannow Island (Ryle *et al.*, 2009).

Bannow Bay SAC (site code: 697) is designated for a range of coastal habitats including vegetated shingle, saltmarsh and sand dunes. The following nine coastal habitats are included in the qualifying interests for the site (* denotes a priority habitat):

- Perennial vegetation of stony banks (1220)
- *Salicornia* and other annuals colonising mud and sand (1310)
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) (ASM) (1330)
- Mediterranean salt meadows (*Juncetalia maritimi*) (MSM) (1410)
- Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) (1420)
- Annual vegetation of drift lines (1210)
- Embryonic shifting dunes (2110)
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (2120)
- Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130)*

The first habitat represents vegetated shingle, the next four are saltmarsh habitats and the last four are associated with sand dune systems, although all nine of these habitats are found in close association with each other. Dune slacks were also recorded at this SAC by the Coastal Monitoring Project (CMP) survey (Ryle *et al.*, 2009).

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

The targets set for the **vegetated shingle** are based in part on the findings of the National Shingle Beach Survey (NSBS), which was carried out in 1999 on behalf of the National Parks and Wildlife Service (NPWS) (Moore & Wilson, 1999) and partly on the Coastal Monitoring Project (Ryle *et al.*, 2009), who recorded a small area of vegetated shingle at Grange. However, as the site was not visited during the NSBS, the conservation objective for the vegetated shingle habitat within the entire SAC is quite generic and may be adjusted in the future in light of new information.

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

The SMP surveyed, mapped and assessed a total of seven sub-sites within Bannow Bay SAC (McCorry & Ryle, 2009):

1. Bannow Island
2. Clonmines
3. Taulaght
4. Saltmills
5. Gorteens
6. Grange
7. Fethard

As part of the SMP detailed individual reports and habitat maps were produced for each sub-site and these are included in a set of Appendices to this document (Appendix III to IX). The conservation objectives for the saltmarsh habitats in Bannow Bay are based on a combination of the findings of the individual reports for each of these sub-sites. There are additional areas of saltmarsh known to be present within the site, however, it is estimated that the seven sub-sites as surveyed by the SMP represents over 91% of the total area of saltmarsh within Bannow Bay SAC.

The targets set for the **sand dune habitats** are based primarily on the results of the Coastal Monitoring Project (CMP) (Ryle *et al.*, 2009) and this document should be read in conjunction with that report. As part of the Coastal Monitoring Project (CMP) detailed individual reports and habitat maps were produced for two sub-sites (Bannow Island and Grange) and these are included in a set of Appendices to this document (Appendix X & XI).

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

2 Conservation Objectives

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

3 Perennial vegetation of stony banks

Perennial vegetation of stony banks is vegetation that is found at or above the mean high water spring tide mark on shingle beaches (i.e., beaches composed of cobbles and pebbles). It is dominated by perennial species (i.e. plants that continue to grow from year to year). The first species to colonise are annuals or short-lived perennials that are tolerant of periodic displacement or overtopping by high tides and storms. Level, or gently-sloping, high-level mobile beaches, with limited human disturbance, support the best examples of this vegetation. More permanent ridges are formed by storm waves. Several of these storm beaches may be piled against each other to form extensive structures. However, little is known about the distribution and nature of this habitat at this site.

3.1 Overall Objective

The overall objective for 'perennial vegetation of stony banks' in Bannow Bay SAC is to 'maintain the favourable conservation condition'. This objective is based on an assessment of the current condition of the habitat under a range of attributes and targets. The assessment is divided into three main headings (a) Range, (b) Area and (c) Structure and Functions.

3.2 Area

3.2.1 Habitat extent

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. The target for favourable condition is '*no decrease in extent from the established baseline*'. Bearing in mind that coastal systems are naturally dynamic and subject to change even within a season, this target is assessed subject to natural processes, including erosion and succession.

The exact current extent of this habitat in Bannow Bay is unknown. The National Shingle Beach Survey (Moore & Wilson, 1999) did not visit this site but a small area of vegetated shingle (0.054ha) was recorded at the front of the eroded northern tip of the Grange sub-site and mapped by Ryle *et al.* (2009).

The target is that the area should be stable or increasing, subject to natural processes, including erosion and succession.

3.3 Range

3.3.1 Habitat distribution

Shingle is currently thought to be widely distributed along the edge of the estuary . It is known to occur at Grange, Saltmills and Taulaght.

A small area of vegetated shingle was recorded at the front of the eroded face of the fixed dunes at the northern tip of the sub-site at Grange (Ryle *et al.*, 2009).

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

3.4 Structure and Functions

A fundamental aim of shingle conservation is to facilitate natural mobility. Shingle beaches are naturally dynamic systems, making them of geomorphological interest as well as ecological interest. They are constantly changing and shingle features are rarely stable in the long term.

3.4.1 Functionality and sediment supply

The health and on-going development of this habitat relies on a continuing supply of shingle sediment. This may occur sporadically as a response to storm events rather than continuously. Interference with the natural coastal processes, through offshore (or onshore) extraction or coastal defence structures in particular, can interrupt the supply of sediment and lead to beach starvation.

The target is to maintain the natural circulation of sediment and organic matter, without any physical obstructions.

3.4.2 Vegetation structure: zonation

Ecological variation in this habitat type depends on stability; the amount of fine material accumulating between the pebbles; climatic conditions; width of the foreshore and past management of the site. The ridges and lows also influence the vegetation patterns, resulting in characteristic zonations of vegetated and bare shingle. In the frontal less stable areas of shingle, the vegetation tends to be dominated by annuals and short-lived salt-tolerant perennials. Where the shingle is more stable the vegetation becomes more perennial in

nature and may include grassland, heathland and scrub, depending on the exact nature of the site. The presence of lichens indicates long term stability of the shingle structure. Transitions to intertidal, saltmarsh and sand dune habitats occur at this site.

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

3.4.3 Vegetation composition: typical species & sub-communities

The degree of exposure, as well as the coarseness and stability of the substrate determines species diversity. There is no available information concerning the vegetation growing on the shingle at Bannow Bay but it is assumed to support a typical flora for this habitat. Typical species would include sea sandwort (*Honckenya peploides*), sea beet (*Beta vulgaris* ssp. *maritima*), rock samphire (*Crithmum maritimum*), sea mayweed (*Tripleurospermum maritimum*) and sea campion (*Silene uniflora*).

The target for this attribute is to ensure that the typical flora of vegetated shingle is maintained, as are the range of sub-communities within the different zones.

3.4.4 Vegetation composition: negative indicator species

Where shingle becomes more stabilised negative indicator species can become an issue. Negative indicator species can include non-native species (e.g. *Centranthus ruber*, *Lupinus arboreus*); species indicative of changes in nutrient status (e.g. *Urtica dioica*) and species not considered to be typical of the habitat (e.g. *Pteridium aquilinum*).

The target for this attribute is that negative indicator species (including non-native species) should represent less than 5% of the vegetation cover.

4 Saltmarsh habitats

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

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

All four habitats are listed as Qualifying Interests for Bannow Bay SAC. Detailed descriptions of each habitat in the 7 sub-sites recorded by McCorry & Ryle (2009) in Bannow Bay can be found in Appendices III to IX.

The SMP surveyed, mapped and assessed a total of seven sub-sites within Bannow Bay SAC (McCorry & Ryle, 2009). See Appendix I for map:

1. Bannow Island (Appendix III)
2. Clonmines (Appendix IV)
3. Taulaght (Appendix V)
4. Saltmills (Appendix VI)
5. Gorteens (Appendix VII)
6. Fethard (Appendix VIII)
7. Grange (Appendix IX)

Within Bannow Bay SAC the areas of *Salicornia* habitat are limited, though the typical structure is present especially in salt meadows where the transition from one habitat to the other is evident, i.e. saltmarsh, *Salicornia* beds, mudflats. There is a good diversity of *Salicornia* species present, though the spread of *Spartina* is a threat. Natural erosion of the dunes resulting in the spread of sand over the saltmarsh in some areas is having an impact.

Atlantic salt meadows (ASM) is the dominant saltmarsh habitat at the site and was recorded at all 7 sub-sites. Mediterranean salt meadows (MSM) is more restricted in its distribution and size, being recorded from 5 of the 7 sub-sites.

Mediterranean and thermo Atlantic halophilous scrub (*Sarcocornetea fruticosi*) is the rarest of the four Annex I saltmarsh habitats found in Ireland. Within Bannow Bay, it is found in salt-pans and tidal muds and often on higher gravelly saltmarsh. It is characterised by the presence of the legally protected perennial glasswort (*Sarcocornia perennis*).

All four qualifying interest habitats have been recorded at Taulaght and Gorteens.

At the Bannow Island sub-site, the saltmarsh has developed in the low-lying sheltered area of Bannow Bay between Bannow Island and the eastern side of the Bay. Most of the established saltmarsh is found behind the small dune system in the low-lying area behind the island and the adjacent mainland. Common Cord Grass (*Spartina*) swards are also found within the saltmarsh at this site. There are two main areas of saltmarsh at Bannow Island. Three Annex I habitats were recorded at this sub-site: *Salicornia* mudflats, ASM and Halophilous scrub (McCorry & Ryle, 2009).

The Clonmines sub-site is located at the northern end of Bannow Bay where the Owenduff and Corock Rivers enter the Bay. The saltmarsh at Clonmines is one of the largest in the county (Goodwillie, 1979). The saltmarsh at this site is quite fragmented and there are several large patches scattered along the shoreline in low-lying intertidal areas, mainly on the western side of the channel. The saltmarsh has developed where mud has accreted in the quiet zones of the main undulating channel flowing through this area. The largest section has developed in a sheltered area behind a shingle ridge. Three Annex I saltmarsh habitats were recorded at this sub-site: *Salicornia* mudflats, ASM and MSM (McCorry & Ryle, 2009).

Taulaght saltmarsh is located in a small inlet along the Bannow Bay shoreline. The main saltmarsh has developed in a sheltered area behind a shingle spit. A small stream flows into this inlet from the adjacent land. The bay drains at low tide to expose extensive mudflats adjacent to the shingle spit. This sub-site supports four Annex I saltmarsh habitats: *Salicornia* mudflats, ASM, MSM and Halophilous scrub (McCorry & Ryle, 2009).

Saltmills saltmarsh has developed in a small partially enclosed area by a shingle ridge. It was probably reclaimed to some extent in the past but has been left derelict for a considerable time. It consists of a small low-lying plain behind a glacial mound, which contains some improved grassland, transitional coastal grassland and scrub. There are some modified drainage channels through the marsh. Three Annex I saltmarsh habitats occur at this site: *Salicornia* mudflats, ASM and MSM (McCorry & Ryle, 2009).

The saltmarsh at Gorteen is poorly developed along both sides of an inlet and is mainly represented as a narrow band of continuous habitat stretched along the shoreline, usually 5-20m wide. This saltmarsh has developed adjacent to soft intertidal mudflats. There are some larger sections where saltmarsh has developed in small more sheltered indentations associated with streams running off the adjacent land where *Spartina* swards have developed (McCorry & Ryle 2009). Four Annex I saltmarsh habitats occur at the Gorteen sub-site: *Salicornia* mudflats, ASM, MSM and Halophilous scrub (McCorry & Ryle, 2009).

The Grange sub-site (or Big Burrow as it is often referred to) is situated directly opposite Bannow Island sub-site at the mouth of Bannow Bay. This site has been eroded over the past number of years. Anecdotal evidence suggests that the sand-flats around Grange were once overlain with a thick band of shingle and cobble which has been removed over the decades for use as building material. This has resulted in 'unquantified' acceleration of the erosion along much of the low cliffs and coastal habitats around Grange and further south to Fethard. These changes have also had a very significant impact of the coastal habitats at this quite dynamic site to the degree that two habitats that were formerly recorded at the site were not found by McCorry & Ryle (2009). The saltmarsh at this site is notable for the presence of sharp rush (*Juncus acutus*). This species is much more rarely found on saltmarshes compared to sea rush (*Juncus maritimus*). Stands of saltmarsh vegetation dominated by either sea rush (*Juncus maritimus*) or sharp rush (*Juncus acutus*) can be classified as MSM. There are few saltmarshes in Ireland with the rarer MSM sub-type dominated by sharp rush (*Juncus acutus*). Two Annex I habitats occur at this site: ASM and MSM (McCorry & Ryle, 2009).

The Fethard sub-site is located south of Bannow Bay in a small sheltered inlet south of Fethard village. The inlet is sheltered at the seaward end by a small sand spit with minor development of sand dunes. One notable feature of this site is that the majority of the saltmarsh has developed in the past 100 years and the old OSI 2nd edition 6 inch map does not show any saltmarsh habitat within the inlet, which is marked as containing intertidal mud and sand flats. Three Annex I saltmarsh habitats occur at this sub-site: *Salicornia* mudflats, ASM and Halophilous scrub (McCorry & Ryle, 2009).

4.1 Overall Objectives

The overall objective for 'Salicornia and other annuals colonising mud and sand' in Bannow Bay Complex SAC is to 'restore the favourable conservation condition'.

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

The overall objective for 'Mediterranean salt meadows' in Bannow Bay SAC is to 'restore the favourable conservation condition'.

The overall objective for 'Mediterranean and thermo-Atlantic halophilous scrub' in Bannow Bay SAC is to 'restore the favourable conservation condition'.

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

4.2 Area

4.2.1 Habitat extent

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. The target is no decrease in extent from the baseline which was established by McCorry and Ryle (2009). Bearing in mind that coastal systems are naturally dynamic and subject to change, this target is assessed subject to natural processes, including erosion and succession.

Baseline habitat maps were produced for the saltmarsh in Bannow Bay during the SMP. These maps are included with the individual site reports in the Appendices at the end of this document.

Although most sub-sites showed no loss of area, significant losses were recorded in all four habitats at Grange, to the extent where two habitats are no longer recorded there (*Salicornia* mudflats and halophilous scrub). It is unclear to what degree human impact (through the removal of material) has accelerated erosion at this sub-site but it was considered by the CMP to be a contributing factor in the unfavourable conservation status ratings for these habitats. The targets are based on the assumption that this erosion is partly the result of human activities. Should it be established subsequently that the erosion is a natural feature this objective should be amended to 'maintain favourable conservation condition' for all four habitats.

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

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

1. Where a polygon was identified as a mosaic of an Annex I habitat and a non-Annex I habitat, then the entire area was counted as the Annex I habitat.

2. Where a polygon was identified as a mosaic of two Annex I habitats, the area was divided 50:50 for each habitat.

Sub-site	Total area (ha) of <i>Salicornia</i> mudflats (excluding mosaics) from SMP	Total area (ha) of <i>Salicornia</i> mudflats within SAC boundary (including mosaics)
Bannow Island	0.002	0.002
Clonmines	0.023	0.022
Taulaght	0.006	0.006
Saltmills	0.015	0.014
Gorteens	-	0.008
Fethard	0.100	0.099
Total	0.146	0.151

Sub-site	Total area (ha) of ASM (excluding mosaics) from SMP	Total area (ha) of ASM within SAC boundary (including mosaics)
Bannow Island	1.981	2.570
Clonmines	15.870	16.164
Taulaght	2.547	2.952
Saltmills	1.127	1.1425
Gorteens	0.997	1.174
Grange	0.014	0.014
Fethard	4.276	5.849
Total	26.812	29.865

Sub-site	Total area (ha) of MSM (excluding mosaics) from SMP	Total area (ha) of MSM within SAC boundary (including mosaics)
Bannow Island	-	-
Clonmines	1.922	1.922
Taulaght	0.491	0.491
Saltmills	0.843	0.827
Gorteens	0.785	0.767
Grange	0.40	0.40
Fethard	-	-
Total	4.441	4.407

Sub-site	Total area (ha) of Halophilous scrub (excluding mosaics) from SMP	Total area (ha) of Halophilous scrub within SAC boundary (including mosaics)
Bannow Island	0.166	0.166
Clonmines	-	-
Taulaght	0.012	0.012
Saltmills	-	-
Gorteens	0.059	0.059
Grange	-	-
Fethard	0.121	0.122
Total	0.358	0.359

Based on the assumption that the on-going erosion problem at this site may be the result of the deliberate removal of beach material the target for all four saltmarsh habitats is that their areas should be increasing, subject to natural processes, including erosion and succession.

4.3 Range

4.3.1 Habitat distribution

Saltmarsh is currently known to display a wide distribution throughout the site with concentrations at Clonmines (19.03ha) and Fethard (10.155ha). Atlantic salt meadows are by far the dominant saltmarsh habitat, being recorded at all 7 sub-sites. There are also some mosaic communities with *Salicornia* mudflats, Mediterranean salt meadows and Halophilous scrub.

Mediterranean salt meadows are absent from Fethard and Bannow Island subsites (McCorry & Ryle 2009).

Mediterranean and thermo-Atlantic halophilous scrub (*Sarcocornetea fruticosi*) was also recorded at the Fethard sub-site as well as Taulaght, Gorteens and Bannow Island. It appears to have disappeared from Grange (McCorry & Ryle, 2009).

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

4.4 Structure and Functions

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

4.4.1 Physical structure: sediment supply

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

The SMP noted that the Fethard sub-site was quite a dynamic site (McCorry & Ryle, 2009).

The target is to maintain the natural circulation of sediment and organic matter, without any physical obstructions.

4.4.2 Physical structure: creeks and pans

Saltmarshes can contain a distinctive topography with an intricate network of creeks and pans occurring on medium to large-sized sites. Creek density is influenced by vegetation cover, sediment supply and tidal influence. Creeks absorb tidal energy and assist with delivery of sediment into the saltmarsh. The efficiency of this process depends on creek pattern. Creeks allow pioneer vegetation to become established along their banks higher up into the saltmarsh system. Major erosion of saltmarsh is indicated by internal dissection and enlargement of the drainage network, ultimately leading to the creation of mud basins.

At the Clomines sub-site the structure of the saltmarsh has been modified by the construction of deep drains, though within the ASM and MSM there are still some natural drainage creeks present and there are well-developed salt pans also present.

At Bannow Island the structure of the ASM is moderately developed and there are a series of moderately sized saltpans in the area (McCorry & Ryle, 2009).

At the Fethard sub-site, the structure of the saltmarsh is particularly well developed with an intricate network of creeks in places, partly because most of the marsh is quite flat and at a similar elevation. This site is also one of the few moderately sized sites that have not been altered by drainage and reclamation (McCorry & Ryle, 2009).

The structure of the ASM and MSM at the Gorteens sub-site are poorly developed (McCorry & Ryle, 2009).

The saltmarsh structure at Saltmills has been modified in the past by drainage with one main channel draining the site and smaller drains criss-crossing the rest of the saltmarsh. These artificial drains, however, act in the same way as natural channels and are partially infilling to create pan-like structures in places. Some well-developed natural large salt pans are also present. There is some zonation evident in the MSM at this sub-site, where sea rush (*Juncus maritimus*) tussocks are also present in the mid-marsh zone (McCorry & Ryle, 2009).

Both the ASM and MSM at Taulaght have well-developed structure. The ASM contains medium sized pans with clumps of cordgrass (*Spartina* species). The saltmarsh creek structure is also well developed and there are some wide channels where the established saltmarsh has been cut-off and forms small islands that may be surrounded by *Spartina* sward. The MSM also has a well-developed saltmarsh structure in places with creeks and small salt pans present (McCorry & Ryle, 2009).

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

4.4.3 Physical structure: flooding regime

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

The target is to maintain a flooding regime whereby the lowest levels of the saltmarsh are flooded daily, while the upper levels are flooded occasionally (e.g. highest spring tides).

4.4.4 Vegetation structure: zonation

Saltmarshes are naturally dynamic coastal systems. As is the case on the majority of Irish saltmarshes, ASM is the dominant saltmarsh habitat at Bannow Bay where it occurs in a mosaic with other saltmarsh habitats, including '*Salicornia* and other annuals colonising mud and sand', 'Mediterranean salt meadows' and 'Halophilous scrub'. In order to ensure the ecological functioning of all of the saltmarsh habitats it is vital to maintain the zonations and transitions to other habitats, including intertidal, shingle and sand dune habitats.

At the Clonmines sub-site, deep drains have altered the zonation of the ASM vegetation somewhat. Spoil from the drains has been placed along the edge to form a low ridge with differently zoned vegetation. Mid upper marsh vegetation can be seen along the edges of the drains with lower zone vegetation found behind these low ridges and this is an example of reverse zonation (McCorry & Ryle, 2009).

At Bannow Island sub-site there is poor transition from the *Salicornia* sand flats to the other saltmarsh habitats. The southern part of the saltmarsh is largely dominated by low-mid and mid ASM vegetation which transitions into transitional grassland/disturbed dune grassland. Further east, the saltmarsh grades into mosaics with *Spartina* sward (McCorry & Ryle, 2009).

At the Fethard sub-site the saltmarsh is now dominated by *Spartina* swards that have nearly infilled former intertidal mudflats that were previously found in the inlet around more established saltmarsh. Also at this site, Halophilous scrub patches are distributed throughout the ASM, the *Spartina* sward and associated mosaics. There is some transition along the northern boundary of the saltmarsh habitat to a narrow zone supporting brackish vegetation dominated by sea club-rush (*Bolboschoenus maritimus*). There is also some natural transition from the saltmarsh habitats to fixed dune vegetation along the sand hills (McCorry & Ryle, 2009).

The very small saltmarsh (0.054ha) at the Grange sub-site is associated with a small sand dune system and brackish waterbody that is found at the northern tip of Grange, towards Oyster Point, however the saltmarsh at this site has been significantly reduced in extent due to erosion. The Grange sub-site is quite dynamic and there are frequent indicators that it is still changing (McCorry & Ryle, 2009).

The main saltmarsh at Gorteens is mainly a mosaic of ASM and MSM. *Spartina* swards have also developed along the seaward side of this more established saltmarsh. There is also some typical zonation of vegetation along the upper boundary of the established saltmarsh. Also at this sub-site, several small patches of *Salicornia* mudflats occur in association with a

small shingle bank in the inlet in the eastern end of the site. This habitat is also found in some tiny patches within salt pans on the seaward side of the site (McCorry & Ryle, 2009).

The saltmarsh at the Saltmills sub-site has developed in a small area partially enclosed by a shingle ridge. The saltmarsh consists of a small low-lying plain behind a glacial mound, which contains some improved grassland, transitional coastal grassland and scrub. The majority of the main saltmarsh at this sub-site is dominated by ASM with small patches of MSM scattered throughout. Within the ASM there are well-developed examples of mid marsh and mid-upper marsh vegetation (McCorry & Ryle, 2009).

The saltmarsh at the Taulaght sub-site has developed behind a shingle bank on the southern side of the inlet and a significant part of the established saltmarsh has been invaded by common cordgrass (*Spartina* species) (McCorry & Ryle, 2009). The site also supports a mosaic of saltmarsh habitats.

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

4.4.5 Vegetation structure: vegetation height

A varied vegetation structure is important for maintaining species diversity and is particularly important for invertebrates and birds. Grazing is often used as a tool for maintaining structural diversity in the sward but stocking levels need to be appropriate. Overgrazing can lead to loss of species and destruction of the vegetation cover, while undergrazing can lead to a loss of plant diversity due to competitive exclusion.

There is some natural grazing by wildfowl at Fethard, Bannow Island and Clonmines. The largest saltmarsh section at Clonmines is grazed by cattle and there is some localised overgrazing.

The target is to maintain structural variation within the sward. A general guideline is that there should be a sward ratio of 30% tall:70% short across the entire saltmarsh.

4.4.6 Vegetation structure: vegetation cover

Vegetation cover can have a major effect on saltmarsh development by reducing the velocity of the tide and thereby enhancing the deposition of sediment. Excessive bare mud, however, is often a sign of overuse by livestock or humans and can lead to destabilisation and accelerated erosion of the system.

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

4.4.7 Vegetation composition: typical species & sub-communities

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

The target for this attribute is to ensure that a typical flora of saltmarshes is maintained, as are the range of sub-communities within the different zones. Below are lists of typical species for the different saltmarsh zones, although some of these species have a restricted distribution nationally and may not occur in the Bannow Bay area.

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

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

Stands of saltmarsh vegetation dominated by either sharp rush (*Juncus acutus*) or sea rush (*Juncus maritimus*) can be classified as MSM. The saltmarsh at Grange is one of the few saltmarshes in Ireland with this rarer MSM sub-type, which is dominated by sharp rush (*Juncus acutus*) (McCorry & Ryle, 2009).

Mediterranean and thermo-Atlantic Halophilous scrubs (1420) is the rarest of the four Annex I saltmarsh habitats found in Ireland. The habitat is characterised in Ireland by the presence of perennial glasswort (*Sarcocornia perennis*). This species is a Red Data Book species (Curtis & McGough, 1988) and is listed on the Flora (Protection) Order 1999. Bannow Bay is one of only two coastal sites where perennial glasswort (*Sarcocornia perennis*) has been recorded in Ireland. The sub-sites Fethard, Bannow Island and Gorteens all support populations, although it has disappeared from Grange. This species is found in association with a range of coastal communities within the Bannow Bay SAC including, shingle, ASM, MSM and *Spartina* swards (McCorry & Ryle, 2009).

4.4.8 Vegetation structure: negative indicator species

The only invasive and non-native species recorded on saltmarshes during the SMP was common cordgrass (*Spartina anglica*). This species was recorded frequently in Bannow Bay SAC by the SMP (McCorry & Ryle, 2009).

The Saltmills and Grange sub-sites are unlike many of the other sub-sites in that *Spartina* swards were not commonly recorded (McCorry & Ryle, 2009). At other sites the *Spartina* sward covers a significant area of the total saltmarsh extent. For example, at Bannow Island *Spartina* swards cover 5.8ha of a total saltmarsh area of 7.9ha, at Fethard they cover 5.6ha of a total saltmarsh area of 10.1ha and at Gorteens they cover 2.9ha of a total saltmarsh area of 4.7ha,

While invasive common cordgrass is generally thought to out-compete most saltmarsh species in the lower marsh zone, it seems to have provided new habitat for colonisation by perennial glasswort (*Sarcocornia perennis*). This rare species was recorded in newly developed areas of *Spartina* sward/ASM mosaic, indicating it has recently colonised this habitat (McCorry & Ryle, 2009).

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

5 Sand dune habitats

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

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

- **Annual vegetation of drift lines (1210)**
- **Embryonic shifting dunes (2110)**
- **Shifting dunes along the shoreline with *Ammophila arenaria* (2120)**
- **Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130) ***
- Decalcified dunes with *Empetrum nigrum* (2140) *
- Decalcified dune heath (2150) *
- Dunes with *Salix repens* (2170)
- Humid dune slacks (2190)
- Machair (21AO) *

Five dune habitats were recorded by Ryle *et al.* (2009) but only the four habitats indicated in bold above are listed as Qualifying Interests for Bannow Bay SAC. These habitats include mobile areas at the front, as well as more stabilised parts of dune systems. Humid dune slacks were also recorded at the Grange sub-site.

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

prostrata), frosted orache (*A. laciniata*), sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*) and prickly saltwort (*Salsola kali*).

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

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

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

All the dune habitats indicated above occur as a complex mosaic of constantly changing and evolving vegetation communities. They are inextricably linked in terms of their ecological functioning and should be regarded as single geomorphological units. As such, no dune habitat should be considered in isolation from the other dune habitats present at a site, or the adjoining semi-natural habitats with which they often form important transitional communities. Detailed descriptions from the Coastal Monitoring Project (CMP) (Ryle *et al.*, 2009) of each sand dune habitat found at Grange and Bannow Island are presented in Appendices X & XI.

The CMP surveyed two sub-sites within Bannow Bay SAC. See Appendix II for map:

1. Bannow Island (Appendix X)
2. Grange (Appendix XI)

Bannow Island lies at the mouth of the large south-facing estuary of Bannow Bay on its Eastern flank. The other sub-site Grange lies on the opposite side of the the bay.

5.1 Overall objectives

The overall objective for 'Annual vegetation of drift lines' in Bannow Bay SAC is to 'maintain the favourable conservation condition'.

The overall objective for 'Embryonic shifting dunes' in Bannow Bay SAC is to 'restore the favourable conservation condition'.

The overall objective for 'Shifting dunes along the shoreline with *Ammophila arenaria*' in Bannow Bay SAC is to 'restore the favourable conservation condition'.

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

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

5.2 Area

5.2.1 Habitat extent

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

The beach at Bannow Island is relatively sheltered, and has undergone less erosion than might be expected at the mouth of a bay or estuary. The area occupied by coastal habitats at Grange however, is in decline owing to the severity of natural erosion. A comparison of the CMP habitat map with the 2000 series aerial photographs reveals that at its widest point near the northern part of the site, the system has undergone over 180m of erosion. The level of erosion is indicated by the solitary remnant tussocks of dead Sharp Rush (*Juncus acutus*) now standing at the front of the dune system (Ryle *et al.*, 2009).

The embryo dunes at the Grange sub-site have both eroding and accreting zones. The majority of embryonic dunes have been decimated at the northern end of the sub-site, while accretion was noted at the north-western corner and at the southern end of the sub-site where a wide embryonic dune, nearly 30m at its widest point occurs (Ryle *et al.*, 2009).

The Shifting dunes at the Grange sub-site have undergone significant erosion. Though despite the erosion, sand is accumulating in places. The front of the dune face at Bannow Island sub-site is being regularly reworked, as a result only a narrow band of shifting dunes were recorded in front of fixed dune habitat (Ryle *et al.*, 2009)

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

Habitat	Total area (ha) of habitat from CMP	Total area (ha) of habitat within SAC boundary
Annual vegetation of driftlines	0.103	0.025
Embryonic shifting dunes	1.439	1.365
Shifting dunes along the shoreline with <i>Ammophila arenaria</i>	0.754	0.655
Fixed coastal dunes with herbaceous vegetation	4.081	4.053
Total	6.377	6.099

The general target for this attribute in the case of each habitat is that the area should be stable, or increasing. However, in the case of ‘embryonic dunes’ and ‘shifting dunes along the shoreline with *Ammophila arenaria*’ losses were reported during the baseline survey (Ryle *et al.*, 2009). Therefore, the target for these two habitats is that they should be increasing. Bearing in mind that coastal systems are naturally dynamic and subject to change, this target is always assessed subject to natural processes, including erosion and succession.

5.3 Range

5.3.1 Habitat distribution

There are two areas of sand dune, at Bannow Island and Grange, which lie on opposite sides of the mouth of the estuary.

The strandline, embryo dune, mobile dune and fixed dune, were recorded at Grange. These habitats with the exception of Embryo dunes were also recorded at Bannow Island. The distribution of sand dune habitats as mapped by Ryle *et al.* (2009) is presented in Appendix II.

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

5.4 Structure and Functions

The location, character and dynamic behaviour of sand dunes are governed by a combination of geographic, climatic, edaphic and anthropogenic factors. Sand dunes are highly complex, dynamic systems, where the habitats occur in a complex and constantly evolving and changing mosaic. They function as systems in terms of geomorphology and hydrology and maintaining the favourable conservation condition of the habitats present depends on allowing these processes to continue unhindered. Maintaining the favourable conservation condition of all of the sand dune habitats in Bannow Bay SAC in terms of structure and functions depends on a range of attributes for which targets have been set as outlined below.

5.4.1 Physical structure: functionality and sediment supply

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

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

The target for this attribute is to maintain the natural circulation of sediment and organic matter throughout the entire dune system, without any physical obstructions.

5.4.2 Vegetation structure: zonation

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

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

5.4.3 Vegetation structure: bare ground

This target only applies to fixed dunes. It does not apply to the other habitats present where high levels of bare sand are a natural component of the habitat. In the fixed and slack areas some degree of instability is vital. Constant cycles of erosion and stabilisation provide the necessary conditions for the establishment of pioneer species and species that favour open conditions including invertebrates, helping to increase biodiversity.

The target is to achieve up to 10% bare sand. This target is assessed subject to natural processes.

5.4.4 Vegetation structure: vegetation height

This attribute applies to the fixed dunes, where a varied vegetation structure is important for maintaining species diversity and is particularly important for invertebrates and birds. The ecological benefits of moderate levels of grazing on dunes have been well documented (Gaynor, 2008). Moderate grazing regimes lead to the development of a species-rich vegetation cover. The animals increase biodiversity by creating micro-habitats through their grazing, dunging and trampling activities. Grazing slows down successional processes and in some cases reverses them, helping to achieve a diverse and dynamic landscape. The effects of trampling assist the internal movement of sand through the development of small-scale blowouts, while dunging can eutrophicate those dune habitats whose nutrient-poor status is crucial for the survival of certain vegetation types. Many species, from plants to invertebrates, benefit immensely from the open and diverse system created by a sustainable grazing regime. Many dune species are small in size and have relatively low competitive ability.

Consequently, the maintenance of high species diversity on a dune system is dependent on the existence of some control to limit the growth of rank coarse vegetation (Gaynor, 2008).

Grazing is absent from both CMP surveyed subsites in Bannow Bay (Ryle *et al.*, 2009) and as a result the dunes are becoming rank and failing to meet their targets under Structure & Functions.

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

5.4.5 Vegetation composition: plant health of dune grasses

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

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

5.4.6 Vegetation composition: typical species & sub-communities

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

The Grange and Bannow Island sub-sites support a characteristic dune flora, details of which can be found in the site report from the CMP (Ryle *et al.*, 2009) which is included in Appendix X and XI. Rare elements of the site flora include wild asparagus (*Asparagus officinalis* var. *prostratus*), a Red Data Book species which had been previously recorded at the site but not noted by the CMP survey (Ryle *et al.*, 2009).

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

5.4.7 Vegetation composition: negative indicator species

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

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

Bracken (*Pteridium aquilinum*) was recorded at Grange sub-site and is spreading at the rear of the dune system (Ryle *et al.*, 2009). No buckthorn (*Hippophae*) was recorded on the dunes by the CMP, although it has been recorded in the area (Preston *et al.*, 2002)

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

5.4.8 Vegetation composition: scrub/trees

This attribute only applies to the fixed dunes. Scrub encroachment leads to reduction in dune biodiversity and needs to be controlled. The presence of scrub and trees which have deep roots can also lower the groundwater table which can have significant impacts on the slack communities.

At the Grange sub-site, a narrow band of blackthorn (*Prunus spinosa*) scrub separates the fixed dunes from adjacent agricultural land. While at Bannow Island sub-site, shrub-dominated vegetation is a feature of the fixed dunes. At this site, a derelict cottage with a heavily overgrown garden is the source of many of the individual shrubs (Ryle *et al.* 2009).

The target for this attribute therefore is that the cover of scrub and tree species should be under control or represent no more than 5% of the vegetation cover.

6 References

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

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

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

Goodwillie, R. (1979). *A preliminary report on Areas of Scientific interest in County Wexford*. An unpublished report for An Foras Forbatha.

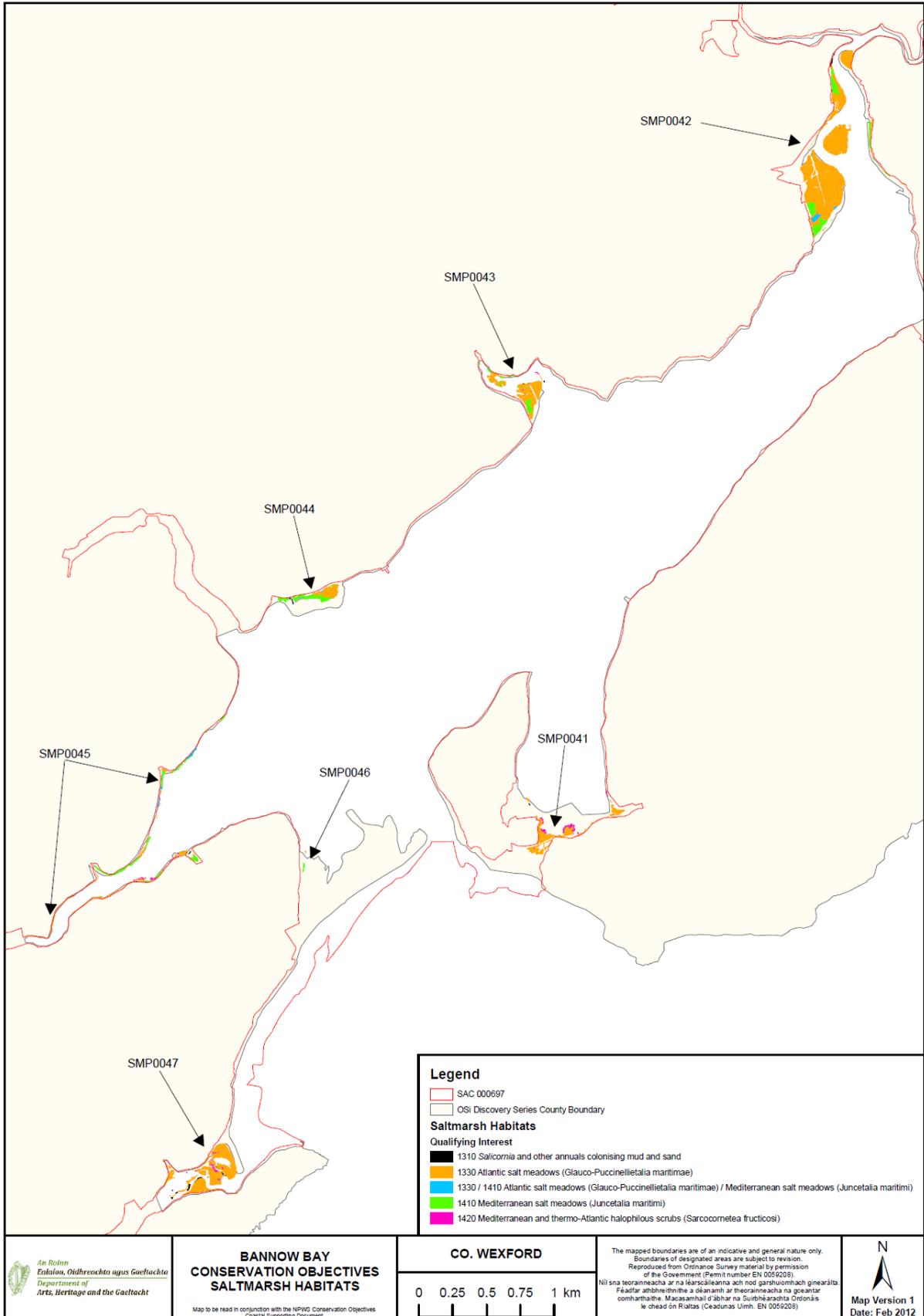
McCorry, M. & Ryle, T. (2009). *Saltmarsh Monitoring Project 2007-2008*. Unpublished report to the National Parks and Wildlife Service, Dublin.

Moore D. & Wilson, F. (1999) *National Shingle Beach Survey of Ireland 1999*. Unpublished report to NPWS, Dublin.

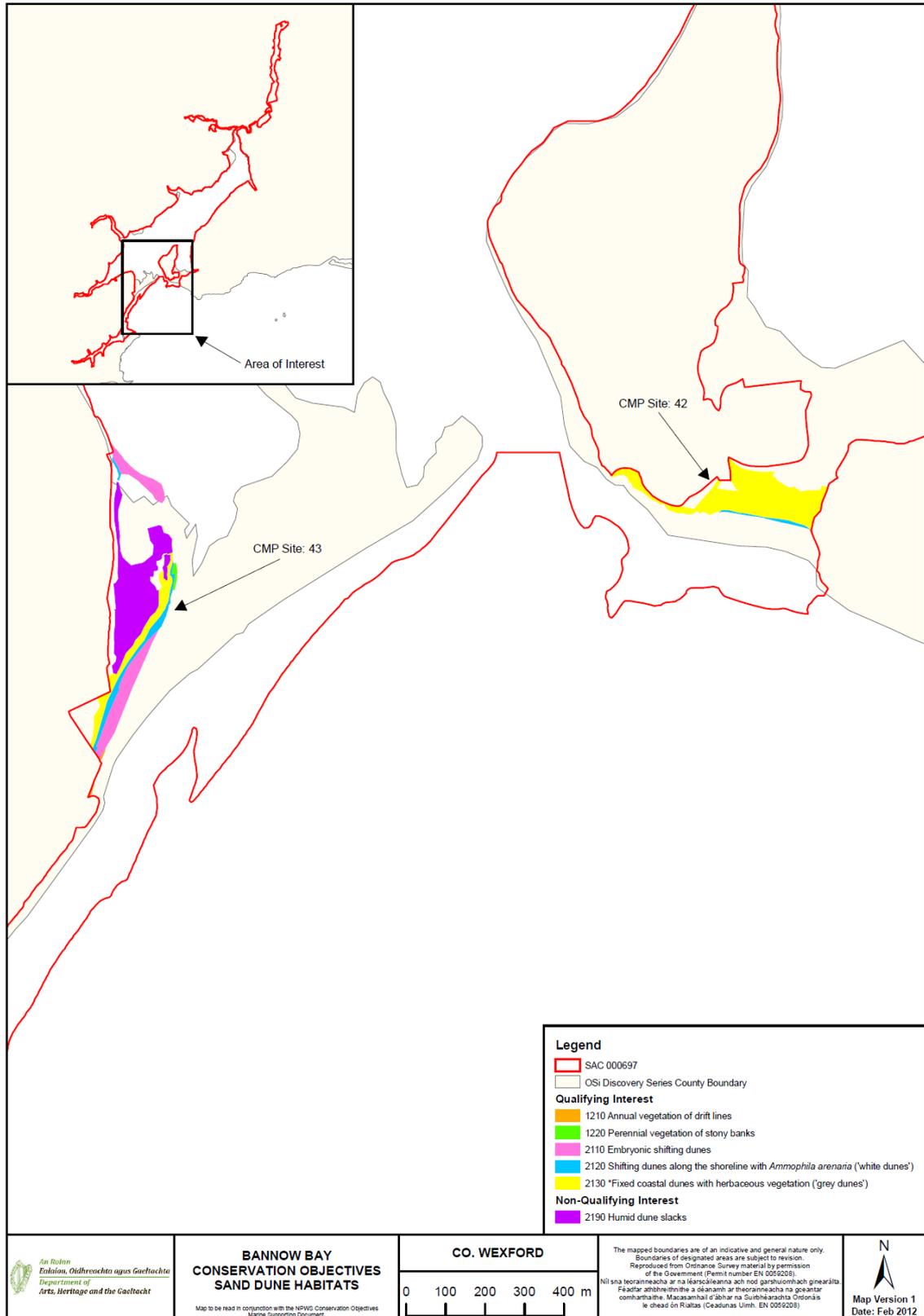
Preston, C.D., Pearman, D.A. and Dinesw, T.D. (2002). *New Atlas of the British and Irish Flora*. Oxford University Press, Oxford.

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

Appendix I – Saltmarsh habitats distribution map within Bannow Bay SAC.



Appendix II – Sand dune habitats distribution map within Bannow Bay SAC



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

1 SITE DETAILS

SMP site name: Bannow Island	SMP site code: SMP0041
Dates of site visit : 30/08/2007 & 21/02/2008	CMP site code: 042
SM inventory site name: Bannow Island	SM inventory site code: 220
NPWS Site Name: Bannow Bay	
NPWS designation cSAC: 697	MPSU Plan: Old Format – Draft 2 Consultation, 2001
pNHA: 697	SPA: 4033
County: Wexford	Discovery Map: 76 Grid Ref: 282500, 107700
Aerial photos (2000 series): O 5778-A, B, C, D	6 inch Map No: Wx 45
Annex I habitats currently listed as qualifying interests for Bannow Bay cSAC:	
H1310 Salicornia and other annuals colonizing mud and sand	
H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	
H1410 Mediterranean salt meadows (Juncetalia maritimi)	
H1420 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticos)	
Other SMP sites within this SAC/NHA: Clonmines, Fethard, Gorteens, Grange, Saltmills, Taulaght	
Saltmarsh type: Sandflats	Substrate type: Mud/Sand

2 SITE DESCRIPTION

Bannow Island saltmarsh is located along the southern coast of Co. Wexford in Bannow Bay. This bay is a fairly large estuarine site which empties at low tide to expose extensive intertidal flats. The bay is sheltered somewhat by a narrow connection to the sea. Saltmarsh has developed around the bay at several locations where conditions allow. Bannow Island is a moderately sized saltmarsh that is located in the south-east corner of the bay, near the mouth of the bay. Bannow Island refers to a small raised area of land that is connected to the rest of the shoreline by a narrow low-lying spit with a small sand dune system. This area was surveyed as part of the Coastal Monitoring Project in 2004 (Ryle *et al.*, 2009). Access to the site is via a small local road that leads directly onto Bannow Island itself. The surrounding landscape is low-lying with moderate-gentle slopes to the Bannow Bay shoreline, particularly on the east side. This isolated rural area is largely surrounding by agricultural land, much of it given over to pasture and tillage. There are scattered dwellings along the minor roads through this area.

The saltmarsh has developed in the low-lying sheltered area of Bannow Bay between Bannow Island and the eastern side of the bay. Most of the established saltmarsh is found behind the small sand dune system in the low-lying area between the island and the adjacent

mainland. The access road to Bannow Island is built on an embankment across this area and forms a barrier between this saltmarsh and the adjacent *Spartina* sward on the northern side of the causeway. *Spartina* swards have infilled an extensive area of intertidal mudflats adjacent to this saltmarsh and along the shoreline to the eastern side of the bay.

Bannow Island saltmarsh is one of 7 separate saltmarshes that are included within the Bannow Bay candidate Special Area of Conservation (cSAC 696). The cSAC takes in all of Bannow Bay and some land on the shoreline and extends down the coastline to Fethard. The main habitats within the cSAC are the extensive intertidal mudflats, which also support notable populations of wintering waders and wildfowl. Other notable coastal habitats found within the cSAC include the sand dune complexes at Bannow Island and Big Burrow on either side of the entrance to the bay. Three Annex I saltmarsh habitats were recorded at this site including *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Both habitats are listed as qualifying interests for this site. *Spartina* swards are also found within the saltmarsh at this site, although this habitat is not now considered to qualify as an Annex I habitat.

Bannow Bay is one of two coastal sites where Perennial Glasswort (*Sarcocornia perennis*) has been recorded in Ireland (the other being Ballyteige Burrow further east along the shoreline in Co. Wexford). Mediterranean and thermo-Atlantic Halophilous scrubs (1420) (from here known as Halophilous scrubs) are the rarest of the four Annex I saltmarsh habitats found in Ireland. This habitat is characterized in Ireland by the presence of Perennial Glasswort on saltmarsh. This species is very rare in Ireland and is listed as a Red Data Book species (Curtis and McGough 1988) and is also listed on the Flora Protection Order. This species has been recorded from this saltmarsh in the past (NPWS Rare Plant Survey) where one individual plant was noted in the saltmarsh south of the causeway.

The majority of the saltmarsh habitat is found within the digital cSAC boundary. A minor area of saltmarsh habitat is excluded around the shoreline and this is related to small differences between the old OSI 2nd edition 6 inch map and the current 2005 aerial photo series. Saltmarsh extends beyond the upper boundary as indicated by the old OSI 6 inch map in places.

3 SALTMARSH HABITATS

3.1 General description

There are two main areas of saltmarsh at Bannow Island. The first has developed along the back of a disturbed sand dune system and is nestled along the southern side of the road connecting Bannow Island to the mainland. This area is dominated by Atlantic salt meadows (ASM) and contains two shallow lagoons or large pools (Table 3.1). Two individuals of Perennial Glasswort were recorded in this area. There is a landward transition to disturbed fixed dune grassland. There is a single clump of Sharp Rush (*Juncus acutus*) in this area that

is located on the dune grassland above the upper saltmarsh boundary. This marsh is connected to the bay by means of two drainage pipes under the road embankment, which lead out onto the second and more extensive block of saltmarsh.

Much more extensive saltmarsh is found on the northern side of the minor road. The old OSI 2nd edition 6 inch map does not show any saltmarsh development in this area, so this saltmarsh has only developed quite recently. This area is dominated by extensive dense *Spartina* swards. ASM dominates two smaller areas on the northern side of the road. The ASM also forms a narrow band around the shoreline along the landward side of the *Spartina* sward. There is some development of ASM/*Spartina* ward mosaic in the transition zone between these two habitats. Small newly discovered patches of Perennial Glasswort are scattered through this area, particularly in the lower ASM transition zone with *Spartina* sward. These are mapped as Halophilous scrubs (1420). There are some further landward transitions around the shoreline to brackish habitats dominated by 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 small inlet at the east side of the site that contains more extensive brackish marsh. Attempts were made in the past to reclaim this area with a sea wall. This area now contains extensive ASM/*Spartina* sward mosaic and patches of brackish marsh dominated by Common Reed.

There is also a large area located at the west side of the site along the Bannow Island shoreline. A large area has been reclaimed in the past behind a tall embankment that extends from a small mound called Clare Island. A substantial area of former saltmarsh at this site may have been reclaimed. There is still some tidal influence on this area behind the embankment, perhaps due to a valve that has been stuck in an open position. There is a large intertidal pool at the northern end that is fringed by extensive marginal Sea Club-rush prominent. Common Cordgrass is also present in this area. Some Sea Rush (*Juncus maritimus*) is present. Some small patches along drains through this area are typical of ASM and are dominated by Creeping Bent (*Agrostis stolonifera*). However there are also transitional species present like Marsh Ragwort (*Senecio aquaticus*) and Yellow Flag (*Iris pseudacorus*). Some of the vegetation could be classified as Mediterranean salt meadows where Sea Rush is prominent. Several clumps of Sharp Rush (*Juncus acutus*) are also scattered through this area. This area was not surveyed in detail due to the presence of livestock and was mapped in general a brackish marsh (CM2) due to the dominance of Sea Club-rush around the small lagoon.

Table 3.1. Area of saltmarsh habitats mapped at Bannow Island.

EU Code	Habitat	Area (ha)
1310	<i>Salicornia</i> and other annuals colonizing mud and sand (1310)	0.002
1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>)	1.981
1420	Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)	0.166
non-Annex	<i>Spartina</i> swards	5.789
	Total	7.938

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

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

This habitat is not well represented at Bannow Island and there is very little development of *Salicornia* habitat on the intertidal mudflats. The species is occasionally noted in very small patches, but the habitat is only identified from one location along the embankment on mud behind the *Spartina* sward. This patch of habitat was characterised by a scattered individuals of Glasswort (*Salicornia* sp.) in isolation of other saltmarsh species. There is no transition from *Salicornia* flats to ASM along the embankment and the *Salicornia* flats are found in isolation of the other saltmarsh habitats.

3.3 Atlantic salt meadows (H1330)

This habitat is moderately well-developed at this site. The southern, and more sheltered part of the saltmarsh is largely dominated by low-mid and mid ASM vegetation which transitions into transitional grassland/disturbed dune grassland. There are well developed examples of mid marsh sward dominated by Sea Pink (*Armeria maritima*) and Sea Plantain (*Plantago maritima*). Other species present include Lax-flowered Sea Lavender (*Limonium humile*), Sea Aster (*Aster tripolium*), Common Scurvy-grass (*Cochlearia officinalis*) and Greater Sea-spurrey (*Spergularia media*). Sea Purslane is also present but is rare in this area. Lower lying depressions and channels in this area also contain lower marsh vegetation with more frequent Common Saltmarsh-grass (*Puccinellia maritima*) and also containing Glasswort.

The saltmarsh structure is moderately developed and there are a series of moderately sized salt pans in this area. Common Cordgrass is present south of the road but is rare and the overall cover is less than 1%. The tidal regime in this area has been created by the construction of the causeway and the narrow drains, which slow the inflow and outflow to this section. This area has a variable sward height depending on the community type and is not grazed.

The mid-upper marsh vegetation is characterised by increased cover of Red Fescue (*Festuca rubra*). Due to the gentle gradients across the saltmarsh there are some subtle transitions from the mid marsh to mid-upper marsh. This type of vegetation is also found on some low-lying man-made ridges across the marsh where material from drains was deposited. There

are some indicators of transitional grassland on these ridges with the appearance of species like Birdsfoot (*Lotus corniculatus*).

ASM on the northern side of the road-bridge is somewhat different in character. This saltmarsh has the appearance of being recently developed and saltmarsh communities have not stabilised yet. A large area is dominated by a rank sward of Common Saltmarsh-grass with a low diversity. Other species present in this low zone include Sea Aster and Sea Plantain. There is some zonation within the ASM to low-mid marsh further east with more frequent Sea Plantain, Sea Aster and Sea Pink. The saltmarsh structure in this area is poorly developed.

Further examples of pure-ASM are found along the upper stretches of the marsh further east. There are occasional clumps of Sea Rush scattered throughout the saltmarsh. It is however very limited in its distribution and is often only defined by the presence of this one species along with ASM species. For this reason, MSM is not recognised from Bannow Island.

Most of the ASM type vegetation in this area grades into mosaic with *Spartina* sward and has been mapped as such.

3.4 Mediterranean and thermo-Atlantic Halophilous scrubs (*Sarcocornetea fruticosi*) (H1420)

This habitat has been characterised based on the presence of Perennial Glasswort in other saltmarsh vegetation that would mainly be characterised as *Spartina* sward or ASM/*Spartina* sward mosaic in the absence of this species. The species has previously been noted from Bannow Island on the southern part of the saltmarsh in the ASM. Several new records were located in the summer of 2007 in the northern section and the site was revisited in February 2008 with a view to identifying as many records both old and new as possible. Many of these plants are quite stringy and small, indicating that they may be relatively young compared to larger clones of over 1 m in diameter that were found at other sites. This habitat is scattered over a wide area and is probably somewhat under-recorded. More time would be required to survey the marsh in detail for this species, which can be quite elusive in the *Spartina* sward.

Perennial Glasswort is associated with abundant cover of Common Cordgrass and less frequent Common Saltmarsh-grass, Sea Aster, Lax-flowered Sea Lavender, Greater Sea-spurrey and Annual Sea-blite in the transition zone between the *Spartina* sward and the ASM. It grows around the base of the Common Cordgrass plants.

3.5 *Spartina* swards

By far the largest part of saltmarsh vegetation at Bannow Island is occupied by Common Cordgrass (*Spartina anglica*). It only occurs on the former mudflats and is not recorded from the smaller section of saltmarsh associated with the small sand-dune system. At the seaward edge of the mudflats, isolated clumps of Common Cordgrass occur some distance out into the bay and are mapped as isolated clumps on mud. There are numerous newly-formed small

clumps and seedlings present in this zone indicating that *Spartina* sward is likely to spread further seaward at this site. Much of the mud is unconsolidated and treacherous underfoot.

This *Spartina* sward has developed on very gently sloping intertidal mudflats, so there is well-developed transition between the sward and adjacent ASM along the north side of the road. This zone is characterised by frequent Common Saltmarsh-grass within the *Spartina* sward. There are also smaller amounts of Greater Sea-spurrey and Sea Purslane in this zone.

4 IMPACTS AND ACTIVITIES

There are relatively few damaging impacts and activities at Bannow Island (Table 4.1). The main impact is the presence of Common Cordgrass, an invasive species (954). Grazing (140) is not a significant impact at this site. Most of the saltmarsh is not grazed by livestock but there may be some natural grazing. The level of grazing by wintering wildfowl was not considerable and the sward was quite rank north of the road.

There are several tracks (501) across the marsh adjacent to the dunes where the saltmarsh is used for car-parking. The damage is minimal as is mainly concentrated to vehicle ruts.

There is a significant area of *Spartina* sward at this site and its area is approximately 3 times that of the ASM. Common Cordgrass is an invasive species of saltmarsh (954). The presence of seedlings at the seaward side of the *Spartina* sward would suggest that it is still expanding over the intertidal mudflats. The ASM marsh that is located south of the road contains very little Common Cordgrass. This area is not likely to be vulnerable to the spread of Common Cordgrass, probably because of the one-way culvert that drains the marsh on this side of the road and forms a partial barrier to this species

Nairn (1986) notes that *Spartina* was recorded in Bannow Bay in 1960's, but there is no information to indicate whether it was planted or naturally colonised the site, and for how long it had been present at the site. There is no documented information as to the presence of Common Cordgrass in Bannow Bay, but it is likely to have colonised between 1930 and 1960. There is no information to indicate that the *Spartina* sward has spread significantly at the expense of ASM at this site within the current monitoring period as no ASM was mapped here in the past. The spread of Common Cordgrass may have actually promoted the expansion of ASM due to natural succession (990) and for this reason the impact of invasive species is assessed as neutral. The Perennial Glasswort appears to prefer the transitional zone between *Spartina* sward and the ASM/*Spartina* mosaic, north of the road and co-exists happily with Common Cordgrass. For this reason the impact of the presence of Common Cordgrass on the Perennial Glasswort is assessed as neutral.

Common Cordgrass may colonise into the ASM north of the road in the future. Much of this ASM is dominated by low marsh sward that is likely to be vulnerable to colonisation by this species. It is unusual to see a sward dominated by Common Saltmarsh-grass adjacent to *Spartina* sward as Common Cordgrass is usually more competitive in both communities.

However, there seems to be a distinctive increase in abundance of Common Cordgrass along the gradual seaward gradients on this site so ecological factors may be preventing the spread of this species further landward. This is one indication of the relatively young age and under-development of this saltmarsh.

Erosion (900) is not a significant impact at this site. In fact the upgrading of the track (which was likely inundated at some high tides with a minor embanked road, may have enhanced accretion (910) and the establishment of new saltmarsh in the area north of the road. Much of the current saltmarsh seems to have developed within the past few decades, as a result of changing of infilling mud within this sheltered corner of Bannow Bay. Accretion is assessed as having a positive impact on the ASM north of the road. Continued accretion may lead to further expansion of ASM and *Spartina* sward at this site in the future.

A comparison of the OSI 2nd edition 6 inch map with the year 2000 series aerial ortho-photographs shows that the saltmarsh has expanded considerably in this area during this period and no saltmarsh was mapped in this area on the OSI 2nd edition 6 inch map. It is difficult to determine whether the ASM saltmarsh (north of the road) developed prior to the colonisation of this area by Common Cordgrass. There is likely to have been some development of ASM when the causeway was built and there may have been further expansions after colonisation by Common Cordgrass.

A large area within the intertidal zone adjacent to Bannow Island was reclaimed behind a seawall during the 19th century. This area is likely to have contained some established saltmarsh but has been partially drained and improved. As this reclamation occurred outside the current monitoring period, this impact is not assessed.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	954	C	0	0.002	Inside
1330	501	C	-1	0.005	Inside
1330	910	C	0	1.3	Inside
1330	954	B	0	1.2	Inside
1330	990	C	+1	1.2	Inside
1420	910	C	0	0.166	Inside
1420	954	C	0	0.166	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 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. Previous assessments have concentrated on the entire cSAC. As a result of this, there is very little detailed information with which to compare and quantify the findings. There is some more detailed baseline data available from the Rare Plant Survey. It is worth remembering that several separate saltmarshes are found within the Bannow Bay cSAC.

Overall this site has an *unfavourable-inadequate* conservation status (Table 5.1). Most of the saltmarsh is in good condition but the small area of *Salicornia* flats is vulnerable to colonisation by Common Cordgrass in the future. There are few activities impacting on this site at present, other than changing tidal/sedimentation patterns which are considered to be beneficial, as this could lead to the apparent increase in the marsh on consolidated substrate at the back of older *Spartina* sward due to natural succession.

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

Habitat	EU Conservation Status Assessment			Overall EU conservation status assessment
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	
<i>Salicornia</i> flats (1310)	Extent Structure and functions	Future prospects		Unfavourable - Inadequate
Atlantic salt meadows (1330)	Extent Structure and functions Future prospects			Favourable
Mediterranean and thermo-Atlantic halophilous scrubs (1420)	Extent Structure and functions, Future prospects			Favourable

Bannow Island saltmarsh has several features of notable conservation interest, particularly the presence of a healthy population of Perennial Glasswort. Much of the saltmarsh is only recently developed in the past 100 years and several Annex I habitats are present. There are no significantly damaging activities affecting the site. Extensive *Spartina* sward has developed at this site, although there are no indications that it has developed as the expense

of other saltmarsh habitats. Perennial Glasswort seems to co-exist happily with Common Cordgrass and actually prefers the transition zone between ASM and *Spartina* sward. *Spartina* swards are likely to continue to spread at this site at the expense in intertidal mudflats, another Annex I habitat not assessed by this survey.

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

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

5.2.1 *Extent*

The extent of the habitat is assessed as *favourable*. Previous information as to the abundance and distribution of this habitat is scant. It could be reasonable to assume that this habitat was more extensive in the past, particularly along the embankment on the west side of the site. However, this was never documented. Although the habitat is not extensive, 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.

5.2.2 *Habitat structure and functions*

Monitoring stops were not carried out in the *Salicornia* habitat owing to its limited distribution and extent of this habitat. However, a visual assessment of the vegetation suggests that the structure and functions of the habitat are rated as *favourable*. The habitat forms part of the pioneer zone along the edge of the embankment. Common Cordgrass is not found in this habitat but is found adjacent to it. Smaller patches are also found along the edges of the small creeks and channels in the saltmarsh.

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. This habitat is not being affected by any damaging activities at present but may be vulnerable to further colonisation by Common Cordgrass in the future, particularly as the patches of habitat are quite small.

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 ASM at this site during the current monitoring period due to erosion, the spread of Common Cordgrass or land-use changes. Some saltmarsh was reclaimed behind an embankment during the 19th century but this reclamation is not assessed.

Earlier OSI maps give no indication that any saltmarsh existed north of the road, as this area was mapped as mud and sandflats. It would appear that the development of this saltmarsh may in part, be due to the construction of the causeway joining Bannow Island to the mainland. Another factor which may have had some influence but which there is no quantifiable evidence is the changing sediment deposition pattern around the mouth of Bannow Bay itself. There is anecdotal evidence that for many years, locals removed much of the shingle deposits from a number of locations around Bannow Bay for construction purposes. despite natural cyclical changes which might be expected in a mouth of any tidal bay, it has been suggested that the sediment deposition patterns within the bay have been so altered that in places the Bay is infilling. This would appear to be the situation at Bannow Island, where the spread of Common Cordgrass has initiated the consolidation of muddy substrates allowing the continued development of ASM.

5.3.2 Habitat structure and functions

The habitat structure and functions of this habitat are assessed as *favourable*. Eight monitoring stops were carried in this habitat; four on the small sheltered area of established saltmarsh, and another four were taken on the younger marsh which lies north of the road. All stops passed and all attributes for habitat structure and functions reached their targets.

The saltmarsh is generally in good condition. The marsh on the southern side of the road contains typical examples of mid and upper vegetation communities and the saltmarsh structure is well-developed. The marsh is not grazed and there are few other significantly damaging activities. There have been some modifications in this area to the structure in the past. Common Cordgrass is not found in this area.

The ASM north of the road is also in good condition. This ASM is also found in a large unit with extensive *Spartina* sward and ASM/*Spartina* sward mosaic. The ASM has the appearance of being relatively young and undeveloped. Common Cordgrass is a prominent part of some of the ASM vegetation (the mosaic areas) but there is no indication that it has spread significantly during the current monitoring period. For this reason, the impact of its spread on species composition is assessed as neutral, mainly due to the lack of accurate baseline data.

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 accretion continue in the near future. There are few damaging activities damaging this site. There would appear to be little change in the saltmarsh on the southern side of the road, whilst the marsh to the north of the causeway would appear to be still developing as the substrate becomes consolidated. Continued accretion may lead to continued expansion of ASM at this site where there is natural succession from *Spartina* swards at their upper boundary.

5.4 Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) (H1420)

5.4.1 Extent

The extent of this habitat is assessed as *favourable*. Although the presence of this habitat has been recognised in the overall cSAC, it has not previously been mapped. The habitat has been mapped based on the occurrence of Perennial Glasswort. Indeed, its presence is more widespread than indicated by the NPWS Rare Plant Survey. And while an estimated 100 plants were recorded, it is likely that it was under-recorded owing to the density of the *Spartina* sward.

5.4.2 Habitat structure and functions

The habitat structure and functions are assessed as *favourable*. The target criteria for this habitat are based upon that used for ASM. Four monitoring stops were carried out in this habitat, all of which passed. The saltmarsh where this species is found is not being affected by any damaging activities.

Perennial Glasswort is thriving in the transition zone between the *Spartina* sward and ASM and over 100 individual plants were recorded. Given the dwarfed nature of the plant, it is likely that further searching would increase this number. Of the plants that were recorded, there was considerable diversity in the size and age of the plants seen. Some plants were greater than 1 metre in diameter, while many of the smaller clumps ranged in diameter from 5 cm to 30 cm. The fact that they are found in the *Spartina* sward, which is only developed in the past 50 years, indicates that it is reproducing. This would indicate healthy population dynamics and thus warrants a *favourable* structure and functions assessment.

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 the impact of Common Cordgrass continue in the near future. Perennial Glasswort seems to co-exist happily with Common Cordgrass at this site and at others in Bannow Bay, so this invasive species is not seen as a threat. As the *Spartina* sward extends seaward, there is potential for the spread of Perennial Glasswort onto newly forming transition marsh.

6 MANAGEMENT RECOMMENDATIONS

Given the relative isolated nature of this marsh, no active management of saltmarsh habitats is required at this site. Regular monitoring, however, of the site is recommended in light of the fact that the marsh is seemingly expanding due to the colonisation of the mudflats by Common Cordgrass.

There is potential at this site for managed retreat in the area at the west side of the site that is enclosed by the seawall. This area contains brackish marsh and informed grassland.

Managed retreat would create newly developed saltmarsh habitat and would also provide new habitat for possible colonisation by Perennial Glasswort. This could aid the future prospects of this species and the extent and distribution of Halophilous scrubs (1420) in Bannow Bay.

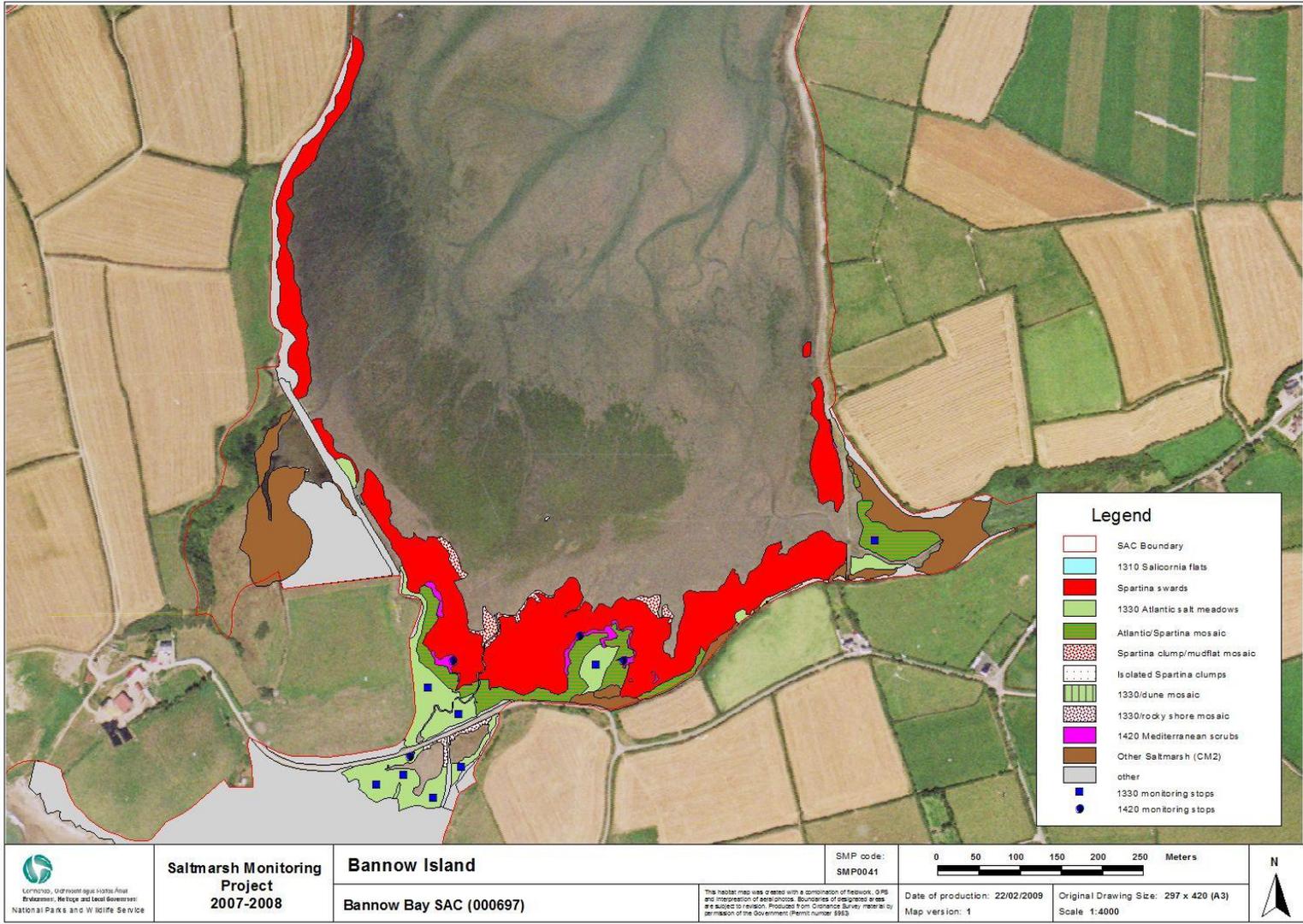
7 REFERENCES

- 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 saltmarshes of Ireland: An inventory and account of their geographical variation. *Biology and Environment: Proceedings of the Royal Irish Academy* **98B**, 87-104.
- Dubsky, K. (2006). *Unpublished correspondence concerning the distribution of Sarcocornia perennis*. National Parks and Wildlife Service, Dublin.
- MPSU (2001). *Draft 2 Conservation Plan and aquaculture zoning for Bannow Bay cSAC 697 and SPA 33*. National Parks and Wildlife Service, Dublin.
- Nairn, R.G.W. (1986). *Spartina anglica* in Ireland and its potential impact on wildfowl and waders - a review. *Irish Birds*, **3**, 215-258.
- Rare Plant Survey (1990). Series of NPWS surveys 1990-1994 of rare plant sites. Information held by NPWS.
- 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 <i>Salicornia</i> flats	0.002	0.002				
2	Spartina swards	5.116					5.116
3	1330 Atlantic salt meadow	1.379		1.379			
4	1410 Mediterranean salt meadow						
5	ASM/MSM mosaic (50/50)						
6	ASM/ <i>Spartina</i> mosaic	1.139		0.569			0.569
7	1330/other SM (CM2) mosaic						
8	1330/coastal grsld mosaic						
9	Other (non saltmarsh)	5.972					
10	<i>Spartina</i> clump/mudflat mosaic (50/50)	0.208					0.104
11	Isolated <i>Spartina</i> clumps on mud (5%)	0.001					0.00005
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	<i>Spartina</i> sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some <i>Spartina</i>						
17	1330/sand dune mosaic	0.007		0.003			
18	Other SM (CM2)	1.896					
19	1330/rocky shore mosaic	0.058		0.029			
20	1420 Mediterranean scrub	0.166				0.166	
21	1310/1330 mosaic						
	Total	15.94	.002	1.98		0.166	5.79



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

SITE DETAILS

SMP site name: Clonmines	SMP site code: 0042
Dates of site visit: 30 & 31/08/2007	CMP site code: N/A
SM inventory site name: Clonmines	SM inventory site code: 219
NPWS Site Name: Bannow Bay	
NPWS designation cSAC: 697	MPSU Plan: Old format plan
pNHA: 697	SPA: 4033
County: Wexford	Discovery Map: 76 Grid Ref: 284700, 112650
Aerial photos (2000 series): O 5638-A,C; O 5708-A	6 inch Map No: Wx 040, 045
Annex I habitats currently listed as qualifying interests for Bannow Bay cSAC:	
H1310	<i>Salicornia</i> and other annuals colonizing mud and sand
H1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)
H1410	Mediterranean salt meadows (<i>Juncetalia maritimi</i>)
H1420	Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)
Other SMP sites within this SAC/NHA: Bannow Island, Fethard, Gorteens, Grange, Saltmills, Taulaght	
Saltmarsh type: Estuary	Substrate type: Mud

SITE DESCRIPTION

Clonmines saltmarsh is located along the southern coast of Co. Wexford in Bannow Bay. This bay is a fairly large estuarine site that empties at low tide to expose extensive intertidal flats. The bay is sheltered somewhat by a narrow connection to the sea. Saltmarsh has developed around the bay at several locations where conditions allow. Clonmines is located at the northern end of the bay within 1 km of small village of Wellingtonbridge. This part of the bay is narrower where the Owenduff River and Corook River enters the bay. The surrounding landscape on the east side of the channel is low-lying and there are berms along the channel that protect adjacent low-lying land including improved grassland and wet grassland from flooding. There are moderate slopes to the shoreline on the western side and the adjacent land is dominated by farmland. The southern section is quite isolated and there is no simple access to the shoreline apart from crossing adjacent land. The main channel narrows in the northern section and then splits where the two river channels connect. This area is low-lying and there are berms along both river channels.

The saltmarsh at this site is quite fragmented and there are several large patches scattered along the shoreline in low-lying intertidal areas, mainly on the western side of the channel.

The saltmarsh has developed where mud has accreted in the quiet zones of the main undulating channel flowing through this area. The largest section has developed in a sheltered area behind a shingle ridge. There are extensive intertidal mudflats in the channel adjacent to the saltmarsh that are exposed at low tide. One section forms an 'island' in the middle of the main channel and there is intertidal mud on both sides. Attempts have been made in the past to reclaim some of this saltmarsh. Further north the saltmarsh development is limited to a narrow fringe along the channel and the marginal vegetation along the river channels becomes more brackish and stands of Common Reed appear in places.

Clonmines is one of 7 separate saltmarshes that are included within the Bannow Bay candidate Special Area of Conservation (cSAC 696). The cSAC takes in all of Bannow Bay and some land on the shoreline and extends down the coastline to Fethard. The main habitats within the cSAC are the extensive intertidal mudflats, which also support notable populations of wintering waders and wildfowl. Other notable coastal habitats found within the cSAC include the sand dune complexes at Bannow Island and Big Burrow on either side of the entrance to the bay. Three Annex I saltmarsh habitats were recorded at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All three habitats are listed as qualifying interests for this site. *Spartina* swards are also found within the saltmarsh at this site, although this habitat is not now considered to qualify as an Annex I habitat.

Bannow Bay is one of two coastal sites where Perennial Glasswort (*Sarcocornia perennis*) has been recorded in Ireland (the other being Ballyteige Burrow further east along the shoreline in Co. Wexford). Mediterranean and thermo-Atlantic Halophilous scrubs (1420) (from here known as Halophilous scrubs) are the rarest of the four Annex I saltmarsh habitats found in Ireland. This habitat is characterized in Ireland by the presence of Perennial Glasswort on saltmarsh. This species is very rare in Ireland and is listed as a Red Data Book species (Curtis and McGough 1988) and is also listed on the Flora Protection Order. This species is not previously known from this site.

The majority of the saltmarsh habitat is found within the digital cSAC boundary. A minor area of saltmarsh habitat is excluded around the shoreline and this is related to small differences between the old OSI 2nd edition 6 inch map and the current 2005 aerial photo series. Saltmarsh extends beyond the upper boundary as indicated by the old OSI 6 inch map in places.

The site can be accessed from a number of locations by crossing adjacent farmland.

SALTMARSH HABITATS

General description

The saltmarsh at this site is found in several discrete sections. The main section has developed at the southern end of the site behind a shingle bar, which protects most of the

seaward side of the saltmarsh. The majority of this saltmarsh is dominated by ASM with smaller amounts of MSM and also some ASM/*Spartina* sward mosaic. This bar is low-lying and contains some disturbed coastal grassland and patches of scrub. This saltmarsh has been significantly modified by drainage in the past. There is some development of brackish habitats with stands of Common Reed (*Phragmites australis*) and Sea Club-rush (*Bolboschoenus maritimus*) along the landward boundary of this saltmarsh. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. There is likely to be some freshwater run off from the adjacent hillside and this zone acts a buffer between the saltmarsh and the adjacent wet grassland or pasture. There are several isolated patches of Sea Club-rush around the saltmarsh also indicating a greater estuarine influence on this site from the adjacent rivers compared to other saltmarshes in Bannow Bay. There are also several patches of *Spartina* sward and scattered clumps of Common Cordgrass (*Spartina anglica*) on bare mud along the seaward side of the shingle bar.

The saltmarsh 'island' situated in the centre of the channel is also dominated by ASM. There are smaller patches of MSM and also stands of Sea Club-rush (mapped as CM2) on this patch of saltmarsh. There are also several low mounds that contain Twitch (*Elytrigia repens*)-dominated grassland. This section has never been modified by drainage or reclamation and is also not grazed by livestock as it is isolated from the mainland. Common Cordgrass is present but is not extensive in cover. There are tall saltmarsh cliffs around the perimeter or seaward boundary of the saltmarsh. The saltmarsh north of Clonmines House is similar in structure. It is dominated by ASM and there are smaller amounts of MSM on this saltmarsh.

The larger semi-circular area of saltmarsh found on the eastern side of the site is dominated by ASM. There is some development of stands of Sea Club-rush on this area and Grey Club-rush (*Schoenoplectus lacustris* spp. *tabernaemontani*) is present. Other species such as Curled Dock (*Rumex crispus*), Parsley Water-dropwort (*Oenanthe lachenalii*), Creeping bent and Sea Aster are found in the areas dominated by Sea Club-rush. A berm marks the upper boundary of the saltmarsh. There are tall saltmarsh cliffs marking the lower saltmarsh boundary. Common Cordgrass is growing in several clumps around the seaward side of the established marsh. This marsh has been modified in the past and there are some deep channels and pits present where material may have been removed for use on the berms.

The tidal influence as noted on the old OSI 2nd edition 6 inch maps extends a short distance beyond the bridge over the river at Wellingtonbridge. Brackish influences can be seen in the vegetation at this location but the vegetation is more typical of brackish marsh and is dominated by Common Reed stands (mapped as other non-Annex I saltmarsh or CM2). There is very little saltmarsh vegetation lining the channel and it is also difficult to access given the treacherous nature of the muddy channel.

Table 3.1. Area of saltmarsh habitats mapped at Clonmines.

EU Code	Habitat	Area (ha)
H1310	<i>Salicornia</i> and other annuals colonizing mud and sand (1310)	0.023
H1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)	15.870
H1410	Mediterranean salt meadows (<i>Juncetalia maritimi</i>)	1.922
non-Annex	<i>Spartina</i> swards	1.215
	Total	19.03

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

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

This habitat is mainly characterised by the presence of Glasswort (*Salicornia* spp.), mainly on muddy substrates at the seaward edge of the established saltmarsh. The habitat has developed on soft intertidal mud with a moderate slope down to the main channel. It is located at the northern end of the site. Other species which were recorded included Common Saltmarsh-grass (*Puccinellia maritima*), Annual Sea-blite (*Suaeda maritima*) and Common Sea-spurrey (*Spergularia media*) but these species only occur quite rarely. There is a distinctive upper boundary to this habitat and no transition between ASM and *Salicornia* flats.

There are other patches of Glasswort vegetation with some other saltmarsh species along the seaward side of the shingle bank. Both *Salicornia europaea* agg. and *S. procumbens* agg. were noted. However, these sparse patches are found on mixed substrate with substantial gravel.

Atlantic salt meadows (H1330)

This habitat is well developed at this site. It dominates all of the main saltmarsh areas. The main section at the southern end of the site contains well-developed examples of all the major zones including some low-mid marsh vegetation. The structure of this area has been modified by construction of deep drains. Spoil from the drains has been placed along the edge to form a low ridge with differently zoned vegetation. Some Twitch appears on these low ridges in places. Mid upper marsh vegetation can be seen along the edges of the drains with lower zone vegetation found behind these low ridges and this is an example of reverse zonation. There are still some natural drainage creeks still present and there are well-developed salt pans also present. Common Cordgrass is found in some of these pans, particularly in the lower half of the marsh but is still less than 1% cover overall.

The mid marsh zone is dominated by Sea Plantain (*Plantago maritima*) and Red Fescue (*Festuca rubra*) with less frequent Sea Arrowgrass (*Triglochin maritimum*). It also contains small amounts of Sea Pink (*Armeria maritima*), Sea Aster (*Aster tripolium*), Saltmarsh Rush (*Juncus gerardii*), Common Saltmarsh-grass, Common Scurvy-grass (*Cochlearia officinalis*) and Sea Milkwort (*Glaux maritima*). There are subtle changes in the species assemblage in this zone which is related to small changes in the surface topography. Shallow depressions

contain more frequent Common Saltmarsh-grass and Lax-flowered Sea Lavender (*Limonium humile*) and can be classified as low-mid marsh.

The mid upper zone is dominated by more frequent Red Fescue. Species such as Common Saltmarsh-grass and Glasswort are absent from this zone and other species such as Saltmarsh Rush are occasionally frequent. The sward height is generally higher in this zone. Along the shingle embankment there is greater abundance of Creeping Bentgrass (*Agrostis stolonifera*) where there is some distinct zonation on a moderate slope to coastal grassland on the bank. Autumn Hawkbit (*Leontodon autumnalis*) and White Clover (*Trifolium repens*) were also present. Wild Celery (*Apium graveolens*) was also noted on some of the low ridges along the drains. There are also sections on the northern half of the main saltmarsh where Creeping Bentgrass is abundant and this is one indication of the estuarine influence on this site. There are occasional clumps of Sea Rush (*Juncus maritimus*) scattered through the ASM in places.

Both the mid marsh and mid-upper marsh zones are also found on some of the other sections of saltmarsh that are not grazed including the 'island'. These areas generally have a taller lush sward particularly in the mid-upper sward that is dominated by Red Fescue. Long-bracted Sedge (*Carex extensa*), Distant Sedge (*Carex distans*) and Hard Grass (*Parapholis strigosa*) were noted in the upper zone of the large semi-circular saltmarsh at the north-eastern end of the site. There is variable sward height in sections and the mid-marsh zone still has a low sward height. The 'island' has a well-developed saltmarsh topography that has not been modified by any reclamation.

Mediterranean salt meadows (H1410)

The MSM is moderately developed at this site. The main portion of MSM is located in the southern section. This habitat is found in the upper zone of the marsh and is characterised by tall scattered clumps of Sea Rush at a lower density compared to some other sites (10-25%). Parts of this habitat are still dominated by typical ASM species such as abundant Creeping Bent, and smaller amounts of Saltmarsh Rush, Red Fescue, Common Scurvy-grass, Spear-leaved Orache (*Atriplex prostrata*) and Sea Plantain between the clumps of Sea Rush. Other species present include Sea Arrowgrass and Sea Aster. The abundance of Creeping Bentgrass indicates some freshwater influence, possibly from runoff from the adjacent hillside. Sea Club-rush is spreading into the upper MSM adjacent to the upper boundary of the habitat. Common Saltmarsh-grass and Common Cordgrass are also found in this area along some of the drainage channels that extend into this habitat. There are some salt pans present within the MSM but the drainage has largely been modified by the creation of the deep drains.

There are also several smaller patches of MSM at various locations around the site on the other patches of saltmarsh. Some of these sections have denser Sea Rush sward compared to the southern section. This MSM generally has a different species assemblage with less frequent Creeping Bent and more frequent Red Fescue. The saltmarsh structure is similar.

There is a narrow band of MSM along the eastern side of the channel lining the berm in places. Some of this MSM is eroded and the Sea Rush is found on isolated hags. This zone contains Sea Plantain, Sea Aster, Common Saltmarsh-grass, Lax-flowered Sea Lavender, Red Fescue and Sea Pink. There are also patches where Sea Rush is spreading back onto the mixed substrate.

***Spartina* swards**

Common Cordgrass has reached its uppermost limits in Bannow Bay just south of Wellingtonbridge. Despite the extensive mudflats, there are few large expanses of *Spartina* sward and most is confined to relatively narrow patches along the seaward side of the marsh. The sward is almost entirely dominated by Common cord-grass and largely confined to muddy substrates. Some narrow sward has developed along the seaward side of the shingle bank at the southern end of the site.

Occasionally, small patches are found along muddy creeks extending into other marsh habitats or on exposed mud over shingle at the southern end of the site. There is also some development of ASM/*Spartina* sward in the southern section, which is already described.

IMPACTS AND ACTIVITIES

This site is affected by several impacts and activities (Table 4.1). Most of the saltmarsh is quite isolated so it is not affected by amenity impacts. The largest section of saltmarsh is grazed by cattle (140) and there is some localised overgrazing (143) in the western section. A large area is not grazed as cattle can not cross the large drain. Another smaller section north of Clonmines House is grazed by sheep and there is also localised poaching. Other sections are not grazed at all by livestock, including the saltmarsh 'island' in the middle of the channel. This section is grazed by wintering wildfowl.

The saltmarsh at this site has been modified by attempted reclamation and drainage in the past. This is most obvious on the southern section where there are deep linear drains cut through the saltmarsh. These old drains pre-date the drawing of the OSI 2nd edition 6 inch map, although they may have been cleaned or deepened since then.

The creation of berms along the upper saltmarsh boundary along much of the channel in the northern section has also modified saltmarsh habitat. Some former saltmarsh in these low-lying areas has been reclaimed behind these berms (870). Some of these dykes are badly maintained in places and the tidal influence is obvious in the maritime element in the grassland habitats. Later modifications have included concrete retaining walls, particularly noticeable on the eastern side of the site towards Wellingtonbridge where erosion has had an obvious impact on the earthen dykes. There is no development of saltmarsh along the front of these concrete structures. The impact of this reclamation is not assessed as it occurred outside the current monitoring period, although these works are still having a residual impact.

Common Cordgrass is present at this site. This is an invasive species of saltmarsh (954). It is not known when Bannow Bay was colonised or was planted by Common Cordgrass, but it has been present since 1960 (Nairn 1986). Small patches of sward have developed mainly along the seaward side of established marsh on former intertidal mudflats. There is also some development of ASM/*Spartina* mosaic in the largest section of saltmarsh where Common Cordgrass has spread into the established saltmarsh and it is having some negative impact on the structure and species composition of this area. The impact of its presence within this mosaic is assessed as moderately negative. There are no indications that there has been significant colonisation by this species during the current monitoring period and it is likely to have mainly become established prior to the current monitoring period. The development of Common Cordgrass along the seaward side of the ASM is not as extensive as other sites within Bannow Bay, possibly owing to the nature of the tidal regime and the location of the site within the upper stretches of the Estuary.

There are some signs of natural erosion (900) at this site, particularly to the island in the centre of the channel and at the northern end of the largest section of saltmarsh. This erosion is mainly due to shifts in position of the main channel and the channel is now undercutting some of the saltmarsh and there are tall saltmarsh cliffs along these sections. The erosion is largely natural but some of the berms near where the two rivers meet have also been damaged by erosion. The creation of berms may be exacerbating the erosional pressure by focusing the river flow into the main channel in periods of flood. There has been a small measurable loss of saltmarsh when the current extent is compared to the extent of saltmarsh marked by the old OSI 2nd edition 6 inch map. About 0.9 ha of saltmarsh has been lost during this period (about 5% over 100 years). However, there has been no measurable loss of saltmarsh during the current monitoring period. The impact of erosion during the current monitoring period is assessed as neutral and having a low intensity.

Impacts and activities adjacent to the site are mainly related to farming (100, 102, 120, 140). There is also dispersed habitation (403) and some roads (502) in the area. These activities have little or no measurable impact on the saltmarsh habitats other than those already mentioned.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	140	C	0	11.5	Inside
H1330	143	B	-1	0.5	Inside
H1330	900	C	0	0.8	Inside
H1330	954	B	-1	0.838	Inside
H1410	140	C	0	1.5	Inside
H1410	143	C	-1	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.

CONSERVATION STATUS

Overall Conservation Status

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

Clonmines saltmarsh is a moderately sized site with some notable conservation features. These include some sections of fairly intact saltmarsh with typical vegetation zones. Overall, the site has an *unfavourable-inadequate* conservation status (Table 5.1). Most of the site is in good condition. However, there is some localised damage from grazing at the site. The structure of the main marsh has been significantly modified by drainage in the past and these modifications are having a residual impact on the structure of the saltmarsh. The land remains quite boggy, although grazing by livestock is still carried out. The structure of some of the other sections has been modified by the construction of berms along the upper boundary. Common Cordgrass is present at the site but does not form a significant part of the saltmarsh vegetation. There is a small area of ASM/*Spartina* sward mosaic.

This site is located within the Bannow Bay 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 Clonmines.

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

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

Extent

The extent of the habitat is assessed as *favourable*. Previous information as to the abundance and distribution of this habitat is scant. Although the habitat is not extensive, there are no indications that there has been any loss of habitat due to natural erosion or spread of Common Cordgrass during the current monitoring period. Indeed it is often recorded as discrete patches, which are some distance removed from the *Spartina* sward.

Habitat structure and functions

Monitoring stops were not carried out in the *Salicornia* habitat owing to its limited distribution and extent of each patch. However, a visual assessment of the vegetation suggests that the structure and functions of the habitat are rated as *favourable*. The habitat forms part of the pioneer zone along the seaward side of the saltmarsh. Although Glasswort is occasionally found among the *Spartina* sward, invariably it is located in small sheltered areas or on shingle. The more exposed examples of the vegetation occur on muddy shingle, which, is not favoured by Common Cordgrass.

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. This habitat is not being affected by any damaging activities at present but may be vulnerable to colonisation by Common Cordgrass in the future, particularly as the patches of habitat are quite small.

Atlantic salt meadows (H1330)

Extent

The extent of this habitat is assessed as *favourable*. While there is an erosional trend acting on part of this site and there has been measurable loss of saltmarsh habitat over a longer period, there are no indications of any significant loss of habitat due to erosion within the current monitoring period. There have been no land-use changes or significant colonisation by Common Cordgrass at this site during the current monitoring period.

Habitat structure and functions

Sixteen monitoring stops were carried out in this habitat resulting in an *unfavourable-inadequate* structure and functions assessment. Of those, only one failed owing to the level of damage from grazing livestock. Most of the habitat is in good condition but there is localised damage around the site due to heavy grazing levels. The damage is obvious with trampling and poaching commonly noted. The structure of the main saltmarsh has been significantly modified by drainage in the past. Common Cordgrass is present at this site but does not form a substantial part of the vegetation. It has formed an ASM/*Spartina* sward mosaic area in the main section of saltmarsh where clumps of Common Cordgrass are more frequent but this is only about 5% of the overall ASM habitat. However, the impact of its spread on species composition is assessed as neutral, mainly due to the lack of accurate baseline data.

There are well-developed examples of several typical ASM zones at this site. There is also some complex zonation in the main saltmarsh. Zonation from ASM to other habitats such as stands of Sea Club-rush and Common Reed are also present, which increase the diversity of the site as a whole.

Future prospects

The future prospects for the Atlantic salt meadows at this site are assessed as *unfavourable-inadequate* for a number of reasons. This assessment assumes that the current management activities and level of impacts such as grazing continue in the near future. Grazing is having the biggest impact at this site and some sections are suffering from localised poaching damage. Despite earlier attempts at draining parts of the site and the network of relatively deep channels and creeks, much of the land remains relatively wet and boggy underfoot. These same areas are used for livestock grazing which further damages the saltmarsh vegetation to the degree that poaching damage has all but bared the vegetation in places.

Heavy poaching may also promote the spread of Common Cordgrass at this site. Common Cordgrass is not well established at the site and may increase its cover in the future on the established saltmarsh. Natural erosion due to scouring along the channel is likely to continue in the future. This may have a long-term impact on the extent of ASM.

Mediterranean salt meadows (H1410)

Extent

The extent of this habitat is assessed as *favourable*. There has been no measurable loss of this habitat due to erosion, land-use changes or the spread of Common Cordgrass within the current monitoring period.

Habitat structure and functions

The habitat structure and functions are assessed as *unfavourable-inadequate*. Four monitoring stops were carried out in this habitat and one stop failed. Most attributes reached their targets. However one stop failed due to damage from heavy poaching. Most of the MSM is in good condition but there is some localised damage.

The MSM at this site has a typical species assemblage. It also forms part of the larger saltmarsh system and there are transitions to other vegetation types including stand of Common Reed and Sea Club-rush and stands of ASM. Common Cordgrass is present in this habitat but is not extensive, mainly due to its position in the upper zone of the saltmarsh.

Future prospects

The future prospects of the MSM habitat at Clonmines are rated as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts such as grazing continue in the near future. Grazing is having the most significant impact on this habitat and is likely to continue to cause some localised damage in places.

The MSM is not being negatively affected by other damaging activities. Common Cordgrass is not likely to spread into this habitat as it is uncompetitive in the upper zone. The MSM is not as vulnerable to erosion compared to ASM as it is shielded by this habitat.

MANAGEMENT RECOMMENDATIONS

It is likely that flood relief measures will remain in place given the importance and proximity of the saltmarsh to the transit village of Wellingtonbridge. While some of the older dykes are in a state of disrepair, this could lead to unlicensed repair in places and possible damage to the saltmarsh.

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 saltmarshes of Ireland: An inventory and account of their geographical variation. *Biology and Environment: Proceedings of the Royal Irish Academy* **98B**, 87-104.

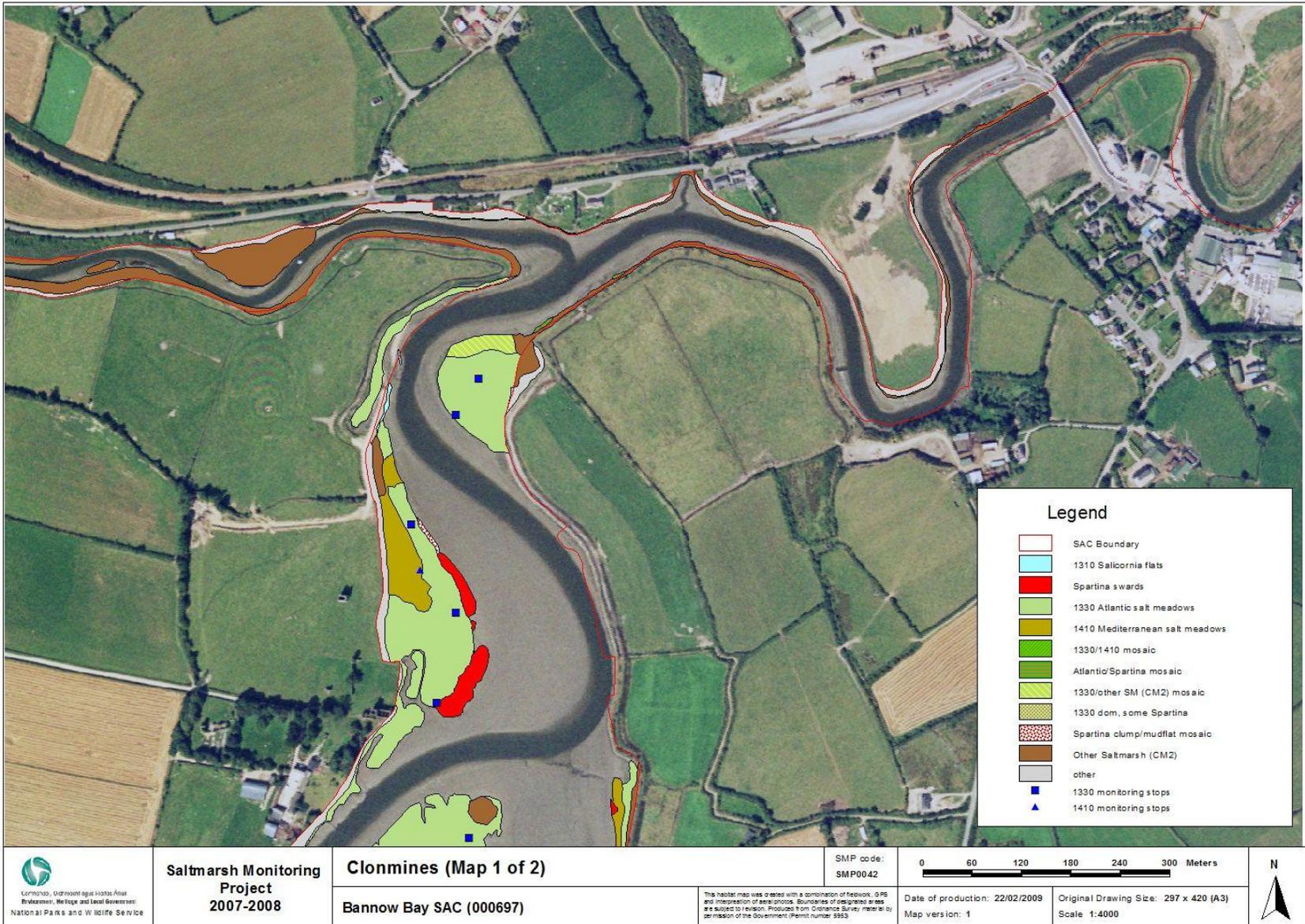
MPSU (2001). *Draft 2 Conservation Plan and aquaculture zoning for Bannow Bay cSAC 697 and SPA 33*. National Parks and Wildlife Service, Dublin.

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

APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 <i>Salicornia</i> flats	0.023	0.023				
2	<i>Spartina</i> swards	0.726					0.726
3	1330 Atlantic salt meadow	15.163		15.163			
4	1410 Mediterranean salt meadow	1.764			1.764		
5	ASM/MSM mosaic (50/50)	0.316		0.158	0.158		
6	ASM/ <i>Spartina</i> mosaic	0.838		0.419			0.419
7	1330/other SM (CM2) mosaic	0.252		0.126			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	4.026					
10	<i>Spartina</i> clump/mudflat mosaic (50/50)	0.140					0.070
11	Isolated <i>Spartina</i> clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	<i>Spartina</i> sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some <i>Spartina</i>	0.004		0.0038			0.0002
17	1330/sand dune mosaic						
18	Other SM (CM2)	3.929					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	27.18	0.023	15.870	1.922		1.215





Legend

- SAC Boundary
- 1310 Salicornia flats
- Spartina swards
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- 1330/1410 mosaic
- Atlantic/Spartina mosaic
- 1330/other SM (CM2) mosaic
- 1330 dom, some Spartina
- Spartina clump/mudflat mosaic
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stops
- 1410 monitoring stops

 Comhaltas, Oidhreachtaí agus Inisí Áine Endowment, Heritage and Local Government National Parks and Wildlife Service	Saltmarsh Monitoring Project 2007-2008	Clonmines (Map 2 of 2) Bannow Bay SAC (000697)	SMP code: SMP0042	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 maps as 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	

Appendix V – Taulaght site report and habitat map from the SMP (McCorry & Ryle 2009)

SITE DETAILS

SMP site name: Taulaght	SMP site code: 0043
Dates of site visit : 27/08/2007 & 21/02/2008	CMP site code: N/A
SM inventory site name: Taulaght	SM inventory site code: 218
NPWS Site Name: Bannow Bay	
NPWS designation cSAC: 697	MPSU Plan: Old format – Draft 2 Consultation
pNHA: 697	SPA: 4033
County: Wexford	Discovery Map: 76 Grid Ref: 282500, 110900
Aerial photos (2000 series): O 5707-A,B,D	6 inch Map No: Wx 045
Annex I habitats currently listed as qualifying interests for Bannow Bay cSAC:	
H1310 <i>Salicornia</i> and other annuals colonizing mud and sand	
H1330 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)	
H1410 Mediterranean salt meadows (<i>Juncetalia maritimi</i>)	
H1420 Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)	
Other SMP sites within this SAC/NHA: Bannow Island, Clonmines, Fethard, Gorteens, Grange, Saltmills	
Saltmarsh type: Estuary	Substrate type: Mud/<i>Phragmites</i> Peat

SITE DESCRIPTION

Taulaght saltmarsh is located along the southern coast of Co. Wexford in Bannow Bay. This bay is a fairly large estuarine site which empties at low tide to expose extensive intertidal flats. The bay is sheltered somewhat by a narrow connection to the sea. Saltmarsh has developed around the bay at several locations where conditions allow. Taulaght is a small isolated saltmarsh situated within a sheltered inlet mid-way along the west side of Bannow Bay and 4.5 km south-west of Wellingtonbridge. The surrounding landscape is low-lying with moderate-gentle slopes to the Bannow Bay shoreline. This isolated rural area is largely surrounded by agricultural land, much of it given over to pasture. There are scattered dwellings along the minor roads through this area. There are also quite a number of well established shellfish operations on mudflats in Bannow Bay that are accessed by the tracks adjacent to this site.

Taulaght saltmarsh is located in a small inlet along the Bannow Bay shoreline. The main saltmarsh has developed in a sheltered area behind a shingle spit. A small stream flows into this inlet from the adjacent land. The bay drains at low-tide to expose extensive mudflats adjacent to the shingle spit.

Taulaght is one of 7 separate saltmarshes that are included within the Bannow Bay candidate Special Area of Conservation (cSAC 696). The cSAC takes in all of Bannow Bay and some land on the shoreline and extends down the coastline to Fethard. The main habitats within the cSAC are the extensive intertidal mudflats, which also support notable populations of wintering waders and wildfowl. Other notable coastal habitats found within the cSAC include the sand dune complexes at Bannow Island and Big Burrow on either side of the entrance to the bay. Three Annex I saltmarsh habitats were recorded at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All three habitats are listed as qualifying interests for this site. *Spartina* swards are also found within the saltmarsh at this site, although this habitat is not now considered to qualify as an Annex I habitat.

Bannow Bay is one of two coastal sites where Perennial Glasswort (*Sarcocornia perennis*) has been recorded in Ireland (the other being Ballyteige Burrow further east along the shoreline in Co. Wexford). Mediterranean and thermo-Atlantic Halophilous scrubs (1420) (from here known as Halophilous scrubs) are the rarest of the four Annex I saltmarsh habitats found in Ireland. This habitat is characterized in Ireland by the presence of Perennial Glasswort on saltmarsh. This species is very rare in Ireland and is listed as a Red Data Book species (Curtis and McGough 1988) and is also listed on the Flora Protection Order. A NPWS Rare Plant Survey (1990) recorded Perennial Glasswort at this site. It was also recorded by a recent Coastwatch survey (2006). It was not located during the 2007 survey, although it was relocated at most of the previously known stations at Taulaght and a number of new records were added in February 2008.

The majority of the saltmarsh habitat is found within the digital cSAC boundary. A minor area of saltmarsh habitat is excluded around the shoreline and this is related to small differences between the old OSI 2nd edition 6 inch map and the current 2005 aerial photo series. Anything lying outside the boundary is generally a narrow fringe of Atlantic salt meadow (ASM) vegetation, which grades into transitional Twitch-rich grassland. One large patch of upper ASM is found outside the northern boundary of the site in a field excluded from the cSAC.

The site is accessed by a small local road which ends at a dirt track. This track is used by the local aquaculture industry. There is an old ford across the inlet onto the main saltmarsh.

SALTMARSH HABITATS

General description

The main part of the saltmarsh that has developed behind the shingle bank on the southern side of the inlet is dominated by ASM (Table 3.1). A significant part of the established saltmarsh has been invaded by Common Cordgrass so a significant area is mapped as ASM/*Spartina* sward mosaic. There is also some development of *Spartina* swards along the seaward boundary of this section. The seaward boundary is marked by a saltmarsh cliff and

there are soft mixed sediments in the intertidal channel in the centre of the inlet. Towards the southern end where the spit is connected to the mainland there is some typical transition from ASM to MSM. There is further transition from saltmarsh to wet grassland at the southern boundary.

The main section of saltmarsh has been modified in the past and is split into two sections by an embankment running north-south that formed part of an old track that ran along the shoreline. There is some development of coastal grassland dominated by Twitch on the shingle bank and along this embankment, as well as some Gorse scrub.

Further west in the inlet there is a mosaic of saltmarsh habitats. There are several relic patches of ASM and MSM that are now surrounded by dense *Spartina* sward and some ASM/*Spartina* mosaic. The northern shoreline is marked by the development of a fringe of dense *Spartina* sward. There is minor ASM development along the landward side of this *Spartina* sward and the upper boundary is marked by a track along the shoreline. There is an additional patch of ASM in a field landward of this track where tidal inundation encroaches along an adjacent drain.

There are several small patches of *Salicornia* flats along the seaward boundary of the main saltmarsh and isolated from the rest of the site on the seaward side of the shingle ridge. Perennial Glasswort was recorded at several locations around the site, including several large plants on the tip of the shingle bank that extends from the main saltmarsh. Small patches of saltmarsh around these plants were mapped as Halophilous scrubs (1420).

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

EU Code	Habitat	Area (ha)
H1310	<i>Salicornia</i> and other annuals colonizing mud and sand	0.006
H1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)	2.547
H1410	Mediterranean salt meadows (<i>Juncetalia maritimi</i>)	0.491
H1420	Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)	0.012
non-Annex	<i>Spartina</i> swards	2.133
	Total	5.189

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

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

Three small patches of this habitat are found along the muddy front of the saltmarsh on exposed semi-solid mud ridges at the front of Atlantic/*Spartina* sward mosaic. The habitat is defined by the presence of Glasswort (*Salicornia* sp.) that has colonised intertidal mud seaward of the established saltmarsh. There are no other saltmarsh species in this habitat. Despite the extent of soft mudflats in the intertidal zone at Taulaght, the occurrence of Glasswort is not widespread. In total, it is estimated that the area of *Salicornia* flats vegetation is approximately 0.006ha (Table 3.1). The habitat is rarely species-rich, a feature

of this annual vegetation and the conditions in which it is usually found. Although Common Cordgrass dominates large areas of the intertidal zone, it would not appear to be threatening the current extent of the *Salicornia* flats. However this habitat may have been more extensive in the past before the spread of Common Cordgrass.

The fourth and final patch of *Salicornia* flats vegetation occurs towards the seaward side of the saltmarsh and is located on sandy shingle. It co-exists with Annual Sea-blite (*Suaeda maritima*), which is another species typical of the habitat.

Atlantic salt meadows (H1330)

The ASM at this site is well-developed. It dominates the main saltmarsh and smaller patches are also scattered around the inlet. The main section is dominated by a mid marsh and mid-upper marsh zone. The mid marsh zone is dominated by a low sward of Sea Plantain (*Plantago maritima*) and Sea Pink (*Armeria maritima*) and generally flat platforms. This zone also contains Sea Aster (*Aster tripolium*), Sea Purslane (*Atriplex portulacoides*), Common Scurvygrass (*Cochlearia officinalis*), Sea Milkwort (*Glaux maritima*), Greater Sea-spurrey (*Spergularia media*), Sea Arrow-grass (*Triglochin maritimum*) and Lax-flowered Sea Lavender (*Limonium humile*). This zone has a well-developed saltmarsh structure and contains medium-sized salt pans with clumps of Common Cordgrass. There may be patches of this species in this zone, particularly near the ASM/*Spartina* mosaic. The saltmarsh creek structure is also well-developed and there are some wide channels where the established saltmarsh has been cut off and forms small 'islands' that may be surrounded by *Spartina* sward.

The lower zone is poorly represented at this site as much of this zone has been colonised by Common Cordgrass to create *Spartina* sward and ASM/*Spartina* mosaic. There is some zonation on the mid marsh from the mid marsh zone to a low-mid zone along lower channels and depressions in the marsh where Sea Purslane and Common Saltmarsh-grass become more frequent. Common Cordgrass also increases in abundance.

In upper part of the ASM zone, the vegetation is often dominated by lush taller sward dominated by Red Fescue. This zone also contains small amounts of Saltmarsh Rush (*Juncus gerardii*), Sea Aster, Sea Milkwort, Common Scurvy-grass, Sea Plantain, Sea Purslane, Spear-leaved Orache (*Atriplex prostrata*) and Creeping Bent-grass (*Agrostis stolonifera*). There may also be some clumps of Sea Rush present. The ASM found in the field at the north of the site is also dominated by mid-upper zone vegetation with some mid marsh and lower-mid zone marsh development along the channel.

A large part of the main saltmarsh and the smaller patches to the west is characterised by abundant cover of Common Cordgrass, which can account for up to 50% of ground cover, although it can be patchy at the outer edges. This area is mapped as ASM/*Spartina* sward mosaic. There is also frequent Common Saltmarsh-grass and Sea Purslane in this zone within the *Spartina* sward. There are also patches of more typical low-mid and mid-marsh

ASM vegetation with sparser cover of Common Cordgrass. This mosaic has developed in established saltmarsh and also in some of the newly formed *Spartina* sward, which indicates that some vegetation succession is occurring.

Mediterranean salt meadows (H1410)

This habitat is generally confined to the landward side of the main saltmarsh and it is uncommon for large expanses of the MSM to be in direct contact with tidal waters. The largest area of MSM is on the main island along the creek, where it occurs between the ASM/*Spartina* mosaic and the pure ASM vegetation. There are several smaller, scattered, smaller patches throughout the saltmarsh, although most are located on the western side or uppermost reaches of the saltmarsh where it is found in the mosaic with ASM vegetation. A MSM/*Spartina* mosaic is not common and is recorded in one patch only (~0.004ha).

The habitat is readily distinguished by the presence of a tall sward of Sea Rush (0.5-1m high), which forms large clumps and sometimes these can be extensive. There is also abundant Red Fescue cover in places where the clumps of Sea Rush are less extensive. These patches are more typical of mid-upper marsh ASM. Other species frequently present in low cover include Common Scurvy-grass, Lax-flowered Sea Lavender, Sea Plantain, Sea Aster and Sea Milkwort. Common Cordgrass is present within this habitat but is confined to the creeks that are present in the MSM and its overall cover is quite low. This habitat also contains a well-developed saltmarsh structure in places with creeks and small salt pans present.

Mediterranean and thermo-Atlantic Halophilous scrubs (*Sarcocornetea fruticosi*) (H1420)

The presence of Mediterranean halophilous Scrub (H1420) is not shown on any NPWS map, although it is listed as a qualifying interest for Bannow Bay owing to the presence of Perennial Glasswort.

Perennial Glasswort found in ASM-dominated areas differs from the ecotypes described for Fethard or Bannow Island. Several plants were found in the mid marsh zone on the main saltmarsh in association with Sea Pink, Common Saltmarsh-grass, Lax-flowered Sea Lavender, Sea Plantain and Glasswort. This type of vegetation is found along the edges of channels or salt pans and is adjacent to lower zone ASM with Common Saltmarsh-grass and Common Cordgrass. Several other large plants were noted along the seaward boundary of the ASM found on the northern side of the channel in association with Common Saltmarsh-grass and Greater Sea-spurrey.

Several large clumps of Perennial Glasswort were also distributed along a linear band on the sheltered side of the shingle ridge. This was a new location for this species. These plants were quite woody and seemed older compared to the plants on the saltmarsh. The Perennial Glasswort was found in association with clumps of Sea Purslane, Sea Beet, Sea Milkwort and green algae amongst bare shingle. This type of habitat is similar to that described from

Gorteens, also in Bannow Bay. This ecotype on shingle has also been recorded at other sites in Britain (Rodwell 2000).

***Spartina* swards**

The site is largely dominated by extensive *Spartina* swards, although there is a vegetation transition from pure sward to ASM or rarely to MSM. A large part of the intertidal zone is characterised by the presence of a dense sward comprising monodominant stands of Common Cordgrass. There are few other saltmarsh species in this sward and the sward height is about 0.3-0.5 m high. This sward has mainly developed on former intertidal mudflats along the northern side of the inlet and along the landward side of the shingle bank. One section situated further east along the northern shore has a low closely-cropped sward and may have been cut. *Spartina* sward has also developed around the relic patches of saltmarsh situated further west into the inlet.

A significant amount of ASM/*Spartina* sward mosaic has also developed where Common Cordgrass has spread into the seaward side of the former established saltmarsh. This zone contains a mixed assemblage of low marsh species with the sward also containing frequent Sea Purslane, Common Saltmarsh-grass and occasional Sea Aster and Greater Sea-spurrey. There is a general decrease in cover of Common Cordgrass along a landward gradient and the ASM adjacent to the ASM/*Spartina* sward mosaic contains scattered clumps of Common Cordgrass.

A small number of clumps are confined to sheltered areas towards the upper reaches of the marsh along a narrow stream that feeds into the Bay. One patch was recorded on the open, seaward side of the saltmarsh, along the front of the shingle ridge.

IMPACTS AND ACTIVITIES

This site is affected by several impacts and activities (Table 4.1). Given the isolated nature of this site, there would appear to be few recreational activities along this part of the bay. However, horses are ridden out along the shoreline and sometimes let graze the saltmarsh as indicated by hoof prints (622). Livestock may also occasionally escape onto the marsh, but this is not considered a damaging activity and there was no indication that livestock actively graze the main section at present (140). This section is likely to have been grazed in the past. The shoreline along the northern side of the inlet is occasionally grazed and there is some poaching damage in places. The field at the northern end of the site was also grazed by horses with some localised poaching damage.

The shellfish industry is an important economic feature of Bannow Bay. In developing the shellfish farms on mudflats adjacent to Taulaght (200), a number of access points and tracks along the shoreline are used by the tractors to approach the shellfish trestles. In an attempt to protect the access points, rubble has been dumped on the seaward side of these tracks to prevent excessive flooding and to prevent further erosion and loss of land (803). Some of this

dumping is on a narrow fringe of ASM and also on *Spartina* sward. This dumping does not affect the main section of saltmarsh. Most of this dumping is centred on a track 200 m to the east of the saltmarsh, at the western end of the site. There has also been some dumping of rubble along the narrow dirt track that leads around to separate fields. The amount of dumping was such that an unidentified person erected a small sign next to the piles of spoil notifying people as to the presence of a very rare plant (Perennial Glasswort) in the area. Elsewhere, discarded oyster shells are dumped at the end of the waterlogged path at the ford across the inlet (422).

While erosion (900) is not having a significant impact on the saltmarsh, recent storms has resulted in the erosion of parts of the unprotected coastline and the loss of agricultural land to the sea to the north of the inlet. A comparison of the old 2nd edition 6 inch map to the current extent of the saltmarsh shows that the shingle spit has grown northwards during this period and this has increased the shelter to the inlet. There has been no loss of saltmarsh but there are signs of erosion and loss of habitat on the seaward side of the shingle spit. Saltmarsh cliffs are present around some of the internal margins of the site. There has been no measurable loss of saltmarsh during the current monitoring period. The impact of erosion is assessed as neutral with a low impact on the seaward edge of the saltmarsh, which is mainly saltmarsh sward.

There is a significant area of Common Cordgrass at this site. This is an invasive species of saltmarsh and mudflats (954). First documented in Bannow Bay in the 1960's, (Nairn 1986) it is not known if *Spartina* was transplanted or arrived of its own accord. As the first record for *Spartina* in Ireland relates to the transplanted specimens in Cork Harbour in 1925, it is reasonable to suggest that it arrived in Bannow Bay after that time. It has since thrived within Bannow Bay and is widespread in its distribution. At Taulaght, it occupies an area a little under the total ASM and has formed established close-knit swards (Table 3.1). It is notable that, although *Spartina* swards from an extensive shoreline fringe, that its seedlings were scarce on the mudflats, indicating that it is not spreading seawards at present. Common Cordgrass has already spread into the established ASM (and also some MSM) to create about 1.4 ha of ASM/*Spartina* sward mosaic. For this reason the impact of the presence of Common Cordgrass is assessed as moderately negative within these mosaic areas. The ASM sward is not considered to be under any further significant threat from the spread of Common Cordgrass except around creeks, where it is already present as it is already well-established.

One interesting feature that was observed during the site survey was some damage to a discrete area of Common Cordgrass. It appeared that the Common Cordgrass had been mown as evidenced by the torn leaves and even nature of the sward. This is likely to be an unofficial attempt at controlling Common Cordgrass. When the site was revisited in February 2008, the *Spartina* was showing signs of regrowth although many of the newer shoots were still purple-black.

Impacts and activities adjacent to the site are mainly related to farming (100, 102, 120, 140) and aquaculture (200). There is also dispersed habitation (403) along the minor road (502) on the shoreline. These activities have little or no measurable impact on the saltmarsh habitats other had those already mentioned.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	954	C	-1	0.006	Inside
H1330	140	C	0	0.3	Inside
H1330	422	A	-2	0.001	Inside
H1330	501	C	-2	0.005	Inside
H1330	803	A	-2	0.02	Inside
H1330	900	C	0	0.02	Inside
H1330	954	B	-1	1.4	Inside
H1410	954	C	-1	0.1	Inside
H1420	803	B	0	0.001	Inside
H1420	900	C	0	0.01	Inside
H1420	954	C	0	0.012	Inside
H1330	200	C	-1	0.5	Outside
H1420	200	C	-1	0.012	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.

CONSERVATION STATUS

Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the NHA survey, the 2000 and 2005 OSI aerial photo series. The baseline information from the NHA survey is generally limited to some descriptions of saltmarsh habitat and does not record the specific condition of the saltmarsh during the survey at this site. Previous assessments have concentrated on the entire cSAC. As a result of this, there is very little detailed information with which to compare and quantify the findings. There is some more detailed baseline data available from the NPWS Rare Plant Survey. It is worth remembering that several separate saltmarshes are found within the Bannow Bay cSAC.

Overall, the site has an *unfavourable-inadequate* conservation status (Table 5.1). Most of the site is in good condition. However, there has been some dumping at this site that was probably associated with maintaining tracks along the shoreline. This dumping has destroyed

a small patch of ASM. Further dumping may threaten future distribution of Perennial Glasswort at this site.

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

Habitat	EU Conservation Status Assessment			Overall EU conservation status assessment
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	
<i>Salicornia</i> flats (H1310)	Extent Structure and functions	Future prospects		Unfavourable - Inadequate
Atlantic salt meadows (H1330)	Extent Structure and functions	Future prospects		Unfavourable - Inadequate
Mediterranean salt meadows (H1410)	Extent Structure and functions Future prospects			Favourable
Mediterranean and thermo-Atlantic halophilous scrubs (H1420)	Extent Structure and functions	Future prospects		Unfavourable - Inadequate

Common Cordgrass is well-established at this site and has formed extensive area of sward on former mudflats and has also spread into established saltmarsh to create a significant area of ASM/*Spartina* sward mosaic. Where Common Cordgrass is found in a mosaic with ASM, it is typically around areas where there are creeks. This invasive species is not likely to spread further at this site as it is already well-established.

In addition, Taulaght is one of a handful of sites where Perennial Glasswort is found. Evidence from other sites has shown that this Mediterranean species is often found in transitional zones between *Spartina* sward and other saltmarsh types such as ASM and MSM. Thus Common Cordgrass is not considered to be a significant threat.

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

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

Extent

The extent of the habitat is assessed as *favourable*. Previous information as to the abundance and distribution of this habitat is scant. Although the habitat is not extensive, there are no indications that there has been any loss of habitat due to natural erosion owing to its relatively sheltered position in the marsh.

Habitat structure and functions

Monitoring stops were not carried out in the *Salicornia* habitat owing to its limited distribution and extent of each patch. However, a visual assessment of the vegetation suggests that the structure and functions of the habitat are rated as *favourable*. The habitat forms part of the pioneer zone along the seaward side of the saltmarsh. Common Cordgrass is not found in this habitat but is found adjacent to it.

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. This habitat is not being affected by any damaging activities at present but may be vulnerable to further colonisation by Common Cordgrass in the future, particularly as the patches of habitat are quite small. However, Common Cordgrass seems to be well established at this site and may not spread seaward significantly in the future, and therefore may not threaten these very small patches of pioneer saltmarsh habitat.

Atlantic salt meadows (H1330)

Extent

The extent of this habitat is assessed as *favourable*. It is the most extensive of the saltmarsh habitats at this site closely followed by *Spartina* sward. Its distribution is widespread and it occurs as a number of large, discrete patches throughout the site. There are no indications that there has been any loss of habitat due to natural erosion owing to its relatively sheltered position in the marsh. A small patch of ASM has been destroyed by dumping but this only represents < 1% of the total ASM habitat.

The spread of Common Cordgrass at this site has led to the development of extensive ASM/*Spartina* sward where there is high cover of Common Cordgrass (20-60%) on previously established ASM. However, the Common Cordgrass is well established so much of this colonisation occurred prior to the current monitoring period. Therefore it is not assessed as a negative impact on extent.

Habitat structure and functions

Habitat structures and functions for the ASM at Taulaght are assessed as *favourable*. This assessment is based upon the results of eight monitoring stops that were carried out in this habitat. All eight passed, as all of the attributes reached their targets. The saltmarsh is generally in good condition. There is some minor damage from dumping around the site. Most of the ASM is not grazed although there is some localised poaching in places along the northern side of the inlet and in the field at the northern end of the site.

There is considerable variation within the ASM in terms of species assemblage and zonation is well-developed in places. The saltmarsh structure is also well developed with salt pans and

creeks forming an important part of the saltmarsh structure. The structure of the main saltmarsh has been modified in the past by the construction of an old track on an embankment across the site.

Common Cordgrass is a prominent part of the saltmarsh vegetation and forms a significant area of ASM/*Spartina* sward mosaic at the seaward side of the main marsh. This is an invasive species that is well-established at this site and the lower zone ASM is poorly represented due to the presence of this species. However as it has largely established prior to the current monitoring period the spread of this species is not assessed. The impact of its spread on species composition is assessed as neutral, mainly due to the lack of accurate baseline data.

Future prospects

The future prospects are rated as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts such as grazing and dumping continue in the near future. Most of the ASM is in good condition but there is currently some damage along the northern side of the inlet from dumping along the track. This practise may continue in the future.

While Common Cordgrass occupies a considerable area and may at some point exceed the area currently occupied by the ASM, it is mainly thriving on the intertidal mud. It is well-established at this site and has already spread significantly into the lower zone of the main section to form a large area of ASM/*Spartina* mosaic. As it is already established, it is not likely to spread significantly in the future as the remaining ASM is mainly mid marsh and mid-upper marsh where Common Cordgrass is generally uncompetitive.

Mediterranean salt meadows (H1410)

Extent

The extent of the habitat is rated as *favourable*. While much of the MSM habitat is fragmented, there is one large patch of the vegetation on the main "island", there are no indications, on the ground, that there has been any great loss of extent over the course of the assessment period. There are no indications that there has been any loss of habitat due to the spread of Common Cordgrass, which has mainly spread into the ASM. Dumping has mainly affected the ASM and not this habitat.

Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Two monitoring stops were carried out in the MSM, both of which passed. All attributes reached their targets for favourable conservation status. The MSM is in good condition. The habitat has a typical species diversity that would be expected for MSM. Although not extensive there is some zonation within the MSM particularly towards the periphery of the habitat, where the

occurrence of Sea Rush is more scattered. There are also natural transitions from this habitat to wet grassland at its upper boundary.

Future prospects

The future prospects of the MSM habitat at Taulaght are rated as *favourable*. This assessment assumes that it is unlikely that there will be any significant change in the management or use of the site. The MSM is not being negatively affected by damaging activities. Common Cordgrass is not likely to spread into this habitat as it is uncompetitive. Given the fragmented nature of the habitat in places, a certain degree of natural erosion may have an impact, but it could be expected to be a slow process.

Mediterranean and thermo-Atlantic halophilous scrubs (H1420)

Extent

The extent of this habitat is assessed as *favourable*. Although the presence of this habitat has been recognised in the overall cSAC, it has not previously been mapped. The habitat has been mapped based on the occurrence of Perennial Glasswort. The majority of earlier records for this species at this site were relocated (NPWS Rare Plant Survey) and additional finds on the shingle bank suggest that the colony is established and that it was probably under-recorded at Taulaght. The presence of this species on the main saltmarsh may be somewhat under-recorded. There has been some dumping close to one of the locations of several plants on the northern side of the inlet but it is not known if any plants were destroyed.

Habitat structure and functions

Habitat structure and functions are assessed as *favourable*, owing to the distribution of and indeed variety of the ecotypes that were recorded at Taulaght. A visual assessment of the areas in which Perennial Glasswort was found reveals a good deal of variety in the age and structure of the plants which would suggest a healthy population.

Future prospects

The future prospects are assessed as *unfavourable-inadequate*. Most of the habitat would not appear to be under any direct threat. However, the populations are relatively small with some groups only consisting of 2-3 plants and are therefore quite vulnerable to changes. Common Cordgrass is found in association with some of the plants but is not likely to be a threat. Evidence from other sites in Bannow Bay shows that Perennial Glasswort persists quite happily along the edges of *Spartina* sward in association with dense Common Cordgrass

One area of the marsh is under threat from continued dumping of rubble, possibly to maintain the track used by the aquaculture industry along the shoreline. Some of the dumping has occurred adjacent to a number of plants and person(s) unknown have erected a small sign indicating the significance of the area. This habitat is vulnerable to further dumping along the track and this is the main reason for the assessment as *unfavourable-inadequate*.

MANAGEMENT RECOMMENDATIONS

No change in the management regime is required for this site as it is relatively isolated. A sign has been put up by person(s) unknown indicating the presence of a legally protected and rare species and asking that rubble not be dumped along a stretch of track. Elsewhere, rubble has been dumped along access tracks and on the shoreline at the front of eroded field boundaries in an effort to curtail erosion. This is in contravention of a number of pieces of legislation including waste management legislation, foreshore licensing and the wildlife acts 1976 (&2000) in terms of damaging operations in a SAC. Further dumping is a threat to the ASM and the distribution of Perennial Glasswort at this site.

A small area of Common Cordgrass was also controlled at the site. Owing to these damaging activities at the site, particularly in light of the presence of Perennial Glasswort, it is recommended that the site is regularly visited to curtail these practices which could have an impact (however, well intentioned) on the persistence of this legally protected species.

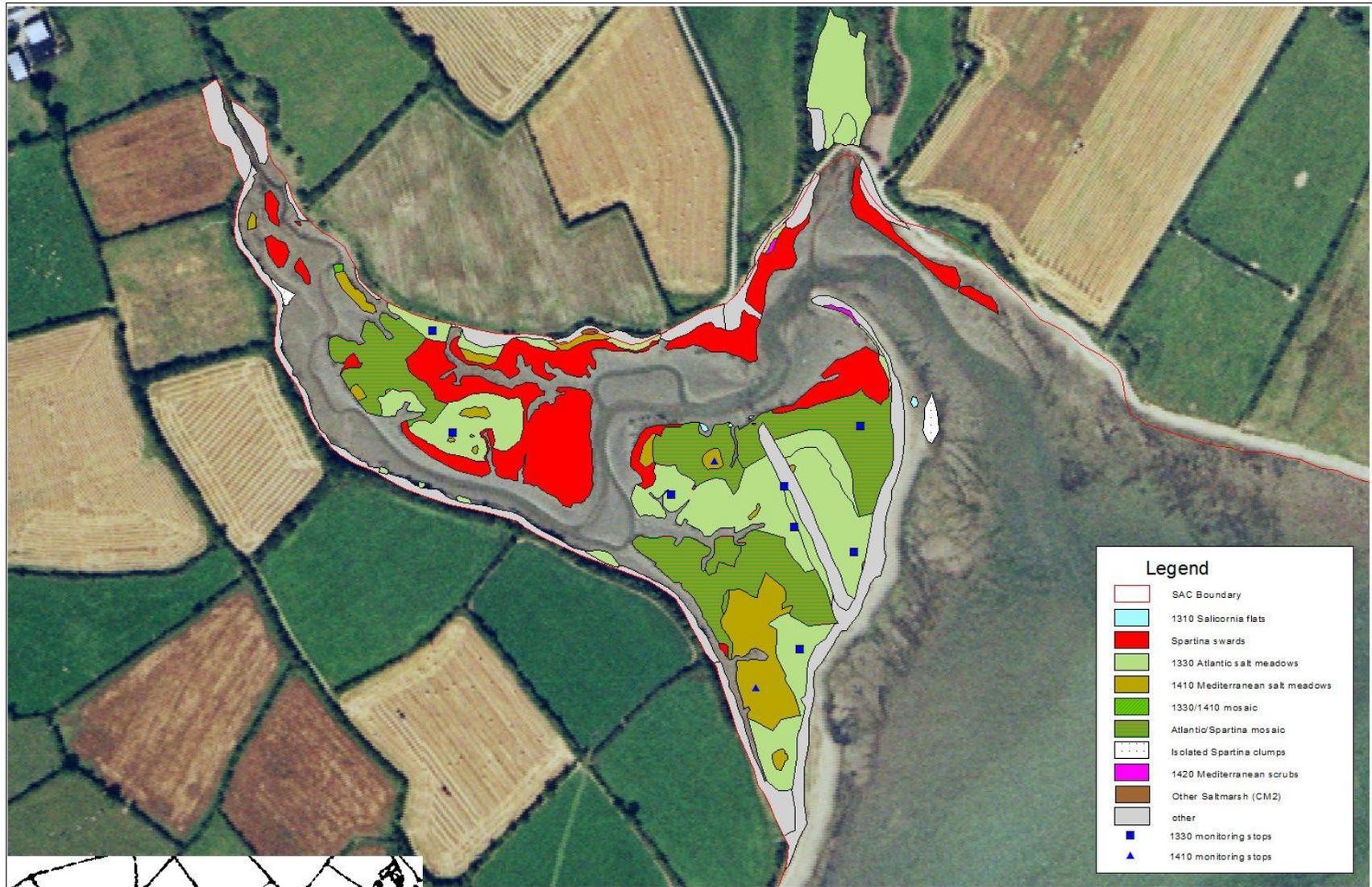
REFERENCES

- 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 saltmarshes of Ireland: An inventory and account of their geographical variation. *Biology and Environment: Proceedings of the Royal Irish Academy* **98B**, 87-104.
- Dubsky, K. (2006). *Unpublished correspondence concerning the distribution of Sarcocornia perennis*. National Parks and Wildlife Service, Dublin.
- MPSU (2001). *Draft 2 Conservation Plan and aquaculture zoning for Bannow Bay cSAC 697 and SPA 33*. National Parks and Wildlife Service, Dublin.
- Nairn, R.G.W. (1986). *Spartina anglica* in Ireland and its potential impact on wildfowl and waders - a review. *Irish Birds*, **3**, 215-258.
- Rare Plant Survey (1990). Series of NPWS surveys 1990-1994 of rare plant sites. Information held by NPWS.
- Rodwell, J.S. (2000). *British Plant Communities Volume 5. Maritime communities and vegetation of open habitats*. Cambridge University Press, Cambridge.

APPENDIX I

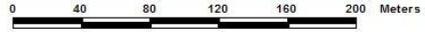
Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 <i>Salicornia</i> flats	0.006	0.006				
2	<i>Spartina</i> swards	1.379					1.379
3	1330 Atlantic salt meadow	1.830		1.830			
4	1410 Mediterranean salt meadow	0.489			0.489		
5	ASM/MSM mosaic (50/50)	0.004		0.002	0.002		
6	ASM/ <i>Spartina</i> mosaic	1.430		0.715			0.715
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	1.224					
10	<i>Spartina</i> clump/mudflat mosaic (50/50)						
11	Isolated <i>Spartina</i> clumps on mud (5%)	0.039					0.039
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	<i>Spartina</i> sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some <i>Spartina</i>						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.004					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub	0.012				0.012	
21	1310/1330 mosaic						
	Total	6.42	0.006	2.55	0.49	0.012	2.13



Legend

- SAC Boundary
- 1310 Salicornia flats
- Spartina swards
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- 1330/1410 mosaic
- Atlantic/Spartina mosaic
- Isolated Spartina clumps
- 1420 Mediterranean scrubs
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stops
- 1410 monitoring stops

 Comhaltas, Oidreacht agus Institiúid Áise Bithéimne, Meitheal agus Iosláir Gníomhaíochtaí National Parks and Wildlife Service	Saltmarsh Monitoring Project 2007-2008	Taulaght Bannow Bay SAC (000697)	SMP code: SMP0043		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. Includes from Ordnance Survey material by permission of the Government (Permit number: 9953)			Date of production: 22/02/2009 Map version: 1	Original Drawing Size: 297 x 420 (A3) Scale 1:2500

Appendix VI – Saltmills site report and habitat map from the SMP (McCorry & Ryle 2009)

SITE DETAILS

SMP site name: Saltmills	SMP site code: 0044
Dates of site visit: 27 & 28/08/2007	CMP site code: N/A
SM inventory site name: Saltmills	SM inventory site code: 217
NPWS Site Name: Bannow Bay	
NPWS designation cSAC: 697	MPSU Plan: Old Format- Draft 2 Consultation 2001
pNHA: 697	SPA: 4033
County: Wexford	Discovery Map: 76 Grid Ref: 280700, 109100
Aerial photos (2000 series): O 5707-C	6 inch Map No: Wx 045
Annex I habitats currently listed as qualifying interests for Bannow Bay cSAC:	
H1310	<i>Salicornia</i> and other annuals colonizing mud and sand
H1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)
H1410	Mediterranean salt meadows (<i>Juncetalia maritimi</i>)
H1420	Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)
Other SMP sites within this SAC/NHA: Bannow Island, Clonmines, Fethard, Gorteens, Grange, Taulaght	
Saltmarsh type: Estuary	Substrate type: Mud

SITE DESCRIPTION

Saltmills saltmarsh is located along the southern coast of Co. Wexford in Bannow Bay. This bay is a fairly large estuarine site which empties at low tide to expose extensive intertidal flats. The bay is sheltered somewhat by a narrow connection to the sea. Saltmarsh has developed around the bay at several locations where conditions allow. Saltmills is located along the western side of the bay 1.2 km south-east of Tintern Abbey. This marsh is also known as St Kieran's Marsh and an old church with this name is located nearby. The adjacent area is dominated by fertile farmland with improved grassland, tillage and arable crops all found in the area. The surrounding area is low-lying and there are gentle-moderate slopes along a seaward gradient to the shoreline. This part of Co. Wexford is quite rural and there is scattered habitation along minor roads in the area and along the shoreline.

The saltmarsh has developed in a small partially enclosed area by a shingle ridge. It was probably reclaimed to some extent in the past but has been left derelict for a considerable time. It consists of a small low-lying plain behind a glacial mound, which contains some improved grassland, transitional coastal grassland and scrub. The site is bounded on its

seaward side by a shingle ridge and on its upper side by a local road. There are some modified drainage channels through the marsh.

Saltmills is one of 7 separate saltmarshes that are included within the Bannow Bay candidate Special Area of Conservation (cSAC 696). The cSAC takes in all of Bannow Bay and some land on the shoreline and extends down the coastline to Fethard. The main habitats within the cSAC are the extensive intertidal mudflats, which also support notable populations of wintering waders and wildfowl. Other notable coastal habitats found within the cSAC include the sand dune complexes at Bannow Island and Big Burrow on either side of the entrance to the bay. Three Annex I saltmarsh habitats were recorded at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All three habitats are listed as qualifying interests for this site. *Spartina* swards are also found within the saltmarsh at this site, although this habitat is not now considered to qualify as an Annex I habitat.

Bannow Bay is one of two coastal sites where Perennial Glasswort (*Sarcocornia perennis*) has been recorded in Ireland (the other being Ballyteige Burrow further east along the shoreline in Co. Wexford). Mediterranean and thermo-Atlantic Halophilous scrubs (1420) (from here known as Halophilous scrubs) are the rarest of the four Annex I saltmarsh habitats found in Ireland. This habitat is characterized in Ireland by the presence of Perennial Glasswort on saltmarsh. This species is very rare in Ireland and is listed as a Red Data Book species (Curtis and McGough 1988) and is also listed on the Flora Protection Order. There was no information from the NPWS site files or the NPWS Rare Plant Survey to suggest that this species was previously recorded at this site. However, one individual plant was located by a recent Coastwatch survey (2006). It was not relocated during this survey.

The majority of the saltmarsh habitat is found within the digital cSAC boundary. A minor area of saltmarsh habitat is excluded and this is related to small differences between the old OSI 2nd edition 6 inch map and the current 2005 aerial photo series. The lower part of the road or upper shoreline as mapped by the 2nd edition 6 inch map was taken as the cSAC boundary but the saltmarsh habitat extends beyond this boundary in places.

Access to the site is from a roadside gate which leads directly onto the foreshore.

SALTMARSH HABITATS

General description

The marsh at Saltmills is a remnant saltings or grazed marsh which may have been associated with the local Abbey at Tintern. It is a small low-lying marsh that is sheltered from all but the most severe tidal inundations by the shingle barrier. This barrier is vegetated by Twitch (*Elymus repens*)-dominated vegetation with other species such as Sow-thistle (*Sonchus* sp.) and Curled Dock also present. The history of the site as a saltings is clear and many of the linear creeks are obviously man-made. They all connect into a single, relatively deep channel which drains to the west of the site into the bay. A Hawthorn-dominated

hedgerow marks the boundary between the saltmarsh and the mound at the western side. The majority of the main saltmarsh is dominated by Atlantic salt meadows (ASM) with small patches of Mediterranean salt meadows also scattered through this main area. The marsh is roughly divided into two with the MSM mainly found on the western side of the site and the ASM confined to the eastern end of the site.

The landward boundary is marked by a band of Common Reed (*Phragmites australis*) along a deep drain that probably marks some freshwater influence from the adjacent land. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification.

There is also some patchy saltmarsh development along the road further west of the main section. This saltmarsh is dominated by MSM with some patches of Common Cordgrass mapped as *Spartina* sward on the seaward side. There are several small patches of *Salicornia* flats in this area.

Table 3.1. Area of saltmarsh habitats mapped at Saltmills.

EU Code	Habitat	Area (ha)
H1310	<i>Salicornia</i> and other annuals colonizing mud and sand	0.015
H1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>)	1.127
H1410	Mediterranean salt meadows (<i>Juncetalia maritimi</i>)	0.843
non-Annex	<i>Spartina</i> swards	0.002
	Total	1.987

note that saltmarsh habitat may continue outside the mapped area.

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

This habitat is characterised by the presence of Glasswort (*Salicornia* spp.), that have colonised mixed substrate (muddy shingle) towards the western side of the site. Annual Sea-blite (*Suaeda maritima*) is also present. It is found outside the main section of marsh and close to the stands of Sea Rush (*Juncus maritimus*) along the roadside. There is a distinctive boundary between the adjacent MSM and the *Salicornia* flats and no accretion ramp is present. While there are clumps of Common Cordgrass in proximity to these small patches of habitat there are none within the patches. There are indications of erosion in this area and Glasswort may be colonising muddy shingle that formerly contained more established saltmarsh in the past.

Atlantic salt meadows (H1330)

There are well-developed examples of mid marsh and mid-upper marsh vegetation at this site. The Atlantic salt meadow habitat is confined to the eastern end of this small marsh, lying behind the elevated shingle ridge. For the most part the vegetation consists of a low sward, distinctive of mid marsh with the vegetation cover about 10 cm high. There are no signs of grazing. There is very little development of a low marsh sward but this habitat can be found

along the main drainage channels and some of the smaller creeks and channels on the site. This community is dominated by a sward of Common Saltmarsh-grass.

The mid-marsh vegetation is dominated by a typical sward of Sea Plantain (*Plantago maritima*) and Sea Pink (*Armeria maritima*). There are generally smaller but variable amounts of Lax-flowered Sea Lavender (*Limonium humile*), Sea Milkwort (*Glaux maritima*), Common Scurvy-grass (*Cochlearia officinalis*), Red Fescue (*Festuca rubra*), Sea Arrow-grass (*Triglochin maritimum*) and Common Saltmarsh-grass (*Puccinellia maritima*). Some zonation is evident and the cover of Lax-flowered Sea Lavender, Sea Aster, Glasswort and Common Saltmarsh-grass increases in some shallow hollows in this zone. There are scattered clumps of Common Cordgrass in this zone but these species do not form a significant part of the vegetation (5-10% overall). This zone has a well-developed salt pan network.

The mid-upper zone is characterised by the greater dominance of Red Fescue and the absence of species like Common Saltmarsh-grass and Lax-flowered Sea Lavender. This zone and contain low mounds with Saltmarsh Rush (*Juncus gerardii*) present. This sward has a higher sward height (10-20 cm). There are also some scattered clumps of Sea Rush (*Juncus maritimus*) in places. Some pans are present in this zone.

The saltmarsh structure has been modified in the past by drainage with one main channel draining the site and smaller drains criss-crossing the rest of the saltmarsh. Ridges dominated by Red Fescue run alongside the drains and this affects zonation across the marsh. However these artificial drainage channels act in the same way as natural channels and are partially infilling in places to create pan like structure in places. Some well-developed natural large salt pans are also present. The presence of these drains has allowed the colonisation of some clumps of Common Cordgrass in places, but this species does not form a significant part of the vegetation. There are also some clumps found within the natural salt pans present in this habitat.

Mediterranean salt meadows (H1410)

This habitat was characterised by frequent cover of Sea Rush (*Juncus maritimus*) clumps interspersed with mid-upper ASM marsh dominated by Red Fescue. There is some typical zonation of this habitat where it is positioned along the landward side of the ASM, mainly around the back of the glacial mound.

The sward height is generally much higher compared to the ASM (0.5 m). Some sections are denser with almost complete cover of Sea Rush cover. Other species present includes small amounts of Creeping Bent (*Agrostis stolonifera*), Sea Plantain, Sea Arrowgrass, Sea Milkwort (*Glaux maritima*), Greater Sea-spurrey (*Spergularia media*) and Parsley Water-dropwort (*Oenanthe lachenalii*). There are some salt pans in this habitat. Some clumps of Common Cordgrass are found within the MSM mainly along some of the artificial drains within this habitat.

There is some zonation evident in this habitat where Sea Rush tussocks are also present in the mid marsh zone, which is dominated by Sea Pink and Sea Plantain. The Sea Rush cover is lower in this zone. Lower zone species such as Common Saltmarsh-grass and Lax-flowered Sea Lavender are also present in this zone which is an unusual occurrence.. There was generally a discrete boundary between the Atlantic and Mediterranean salt meadow which is striking.

A second area of Sea Rush-dominated vegetation is present on the muddy shingle of Bannow Bay to the west of the main marsh. This section seems to have eroded significantly in the past. Sea Rush is found on mixed substrate and there are some signs that it is re-colonising along the lower seaward boundary. This could be classified as a pioneer habitat. There are fewer other species in this section and there is frequent cover of bare substrate.

***Spartina* swards**

Unlike many other saltmarsh sites in Bannow Bay, Common Cordgrass is not commonly recorded at Saltmills. Five separate patches, totalling 0.002ha were patchily distributed on the seaward side of the shingle ridge and there was little distribution of Common Cordgrass within the main section.

IMPACTS AND ACTIVITIES

This is a small saltmarsh and is not greatly impacted by many threatening activities (Table 4.1). It is not easily accessible from the road side as there is a deep drain between the road and the marsh. The saltmarsh is not grazed extensively (140) and the sward height was quite high at the time of the survey. The adjacent small mound with dry coastal grassland has been enclosed in the past and is not grazed at present. The field is not well fenced and cattle could easily access the marsh.

Some round bales of straw have been placed in the adjacent shingle along the outflow at the western side of the saltmarsh. These bales may be acting as sea defence (871) to protect the eroding marsh and shoreline or to prevent the flow of water into the main drainage channel. Some grading of the shingle has also been carried out into a secondary barrier behind the straw bales.

There are few direct signs of erosion (900) in the main section of saltmarsh as it is enclosed and protected by a shingle barrier. Except during storm tides etc which can overtop the shingle ridge, the marsh is open to the sea on its western side only. However, a comparison of the old 2nd edition 6 inch map to the current extent of the saltmarsh as shown from the 2005 aerial photos indicates that it has got smaller during this period. The shingle ridge seems to have retreated somewhat around the seaward side of the site during this period. The retreat of the marsh is by 15 m on the west side adjacent to the glacial mound and up to 50 m towards the south-east corner where it is more low-lying. Old hardened layers of mud

that may have formed part of the saltmarsh in the past are visible on the seaward side of the shingle ridge.

There are also some signs of erosion to the clumps of Common Cordgrass and Sea Rush that have colonised the more exposed area to the west of the main saltmarsh. The old 2nd edition 6 inch map marks a small map of saltmarsh along the shoreline adjacent to the road to the west of the main saltmarsh but this has largely eroded away. This is an indication of an erosional trend acting on the site. However there was no measurable loss of saltmarsh due to erosion during the current monitoring period when the 1995, 2000 and 2005 series aerial photos are compared. Therefore, the rate of erosion is likely to be quite slow but still continuing. There are no prospects for natural landward retreat of saltmarsh at this site as it is confined by a road at the upper boundary. Therefore erosion is assessed as having a moderate negative impact that is affecting all of the saltmarsh. This erosional trend is also present at other sites in Bannow Bay including Grange and Taulaght.

Common Cordgrass is present at this site. This is an invasive species of saltmarsh (954). Although the first record for Common Cordgrass in Ireland is from 1925 in Cork Harbour, it wasn't recorded in Bannow Bay until 1960 (Nairn 1986). There is no documented information as to the presence of Common Cordgrass in Bannow Bay, but it is likely to have colonised between 1930 and 1960. It is not known if it was planted or colonised Bannow Bay naturally. Common Cordgrass is not a prominent part of the saltmarsh vegetation at this site. Saltmills is not considered to be overly threatened by the spread of Common Cordgrass. Its presence at Saltmills is localised at best and of more concern elsewhere in Bannow Bay. Indeed most of the Common Cordgrass that is mapped was recorded on the muddy gravel as groups of clumps or single individuals on the seaward side of the shingle barrier that surrounds this site. For this reason, the impact of the presence of Common Cordgrass is assessed as neutral.

The site has also been affected by drainage in the past. As these works were carried out prior to the current monitoring period these impact are not assessed. However, they are still having a significant residual impact on this site.

Impacts and activities adjacent to the site are mainly related to farming (100, 102, 120, 140). There is also dispersed habitation (403) along the minor road (502) on the shoreline. Bannow Bay is also used for aquaculture (200), mainly growing oysters. However, there are no cultivation areas close to this site. These activities have little or no measurable impact on the saltmarsh habitats.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	954	C	0	0.015	Inside
H1330	140	C	0	1.127	Inside
H1330	871	C	-1	0.01	Inside
H1330	900	B	-2	1.127	Inside
H1330	954	C	0	1.127	Inside
H1410	140	C	0	0.843	Inside
H1410	900	B	-2	0.843	Inside
H1410	954	C	0	0.843	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.

CONSERVATION STATUS

Overall Conservation Status

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

The overall conservation assessment for this site is *unfavourable-bad* (Table 5.1). Saltmills is relatively small and sheltered marsh that still bears a passing resemblance to its earlier heritage as a saltings. The current saltmarsh is in good condition and is not been affected by any significant negative impacts like grazing. The vegetation is well-developed and there are some typical examples of saltmarsh communities present. Drainage in the past is still having a residual impact on the saltmarsh. However, there is a long-term erosional trend at this site and the saltmarsh has retreated significantly when the current extent is compared to the extent indicated by the old OSI 2nd edition 6 inch map. There are no prospects for retreat of saltmarsh habitat at this site as the upper boundary is constrained by the minor road and the adjacent site topography is a gentle-moderate gradient.

This site is located within the Bannow Bay 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 Saltmills.

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

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

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.

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. Common Cordgrass is not present in these small fragments of habitat.

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. This habitat is not being affected by any damaging activities at present but may be vulnerable to colonisation by Common Cordgrass in the future. However, this species prefers softer substrate than the muddy shingle present at this location so it may not spread as significantly as it has at Bannow Island.

Atlantic salt meadows (H1330)

Extent

The extent of this habitat is assessed as *favourable*. While there is an erosional trend acting at this site and there has been measurable loss of saltmarsh habitat over a longer period, there are no indications of any significant loss of habitat due to erosion within the current

monitoring period. There have been no land-use changes at this site during the current monitoring period.

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. The saltmarsh is currently in good condition. There is no grazing at present and there are no other activities significantly affecting the structure and functions of the habitat. Drainage at the site in the past has modified the structure of the saltmarsh and this drainage is still having a residual impact.

There are well-developed examples of mid-marsh and mid-upper saltmarsh zones at this site. Zonation is present and is related to small differences in the surface topography of the saltmarsh, sometimes creating a mosaic of zones. There is some zonation to a low-mid zone with increased cover of Lax-flowered Sea Lavender and common Saltmarsh-grass. Common Cordgrass is present but is not a significant feature of the saltmarsh vegetation and is mainly found along the drains, channels and salt pans in the ASM. The impact of its spread on species composition is assessed as neutral.

There is also some natural zonation along the upper boundary to other habitats such as Common Reed beds, MSM and coastal grassland on a shingle ridge that increase the diversity of the site as a whole. There are some natural saltmarsh features like well-developed salt pans.

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. There are few impacts which are significantly negatively affecting this habitat. However, there is an erosional trend at this site and there has been some measurable loss of saltmarsh habitat in the past 100 years. This erosion is likely to continue in the future and the extent of saltmarsh is likely to be reduced in the long-term. There are no prospects for retreat of saltmarsh at this site as the upper boundary is marked by a minor road.

This habitat is not being significantly affected by any other damaging activities at present. Further modifications and possible coastal protection works along the front of the saltmarsh may affect its structure and composition. The habitat is not likely to be vulnerable to significant further colonisation by Common Cordgrass in the future as the site is dominated by mid-marsh and mid-upper marsh communities where Common Cordgrass does not have a significant competitive advantage.

Mediterranean salt meadows (H1410)

Extent

The extent of this habitat is assessed as *favourable*. While there is an erosional trend acting at this site and there has been measurable loss of saltmarsh habitat over a longer period, there are no indications of any significant loss of habitat due to erosion within the current monitoring period. There have been no land-use changes at this site during the current monitoring period.

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 saltmarsh is currently in good condition. There is no grazing at present and there are no other activities significantly affecting the structure and functions of the habitat. Drainage at the site in the past has modified the structure of the saltmarsh and this drainage is still having a residual impact.

The sward structure of MSM is in good condition. The species assemblage at this site is typical of this habitat and there are some examples of zonation within the MSM. There is also unmodified zonation of coastal grassland along the shingle ridge. Common Cordgrass is present within the habitat but is only found along the drains.

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 current grazing levels continue in the near future. There are few impacts which are significantly negatively affecting this habitat. However, there is an erosional trend at this site and there has been some measurable loss of saltmarsh habitat in the past 100 years. This erosion is likely to continue in the future and the extent of saltmarsh is likely to be reduced in the long-term. There are no prospects for retreat of saltmarsh at this site as the upper boundary is marked by a minor road.

This habitat is not being affected by any other damaging activities at present. The habitat is not likely to be vulnerable to significant further colonisation by Common Cordgrass in the future as the site is dominated by mid-marsh and mid-upper marsh communities where Common Cordgrass does not have a significant competitive advantage.

MANAGEMENT RECOMMENDATIONS

There are no specific management recommendations for this site.

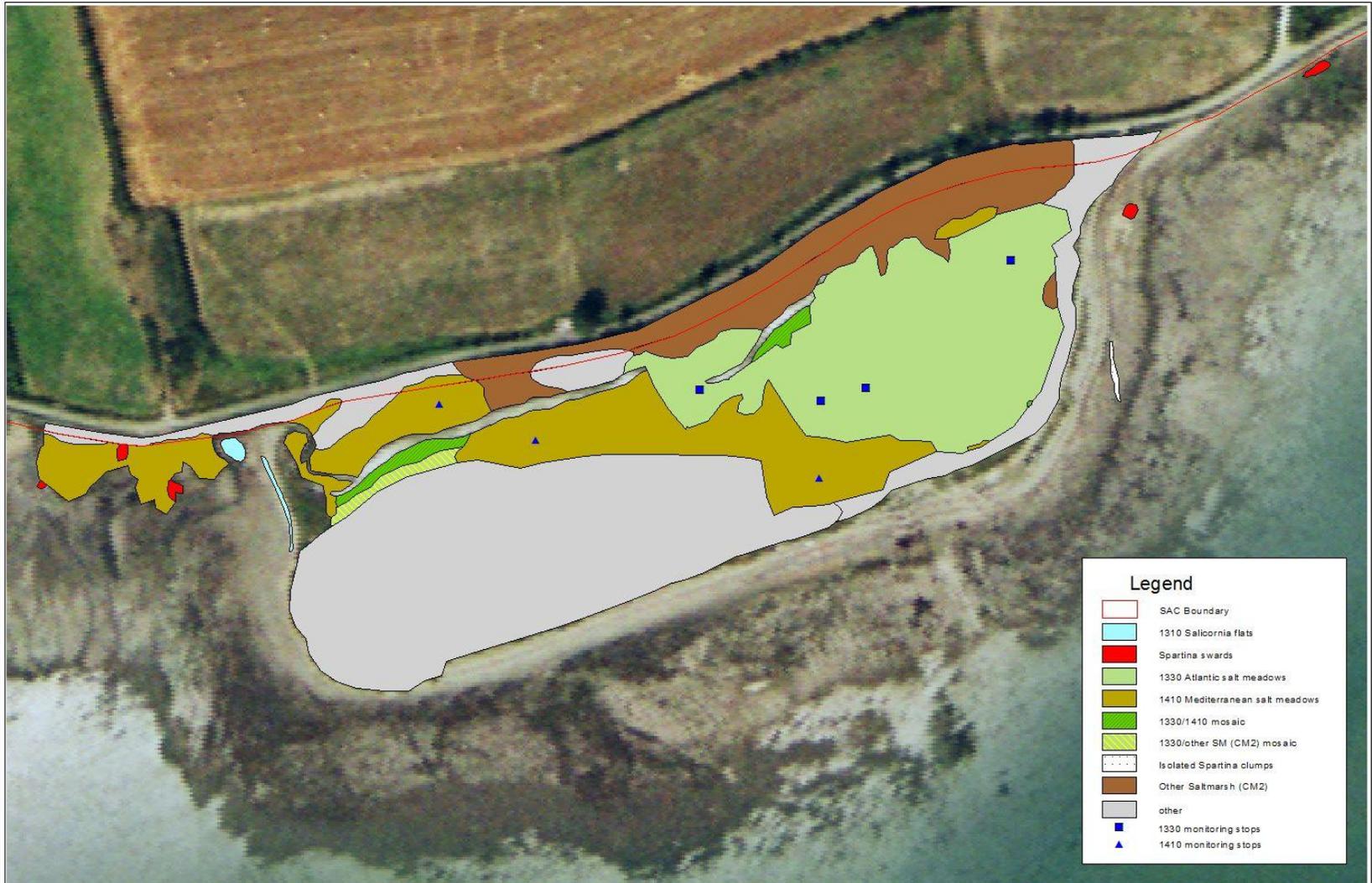
REFERENCES

- Curtis, T.G.F. & McGough, H.N. (1988). *The Irish Red Data Book*. Stationary Office, Dublin.
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- Dubsky, K. (2006). *Unpublished correspondence concerning the distribution of *Sarcocornia perennis**. National Parks and Wildlife Service, Dublin.
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- Nairn, R.G.W. (1986). *Spartina anglica* in Ireland and its potential impact on wildfowl and waders - a review. *Irish Birds*, **3**, 215-258.
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Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 <i>Salicornia</i> flats	0.015	0.015				
2	<i>Spartina</i> swards	0.015					0.015
3	1330 Atlantic salt meadow	1.087		1.087			
4	1410 Mediterranean salt meadow	0.819			0.819		
5	ASM/MSM mosaic (50/50)	0.049		0.024	0.024		
6	ASM/ <i>Spartina</i> mosaic						
7	1330/other SM (CM2) mosaic	0.032		0.016			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	1.819					
10	<i>Spartina</i> clump/mudflat mosaic (50/50)						
11	Isolated <i>Spartina</i> clumps on mud (5%)	0.005					0.005
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	<i>Spartina</i> sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some <i>Spartina</i>						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.584					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	4.43	0.015	1.13	0.84		0.02



Legend

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

 Comhaltas, Gníomhaíocht agus Seirbhís Áite Bhrúnaíochais, Na hÉireann agus na Stát Aontuimthe National Parks and Wildlife Service	Saltmarsh Monitoring Project 2007-2008	Saltmills	SMP code: SMP0044	0 20 40 60 80 100 Meters 	N 
	Bannow Bay SAC (000697)	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: 9963)	Date of production: 22/02/2009 Map version: 1	Original Drawing Size: 297 x 420 (A3) Scale 1:1500	

Appendix VII – Gorteens site report and habitat map from the SMP (McCorry & Ryle 2009)

9 SITE DETAILS

SMP site name: Gorteens	SMP site code: 0045
Dates of site visit : 28/08/2007	CMP site code: N/A
SM inventory site name: Gorteens	SM inventory site code: 216
NPWS Site Name: Bannow Bay	
NPWS designation cSAC: 697	MPSU Plan: Old Format – Draft 2 Consultation, 2001
pNHA: 697	SPA: 4033
County: Wexford	Discovery Map: 76 Grid Ref: 279600, 107200
Aerial photos (2000 series): O 5777-B, D; O 5778-A, C	6 inch Map No: Wx 045, 050
Annex I habitats currently listed as qualifying interests for Bannow Bay cSAC:	
H1310	<i>Salicornia</i> and other annuals colonizing mud and sand
H1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)
H1410	Mediterranean salt meadows (<i>Juncetalia maritimi</i>)
H1420	Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)
Other SMP sites within this SAC/NHA: Bannow Island, Clonmines, Fethard, Grange, Saltmills, Taulaght	
Saltmarsh type: Estuary	Substrate type: Mud/Stones

1 SITE DESCRIPTION

Gorteens saltmarsh is located along the southern coast of Co. Wexford in Bannow Bay. This bay is a fairly large estuarine site which empties at low tide to expose extensive intertidal flats. The bay is sheltered somewhat by a narrow connection to the sea. Saltmarsh has developed around the bay at several locations where conditions allow. The site is located in the south-west corner of Bannow Bay in a small inlet that extends southwards towards the church at Pollfur Bridge and extends to Oyster Point. This area is 1.5 km north of Fethard. Gorteens saltmarsh is located a short distance around the coast from Grange (SMP0044), from where it was accessed. A small river enters the bay and the head of the inlet and there are also several small streams flowing into the bay around the shoreline. The adjacent area is dominated by fertile farmland with improved grassland, tillage and arable crops all found in the area. The surrounding area is low-lying and there are moderate slopes from higher ground along a seaward gradient to the shoreline. This part of Co. Wexford is quite rural and there is scattered habitation along minor roads in the area.

The saltmarsh is poorly developed along both sides of this inlet and is mainly represented as a narrow band of continuous habitat stretched along the shoreline, usually 5-20 m wide. This saltmarsh has developed adjacent to soft intertidal mudflats. There are some larger sections where saltmarsh has developed in small more sheltered indentations associated with streams running off the adjacent land and where *Spartina* swards have developed.

Gorteens is one of 7 separate saltmarshes that are included within the Bannow Bay candidate Special Area of Conservation (cSAC 696). The cSAC takes in all of Bannow Bay and some land on the shoreline and extends down the coastline to Fethard. The main habitats within the cSAC are the extensive intertidal mudflats, which also support notable populations of wintering waders and wildfowl. Other notable coastal habitats found within the cSAC include the sand dune complexes at Bannow Island and Big Burrow on either side of the entrance to the bay. Four Annex I saltmarsh habitats were recorded at this site, *Salicornia* flats, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). All these habitats are listed as qualifying interests for this site. *Spartina* swards are also found within the saltmarsh at this site, although this habitat is not now considered to qualify as an Annex I habitat.

Bannow Bay is one of two coastal sites where Perennial Glasswort (*Sarcocornia perennis*) has been recorded in Ireland (the other being Ballyteige Burrow further east along the shoreline in Co. Wexford). Mediterranean and thermo-Atlantic Halophilous scrubs (1420) (from here known as Halophilous scrubs) are the rarest of the four Annex I saltmarsh habitats found in Ireland. This habitat is characterized in Ireland by the presence of Perennial Glasswort on saltmarsh. This species is very rare in Ireland and is listed as a Red Data Book species (Curtis and McGough 1988) and is also listed on the Flora Protection Order. This species was known from Grange saltmarsh to the east of this site but was not recorded from this area until the Coastwatch Survey in 2006. This SMP survey has increased the distribution and number of records at this site along the southern shoreline.

The majority of the saltmarsh habitat is found within the digital cSAC boundary. A minor area of saltmarsh habitat is excluded around the shoreline and this is related to small differences between the old OSI 2nd edition 6 inch map and the current 2005 aerial photo series. Saltmarsh extends beyond the upper boundary as indicated by the old OSI 6 inch map in places.

The southern side of the site is accessed by continuing on foot from Grange (SMP site number 0044) and walking in a westerly direction around Oyster Point. The southern shoreline is quite inaccessible while the northern shoreline was accessed from several lanes from private farms. While it may seem possible to cross the Sandflats from one side of the inlet to the other at low tides, it is not advisable owing to the fact that there is always water in the channel and the nature of the sediment.

2 SALTMARSH HABITATS

2.1 General description

The saltmarsh is poorly developed compared to other sites in Bannow Bay. Most of the habitat is a thin band along the shoreline that is generally less than 10 m wide although some sections are wider. This saltmarsh has developed on a moderately sloped shoreline so the intertidal zone is narrower. The main saltmarsh is mainly a mosaic of Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM) (Table 3.1). *Spartina* swards have also developed along the seaward side of this more established saltmarsh, mainly on the mudflats. This band of habitat is also quite narrow in places because of the moderate slopes along the intertidal zone but some sections are more extensive.

Saltmarsh is best developed in a small indentation along the southern shoreline where a shingle bank has developed and this is partially vegetated by some ASM. Small patches of Halophilous scrubs (1420) are found on this shingle bank and along the seaward edge of the established saltmarsh. Small patches were also noted in the upper zone of the *Spartina* sward. Further east and north the saltmarsh development ends and the shoreline is dominated by a narrow band of shingle or cobble. There are signs of erosion of this shoreline particularly along the north-western section.

Table 3.1. Area of saltmarsh habitats mapped at Gorteens.

EU Code	Habitat	Area (ha)
H1310	<i>Salicornia</i> and other annuals colonizing mud and sand	0.008
H1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)	0.997
H1410	Mediterranean salt meadows (<i>Juncetalia maritimi</i>)	0.785
H1420	Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)	0.059
non-Annex	<i>Spartina</i> swards	2.906
	Total	4.755

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

There is also some typical zonation of vegetation along the upper boundary of the established saltmarsh. This zone is dominated by Twitch (*Elytrigia repens*). Smaller patches of vegetation that are not classified as Annex I saltmarsh were recorded, often where small streams entered the site or from where there was seepage of fresh water adjacent fields. This vegetation included Common Reed (*Phragmites australis*) most of which were located in a small channel on the northern side of the site. Elsewhere, stands of Sea Club-rush (*Bolboschoenus maritimus*) and Grey Club-rush (*Schoenoplectus lacustris* spp. *tabernaemontani*) appears along the upper saltmarsh boundary in places. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. There is generally some further transition along the landward boundary to a band of Brambles (*Rubus fruticosus*), scrub or a hedge that marks

the boundary of the adjacent farmland. Further west in the inlet where it gets narrower some of the saltmarsh is shaded and overhung by tall trees.

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

This habitat does not form an extensive zone on the mudflats, which are dominated by *Spartina* sward which appears to be more successful at trapping sediment. Several small patches of this habitat are found associated with the small shingle bank in the inlet at the eastern end of the site. It is also found in some tiny patches within small salt pans at the seaward side of this section.

This habitat is characterised largely by the presence of Glasswort (*Salicornia* spp.). It is rarely dense in cover and accounts for 20-40%. Occasionally, Annual Sea-blite (*Suaeda maritima*) is found in this habitat and was co-dominant with Glasswort in one patch of the annual habitat on the seaward side of the large shingle bar. Another species that is noted as an occasional in the habitat is Common Saltmarsh-grass (*Puccinellia maritima*). This is an indication that this habitat is part of the pioneer zone of the saltmarsh and there is some gradual transition from the *Salicornia* flats to ASM along a landward gradient.

Elsewhere, smaller isolated clumps of the Glasswort are found, but rarely is enough to justify mapping it as a separate habitat. It is worth noting that it was sometimes difficult to delineate the habitat as species from other ASM zones such as Common Saltmarsh-grass and Sea Pink (*Armeria maritima*) increase in abundance in the pioneer zone. When these species appear the habitat is generally classified as pioneer ASM.

2.3 Atlantic salt meadows (H1330)

The ASM is generally poorly developed at this site. Much of the ASM vegetation is confined to a relatively narrow band which is found around much of the sheltered estuary at Gorteens. Zonation within this band of ASM is poorly developed and a mixture of species is present, dominated by mid-upper species. Red Fescue (*Festuca rubra*), Saltmarsh Rush (*Juncus gerardii*), Sea Pink, Sea Plantain (*Plantago maritima*) are prominent in these narrow bands and other species like Lax-flowered Sea Lavender (*Limonium humile*), Sea Purslane (*Atriplex portulacoides*), Long-bracted Sedge (*Carex extensa*), Sea Aster (*Aster tripolium*), Greater Sea-spurrey (*Spergularia media*), Sea Milkwort (*Glaux maritima*) and Common Cordgrass (*Spartina anglica*) are all present.

There are some sections where the ASM saltmarsh is somewhat better developed. One of the largest sections is found near the shingle bank at the eastern end of the site. This patch of saltmarsh contains several zones including a low zone and mid-upper zone and the ASM has developed on a low mound. The lower zone is dominated by Common Saltmarsh-grass and is characterised by frequent Annual Sea-blite. Other species present include small amounts of Sea Pink, Sea Aster, Sea Plantain and Lax-flowered Sea Lavender. There is very little Common Cordgrass in this vegetation although it does dominate more extensive vegetation

adjacent to this area. The mid zone is characterised by greater cover of Sea Plantain with smaller amounts of Common Saltmarsh-grass.

Another more extensive patch of ASM has developed further west of this area. There is some typical zonation from ASM to ASM/*Spartina* sward mosaic and onto *Spartina* sward along a seaward gradient. A band of vegetation dominated by Saltmarsh Rush is present along the landward boundary. Further seaward there is a change in vegetation cover and there is increased Common Saltmarsh-grass, Sea Plantain, Sea Pink, Common Cordgrass and Lax-flowered Sea Lavender.

2.4 Mediterranean salt meadows (H1410)

The MSM is poorly developed at this site. It is mainly found as a generally narrow fringe of habitat along the shoreline. Some of this habitat is less than 5 m wide. The habitat is distinguished by the presence of Sea Rush (*Juncus maritimus*). This species dominates some dense patches of the saltmarsh vegetation. The tall rush is quite distinct from the low-growing ASM sward, though it may not actually dominate the cover in places and the sward is dominated by Red Fescue. Other species frequently associated with the Sea Rush include Common Scurvy-grass (*Cochlearia officinalis*), Saltmarsh Rush, Creeping Bent (*Agrostis stolonifera*), Lax-flowered Sea Lavender, Red Fescue, Spear-leaved Orache (*Atriplex prostrata*) and Sea Milkwort. Some sections have an understorey dominated by Sea Plantain and Sea Pink. Zonation is poorly developed in this habitat, although some zonation of some species was noted where species like Common Saltmarsh-grass are found along the seaward boundary.

The saltmarsh structure is poorly developed, but this is typical of a relatively small extent of habitat spread over a large area. A low saltmarsh cliff marks the lower MSM boundary in places but there has been some saltmarsh development along the seaward side of this old cliff. Some clumps of Sea Rush are spreading lower on the shoreline and into the *Spartina* sward in places. Perennial Glasswort is occasionally found within tussocks of Sea Rush in this habitat and these patches are mapped as Halophilous scrubs.

Several patches of the habitat are mapped, and most occur in an intricate pattern with ASM and ASM/*Spartina* mosaics. Some of the MSM forms a narrow band of saltmarsh habitat at the landward side of the *Spartina* sward. Further north there are distinctive signs of erosion within this habitat and hags containing Sea Rush are found along the shoreline.

Towards the edge of the habitat boundary, the clumps of Sea Rush become less frequent and there is often a transition to ASM vegetation. It should be noted that in a small number of cases (1/2) occasional clumps of Sea Rush may be present within the ASM, but do not form any appreciable area of MSM habitat.

2.5 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi) (H1420)

This habitat is widely distributed along the southern side of the inlet, although it covers a relatively small area. It was characterised by the presence of Perennial Glasswort, so small patches of saltmarsh where this species appeared was classified as this habitat. The Coastwatch survey first recorded this species on the shingle bank at the east end of the site. This SMP survey reconfirmed these records and increased the number of and distribution of records westwards into the inlet. During the summer, it is often difficult to identify the thin leggy shoots of this prostrate perennial amongst the dense *Spartina*. For this reason it was considered to be under-recorded and a second visit to the site in February 2008 greatly increased the distribution mapping of the species and consequently the Annex I habitat. More extensive surveying may increase the number and distribution of records at this site.

Perennial Glasswort was found in a broad range of habitats or saltmarsh zones at this site. Several large old and woody plants are growing on the shingle bank. This habitat would not normally be considered saltmarsh habitat but these plants are growing low on the bank adjacent to other saltmarsh vegetation including Sea Plantain, Annual Sea-blite, Lax-flowered Sea Lavender and Common Cordgrass.

Perennial Glasswort was also found in the lower zone saltmarsh mapped as ASM or ASM/*Spartina* sward mosaic depending on the density of Common Cordgrass. Smaller and possibly younger plants were growing amongst a sward with Common Saltmarsh-grass, Glasswort, Annual Sea-blite, Lax-flowered Sea Lavender and Greater Sea Spurrey. Plants were also found in denser cover of Common Cordgrass that is classified as *Spartina* sward, mainly along the transition area between the *Spartina* ward and the adjacent ASM. The presence of younger plants growing in the *Spartina* sward suggests that these plants colonised this saltmarsh after Common Cordgrass colonised this area and the presence of Common Cordgrass does not seem to threaten the status of this plant.

Some plants were also found along the seaward boundary of narrow patches of MSM. These plants are found higher up on the saltmarsh and are growing on a low saltmarsh cliff amongst clumps of Sea Rush. Saltmarsh vegetation indicating *Spartina* sward has developed along the base of this low saltmarsh cliff.

2.6 *Spartina* swards

This habitat covers a considerable area of former intertidal mudflats at the site and seems well-established, particularly further west where the inlet is more sheltered. Most of this sward occupies a narrow zone between 10-20 m wide but there are some larger sections that extend seaward for 60 m. There are several areas further north where isolated clumps were noted, suggesting steady growth rather than significant expansion.

There is some natural succession along the landward side of the *Spartina* sward habitat where Common Saltmarsh-grass, Sea Purslane, Sea Aster, Greater Sea-spurrey and Lax-

flowered Sea Lavender all appear within the upper zone. Some of these areas are mapped as ASM/*Spartina* sward where these species are frequent. It is difficult to ascertain from the maps if this represents original ASM vegetation that Common Cordgrass has colonised. This is likely to have happened but there are also small areas where there has been a measurable expansion of ASM due to natural succession after the development of *Spartina* sward.

3 IMPACTS AND ACTIVITIES

Although the site is surrounded by a largely agricultural setting, there are few threatening impacts on this saltmarsh as it is quite isolated (Table 4.1). There is no grazing and poaching and other associated threats by livestock are not an issue at present as the adjacent land is given over to tillage. The southern side of the site is not used for amenity activities and sections are not vulnerable to other damaging activities like dumping as it is isolated. There are some access tracks (501) along the northern side of the site. These tracks are positioned along the landward side of the saltmarsh and are used by farmers to access other fields along the shoreline.

There is a significant area of Common Cordgrass at this site that is now greater than the total area of the other established saltmarsh. This is an invasive species of saltmarsh and mudflats (954). First documented in Bannow Bay in the 1960's, (Nairn 1986) it is not known if *Spartina* was transplanted or arrived of its own accord. As the first record for *Spartina* in Ireland relates to the transplanted specimens in Cork Harbour in 1925, it is reasonable to suggest that it arrived in Bannow Bay after that time. It has since thrived within Bannow Bay and is widespread in its distribution. The *Spartina* sward has mainly developed on the intertidal mudflats adjacent to the saltmarsh fringe. There is some development of ASM/*Spartina* mosaic in places but there are indications that ASM species are spreading into the *Spartina* sward and not vice-versa. For this reason the impact of its presence is assessed as neutral. The relatively narrow band of established ASM and MSM is less vulnerable to colonisation by this species as it is found on moderate slope at elevations where Common Cordgrass is unfavourable. The natural succession of *Spartina* sward to ASM can be assessed as a positive natural change (990).

Natural erosion (900) was noted at this site, particularly along the northern section. The saltmarsh zone is much narrower and is quite fragmented and patchy. The indented terracing visible along the front of these exposed areas of ASM and MSM show signs of natural erosion with isolated mud mounds and hags with patches of vegetation present. There is no *Spartina* sward along this shoreline and the sandier sediment indicates there are increased tidal currents compared to the narrow sheltered inlet. There are also some signs of erosion along the edge of the saltmarsh that has developed on the shingle bank. There are fewer signs of erosion along the southern side of the inlet. An old saltmarsh cliff is present on the saltmarsh but there has been some subsequent expansion of saltmarsh along the seaward side of this old cliff. Overall, there are signs of both erosion and accretion at this site (although no

measurable erosion or retreat within the current monitoring period) so the impact of erosion is assessed as neutral.

A comparison of the old OSI 2nd edition 6 inch map to the current extent of saltmarsh and the profile of the shoreline shows that there has not been any measurable erosion or retreat of shoreline during this period. Indeed, the spread of Common Cordgrass within the inlet may be an indication of accretion (910) in this area and there is some development of ASM in areas where there was previously no development of established saltmarsh. This indicates that natural succession from *Spartina* sward to ASM is occurring (990). However, this is not likely to have occurred in the current monitoring period but over a longer period of time.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1310	954	C	-1	0.008	Inside
H1330	501	C	-1	0.01	Inside
H1330	900	C	0	0.02	Inside
H1330	954	C	0	0.06	Inside
H1330	990	C	+1	0.02	Inside
H1410	501	C	-1	0.02	Inside
H1410	900	C	0	0.02	Inside
H1420	954	C	0	0.059	Inside

out

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.

4 CONSERVATION STATUS

4.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the NHA survey, the 2000 and 2005 OSI aerial photo series. The baseline information from the NHA survey is generally limited to some descriptions of saltmarsh habitat and does not record the specific condition of the saltmarsh during the survey at this site. Previous assessments have concentrated on the entire cSAC. There is no other data available from other surveys in Bannow Bay.

Gorteens saltmarsh is a notable site of particular conservation interest, mainly for the presence of Perennial Glasswort. This rare and protected species was not recorded from this site until 2005 (Coastwatch 2006). The SMP survey has increased the number of records and their known distribution at this site. The saltmarsh is relatively poorly developed at the site and there are only several minor areas of typical ASM development. *Spartina* swards are

well-established at this site and there is some evidence that natural succession is occurring and *Spartina* swards has transitioned to ASM or ASM/*Spartina* mosaic.

The overall conservation status of this site is *unfavourable-inadequate* (Table 5.1). The saltmarsh is in generally good condition and there are no significant negative impacts affecting this site. Gorteens is situated in an isolated section of Bannow Bay and is not grazed. However, the *Salicornia* flats found at this site are vulnerable to colonisation by Common Cordgrass in the future, particularly as their extent is so small.

This site is located within the Bannow Bay 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 Gorteens.

Habitat	EU Conservation Status Assessment			Overall EU conservation status assessment
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	
<i>Salicornia</i> flats (H1310)	Extent Structure and functions Future prospects	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
Mediterranean and thermo-Atlantic halophilous scrubs (H1420)	Extent Structure and functions Future prospects			Favourable

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

4.2.1 Extent

The extent of the habitat is assessed as *favourable*. Although *Salicornia* flats were recorded at this site, there is no accurate information as to its previous extent or condition. It is not extensive. There are no indications that there has been a reduction in the area of *Salicornia* flats vegetation through competition from Common Cordgrass, merely that it is not extensive at this site.

4.2.2 Habitat structure and functions

Given the scarcity of the vegetation, monitoring stops were not carried out in this habitat. A visual assessment of the vegetation indicates that Glasswort (and associated species) were growing healthily. This habitat is found on the side of the shingle bank on mud and on mixed substrate and Common Cordgrass is rare. For this reason, its structure and functions are rated as *favourable*.

4.2.3 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. This habitat is not being affected by any damaging activities at present but some of the patches on mud may be vulnerable to colonisation by Common Cordgrass in the future, particularly as the patches of habitat are quite small. However, the habitat is generally recorded in sheltered areas or on the muddy edges of shingle deposits where Common Cordgrass does not occur or at least is not abundant. The patches that have developed on mixed substrate are less vulnerable to colonisation by this species.

4.3 Atlantic salt meadows (H1330)

4.3.1 Extent

The extent of this habitat is assessed as *favourable*. While there is an erosional trend acting on part of this site along the northern shoreline, there are no indications of any measurable loss of habitat due to erosion within the current monitoring period. There have been no land-use changes or significant colonisation by Common Cordgrass at this site during the current monitoring period. There are indications that natural succession from *Spartina* sward to ASM is occurring at one location in the inlet. Accretion may be occurring in these sheltered conditions and the spread of Common Cordgrass may have enhanced this accretion.

4.3.2 Habitat structure and functions

This attribute is assessed as *favourable*. Two monitoring stops were carried out, both of which achieved the target criteria for habitat structure and functions. The saltmarsh is in good condition and there are no damaging activities. The site is not grazed so the sward structure is quite variable. The overall saltmarsh structure is poorly developed but this is typical of a relatively small saltmarsh spread over a long shoreline. In general, there was little variation in the overall floristic composition of the marsh, and zonation is poorly developed. There is some succession from *Spartina* sward to ASM and there are several patches of mosaic. For this reason, the impact of its spread on species composition is assessed as neutral.

4.3.3 Future prospects

The future prospects for the Atlantic salt meadows at this site are assessed as *favourable* for a number of reasons. This assessment assumes that the current management activities and

level of impacts such as erosion continue in the near future. There are no apparent damaging activities at this site. Common Cordgrass is present at this site and is well-established on the mudflats. However it is not likely to spread into the existing ASM vegetation as most of this habitat is positioned at a level where Common Cordgrass is uncompetitive. Some of the saltmarsh is exposed to natural erosion but this is likely to be occurring at a very slow rate. In contrast there seems to be some succession of *Spartina* sward to ASM in places so the extent of ASM may also increase in the future.

4.4 Mediterranean salt meadows (H1410)

4.4.1 Extent

The extent of this habitat is rated as *favourable*. Although not as extensive as the ASM (Table 3.1), the habitat characterised by the presence of Sea Rush, is patchily distributed throughout the site. Most of the Mediterranean salt meadow habitat is found in mosaic with ASM though it is also found at the eroded edge of the marsh. While there is an erosional trend acting on part of this site along the northern shoreline, there are no indications of any measurable loss of habitat due to erosion within the current monitoring period.

4.4.2 Habitat structure and functions

The habitat structure and functions are assessed as *favourable*. No monitoring stops were carried out in this habitat so this assessment is based on a visual assessment. The MSM is in good condition and there are no damaging activities. The MSM at this site has a typical species assemblage. It also forms part of the larger saltmarsh system and there are transitions to other vegetation types including stands of Sea Club-rush and mosaics with ASM. Common Cordgrass is present in this habitat but is not extensive, mainly due to its position in the upper zone of the saltmarsh.

4.4.3 Future prospects

The future prospects for MSM are assessed as *favourable* for a number of reasons. This assessment assumes that the current management activities and level of impacts such as erosion continue in the near future. There are no apparent damaging activities at this site. Common Cordgrass is present at this site and is well-established on the mudflats. However it is not likely to spread into the existing ASM vegetation as most of this habitat is positioned at a level where Common Cordgrass is uncompetitive. Some of this habitat along the northern shoreline is vulnerable to natural erosion, although this is probably occurring at a slow rate.

4.5 Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) (H1420)

4.5.1 Extent

The extent of this habitat is assessed as *favourable*. There is no information on the former status of perennial Glasswort at this site as this is a new location for this species. Records from 2005 were relocated and the distribution and number of Perennial Glasswort plants has

been greatly increased as part of this survey. There are no indications of any measurable loss of habitat due to erosion land-use changes or significant colonisation by Common Cordgrass at this site during the current monitoring period. This habitat is mainly shielded from erosion by the other habitats.

4.5.2 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. The saltmarsh habitat is in relatively good condition and there are no damaging activities. Perennial Glasswort is found in a variety of situations including on shingle, on mud within *Spartina* sward, amongst clumps of Sea Rush and in habitat that would otherwise be mapped as ASM/*Spartina* sward. The diversity of these ecotypes is a positive indicator. The fact that plants are found within the *Spartina* sward that has only developed in the past 50 years indicates that this species has obviously reproduced and these are not relic plants that are being 'overwhelmed' by Common Cordgrass. Perennial Glasswort seems to co-exist happily with Common Cordgrass and this is also seen at Bannow Island and Fethard. The impact of Common Cordgrass on this habitat is assessed as neutral.

4.5.3 Future prospects

The future prospects of this habitat are assessed as *favourable* for a number of reasons. This assessment assumes that the current management activities and level of impacts such as erosion continue in the near future. There are no apparent damaging activities at this site. Perennial Glasswort is not threatened by Common Cordgrass or by natural erosion that is occurring at the site. In fact, further succession of *Spartina* sward to ASM due to continued accretion may provide more suitable habitat for this species.

5 MANAGEMENT RECOMMENDATIONS

No management is required of this isolated site, other than a regular monitoring regime so that the status of Perennial Glasswort can be maintained. It is likely that this species still remains under-recorded at this site, particularly along the interface between the *Spartina* sward and the ASM/*Spartina* mosaic.

6 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 saltmarshes of Ireland: An inventory and account of their geographical variation. *Biology and Environment: Proceedings of the Royal Irish Academy* **98B**, 87-104.

Dubsky, K. (2006). *Unpublished correspondence concerning the distribution of Sarcocornia perennis*. National Parks and Wildlife Service, Dublin.

Fitzgerald R. (1990). *Inventory of A. perenne in Ireland. NPWS Rare Plant Survey*, Unpublished report to National Parks and Wildlife Service, Dublin.

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

MPSU (2001). *Draft 2 Conservation Plan and aquaculture zoning for Bannow Bay cSAC 697 and SPA 33*. National Parks and Wildlife Service, Dublin.

Rare Plant Survey (1990). Series of NPWS surveys 1990-1994 of rare plant sites. Information held by NPWS.

7 APPENDIX I

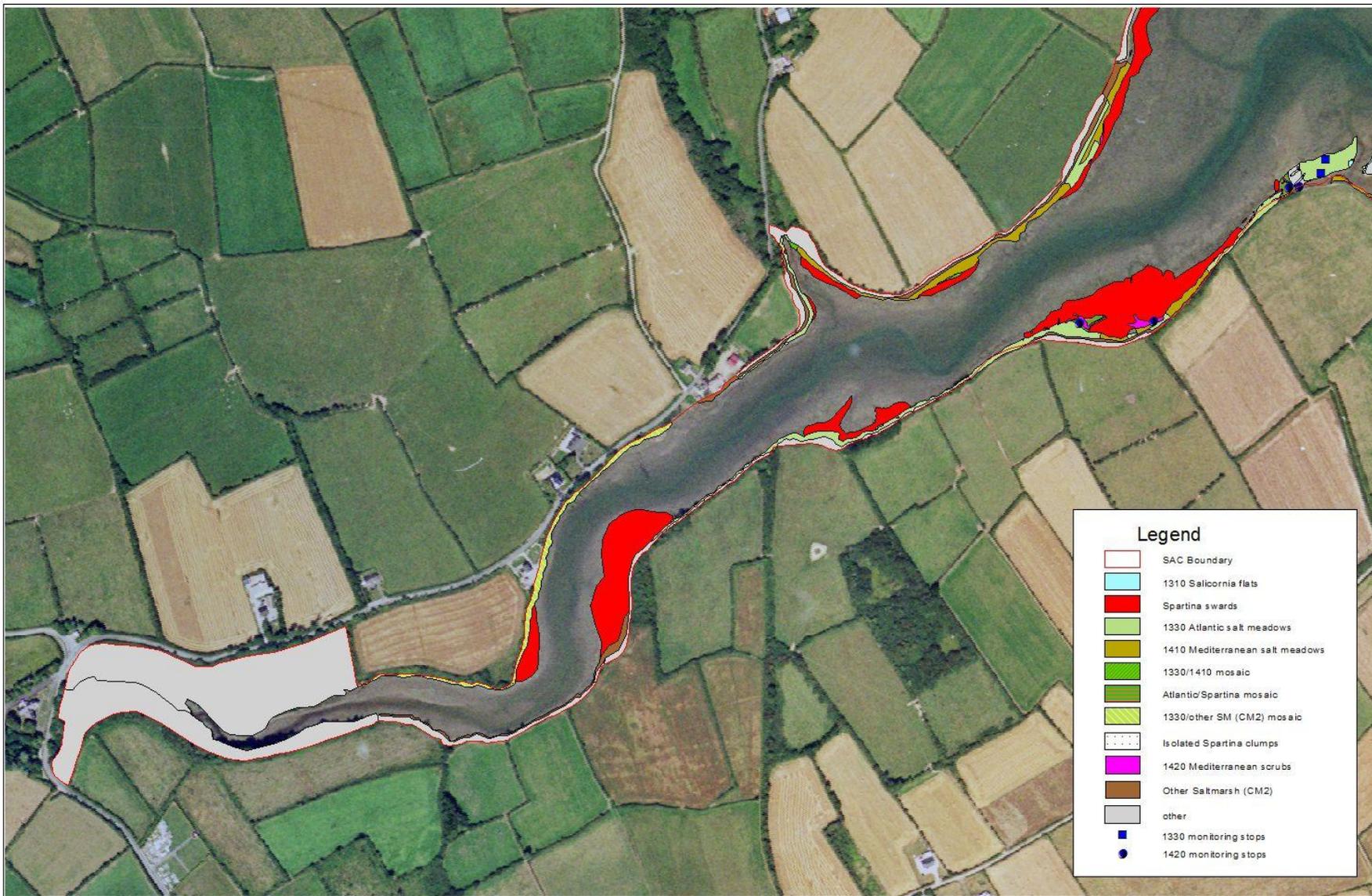
Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 <i>Salicornia</i> flats	0.008	0.008				
2	<i>Spartina</i> swards	2.820					2.820
3	1330 Atlantic salt meadow	0.868		0.868			
4	1410 Mediterranean salt meadow	0.726			0.726		
5	<i>Spartina</i> /MSM mosaic (50/50)	0.118			0.059		0.059
6	ASM/ <i>Spartina</i> mosaic	0.054		0.027			0.027
7	1330/other SM (CM2) mosaic	0.203		0.102			
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	1.326					
10	<i>Spartina</i> clump/mudflat mosaic (50/50)						
11	Isolated <i>Spartina</i> clumps on mud (5%)	0.005					0.00025
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	<i>Spartina</i> sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some <i>Spartina</i>						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.672					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub	0.059				0.059	
21	1310/1330 mosaic						
	Total	6.86	0.008	1.00	0.79	0.059	2.91



<p>Comhaltas, Oidreacht agus Inbhe Agus Ardmáistir, Heige agus Local Government National Parks and Wildlife Service</p>	<p>Saltmarsh Monitoring Project 2007-2008</p>	<p>Gorteens (Map 1 of 2) Bannow Bay SAC (000697)</p>	<p>SMP code: SMP0045</p>	<p>0 60 120 180 240 300 Meters</p> <p>Date of production: 22/02/2009 Map version: 1</p>	<p>Original Drawing Size: 297 x 420 (A3) Scale 1:4250</p>
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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).



Legend

- SAC Boundary
- 1310 Salicornia flats
- Spartina swards
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- 1330/1410 mosaic
- Atlantic/Spartina mosaic
- 1330/other SM (CM2) mosaic
- Isolated Spartina clumps
- 1420 Mediterranean scrubs
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stops
- 1420 monitoring stops

 Comhaltas, Oidhroinnt agus Inbhar Áine An t-Éireann, Heige agus Local Government National Parks and Wildlife Service	Saltmarsh Monitoring Project 2007-2008	Gorteens (Map 2 of 2) Bannow Bay SAC (000697)	SMP code: SMP0045	 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 1:4250	

Appendix VIII – Fethard site report and habitat map from the SMP (McCorry & Ryle 2009)

1 SITE DETAILS

SMP site name: Fethard	SMP site code: 0047
Dates of site visit: 29/08/2007 & 22/02/2008	CMP site code: N/A
SM inventory site name: Fethard	SM inventory site code: 214
NPWS Site Name: Bannow Bay	
NPWS designation cSAC: 697	MPSU Plan: Old Format – Draft 2 Consultation, 2001
pNHA: 697	SPA: N/A
County: Wexford	Discovery Map: 76 Grid Ref: 280000, 105000
Aerial photos (2000 series): O 5849-B,D; O 5850-A,C	6 inch Map No: Wx 050
Annex I habitats currently listed as qualifying interests for Bannow Bay cSAC:	
H1310	<i>Salicornia</i> and other annuals colonizing mud and sand
H1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)
H1410	Mediterranean salt meadows (<i>Juncetalia maritimi</i>)
H1420	Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)
Other SMP sites within this SAC/NHA: Taulaght, Saltmills, Grange, Bannow Island, Gorteens, Clonmines	
Saltmarsh type: Estuary	Substrate type: Mud/Sand/Pebbles

2 SITE DESCRIPTION

Fethard saltmarsh is located along the southern coast of Co. Wexford which lies on the promontory approach to Hook Head. The site is located south of Bannow Bay in a small sheltered inlet south of Fethard Village. This inlet is sheltered at the seaward end by a small sand spit with minor development of sand dunes. The surrounding area is dominated by fertile farmland with improved grassland, tillage and arable crops all found in the area. The inlet is found in a small basin and there are moderate slopes from higher ground. Further west the inlet develops into a small valley through which a river flows into the inlet. This inlet is divided by a road bridge accessing Hook Head. Further west of the road bridge there is extensive development of brackish and freshwater wetland habitats in the basin of the valley. The urban part of the village extends to the edge of one part of the inlet. There are also scattered houses along the minor road along the southern side of the inlet.

Much of the inlet between the road bridge and the sand spit now contains saltmarsh habitats. It is spilt into two sections by an undulating river channel that flows through the site. Much of the inlet contained intertidal mudflats but these have been largely infilled by *Spartina* swards.

One notable feature of this site is that the majority of the saltmarsh has developed in the past 100 years and the old OSI 2nd edition 6 inch map does not show any saltmarsh habitat within the inlet, which is marked as containing intertidal mud and sandflats. Saltmarsh was found west of the road bridge at this stage.

Fethard saltmarsh is one of 7 separate saltmarshes that are included within the Bannow Bay candidate Special Area of Conservation (cSAC 696). The cSAC takes in all of Bannow Bay and some land on the shoreline and extends down the coastline to Fethard. The main habitats within the cSAC are the extensive intertidal mudflats, which also support notable populations of wintering waders and wildfowl. Other notable coastal habitats found within the cSAC include the sand dune complexes at Bannow Island and Big Burrow on either side of the entrance to the bay. Three Annex I saltmarsh habitats were recorded at this site including *Salicornia* flats and Atlantic salt meadows (ASM). Both habitats are listed as qualifying interests for this site. *Spartina* swards are also found within the saltmarsh at this site, although this habitat is not now considered to qualify as an Annex I habitat.

Bannow Bay is one of two coastal sites where Perennial Glasswort (*Sarcocornia perennis*) has been recorded in Ireland (the other being Ballyteige Burrow further east along the shoreline in Co. Wexford). Mediterranean and thermo-Atlantic Halophilous scrubs (1420) (from here known as Halophilous scrubs) are the rarest of the four Annex I saltmarsh habitats found in Ireland. This habitat is characterized in Ireland by the presence of Perennial Glasswort on saltmarsh. This species is known from Fethard saltmarsh (Ferguson, 1962, 1964) and its persistence has been confirmed by a number of surveys (NPWS Rare Plant Survey 1990, Dubskey 2006). The 1990 survey indicated that the colony consisted of approximately 50 separate patches measuring 1 metre by 1 metre and mainly occurred in sand/mud pans.

The majority of the saltmarsh habitat is found within the digital cSAC boundary. A minor area of saltmarsh habitat is excluded around the shoreline and this is related to small differences between the old OSI 2nd edition 6 inch map and the current 2005 aerial photo series. Saltmarsh extends beyond the upper boundary as indicated by the old OSI 6 inch map in places.

The majority of the saltmarsh is located on the northern side of the sheltered river inlet and the site is readily accessed from the slipway to Fethard beach and then walking in a southerly direction over the narrow sand ridge. Alternatively, the site may be accessed from the road bridge that crosses the River to the south of Fethard, although this can only be done at low tides and involves crossing mud. Accessing the second part of the saltmarsh, on the opposite bank of the river inlet, is through crossing the mud and sandflats at low tide or alternatively, from a small slipway which runs from a local road.

3 SALTMARSH HABITATS

3.1 General description

Fethard saltmarsh now occupies most of the inlet between the road bridge and the sand spit towards the seaward side of the site. This saltmarsh is now dominated by *Spartina* swards that have nearly infilled former intertidal mudflats that were previously found in the inlet around more established saltmarsh. Most of the marsh is on the northern side of the river, with only one significant area on the opposite shore as well as some fringing marsh. There are still some bare intertidal mudflats located at the south-west corner and along the main river channel through the marsh.

Much of the older saltmarsh is dominated by Atlantic salt meadows (ASM) and is situated along the northern side of the inlet. Common Cordgrass (*Spartina anglica*) has also spread across this saltmarsh and has created significant areas of ASM/*Spartina* sward or *Spartina* sward with small amounts of ASM vegetation. There has been some secondary succession and ASM has developed along the edge of the *Spartina* swards adjacent to the river channel. The saltmarsh structure is particularly well-developed with an intricate network of creeks in places, mainly because most of the marsh is quite flat and at a similar elevation. This is also one of the few sites visited during the SMP where a moderately sized saltmarsh has not been modified by drainage works or attempted reclamation, perhaps because it is quite young.

Small patches of Halophilous scrubs (1420) are distributed through the ASM, the *Spartina* sward and associated mosaics. There are several patches of *Salicornia* flats, mainly distributed in the main channel and some of the minor creeks on sand and mud banks along the edge of the more established saltmarsh where there is some accretion. Further east there is a low sandy mound along the edge of the saltmarsh with some coastal grassland.

There is some transition along the northern boundary of the saltmarsh habitat to a narrow zone containing brackish vegetation dominated by 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 also some development of a band of transitional Twitch (*Elymus repens*)-dominated vegetation, particularly in the north-east corner and adjacent to the sand spit (also mapped as CM2). This zone is situated around the shoreline and is adjacent to hedgerows at a higher level that marks the field boundaries. There is also some natural transition to fixed dune vegetation along the sand hills.

Table 3.1. Area of saltmarsh habitats mapped at Fethard.

EU Code	Habitat	Area (ha)
H1310	<i>Salicornia</i> and other annuals colonizing mud and sand	0.100
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	4.276
H1420	Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)	0.121
Non-Annex	<i>Spartina</i> swards	5.658
	Total	10.155

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

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

A large proportion of mudflats have been colonised by *Spartina* swards, with the effect that there is minor development by *Salicornia* flats vegetation on the intertidal mudflats. Indeed very little *Salicornia* flats vegetation was recorded adjacent to the *Spartina* sward. Several discrete patches of this habitat have been recorded, most of which are associated with larger creeks or the lower edges of ASM-dominated vegetation. These patches of habitat have developed on sand-banks within the main channel or in small accreting patches within the bends of the main creeks in the marsh.

In addition to Glasswort (*Salicornia* spp.) other species that are recorded in this habitat include Annual Sea-blite (*Suaeda maritima*), Greater Sea-spurrey (*Spergularia media*) and occasionally Sea Purslane (*Atriplex portulacoides*). Not surprisingly as the habitat is found on mudflats, Common Cordgrass can account for a small percentage of the habitat. Some patches of this habitat are dominated by dense rank cover of Annual Sea-blite whose development may be related to nutrient enrichment on the site.

3.3 Atlantic salt meadows (H1330)

A number of typical ASM vegetation communities are found within the saltmarsh at Fethard and represent typical zonation within the marsh from low-mid to upper marsh. Much of the marsh is dominated by a mosaic of low-mid marsh and mid marsh communities with distinct zonation related to small changes in the surface topography of the marsh, mainly around salt pans, creeks and central platforms.

The low-mid zone of the ASM habitat are dominated by patches of Sea Purslane and Common Cordgrass with less frequent Common Saltmarsh-grass (*Puccinellia maritima*) and with small amounts of Lax-flowered Sea Lavender (*Limonium humile*), Sea Pink (*Armeria maritima*), Greater Sea-spurrey and Sea Aster (*Aster tripolium*). This community is found around the edges of some of the pans and depressions on the marsh. Common Cordgrass forms a significant but variable part of this vegetation type and there are subtle transitions into pans dominated by this species. This zone forms a complicated mosaic with the mid-marsh zone and with the various mosaics depending on the cover of Common Cordgrass.

There are small sections along some of the creeks where Common Saltmarsh-grass is dominant and has not been colonised by Common Cordgrass. This lower sward is quite rank, especially as it is not grazed and there is some nutrient enrichment from the sewage outflow.

The transition from *Spartina* sward to pure ASM is represented by a complicated mosaic with admixtures of a variety of ASM species already listed but in particular, Sea Purslane, Common Saltmarsh-grass, and Greater Sea-spurrey. Several discrete patches of this ASM/*Spartina* sward mosaic were recorded and they were commonly found on firmer substrates adjacent to the larger creeks that occur in the site.

Much of the more established ASM in the north-east corner is dominated by a mid-marsh community where Sea Pink and Sea Plantain (*Plantago maritima*) are more prominent. Red Fescue (*Festuca rubra*) also appears in this zone along with Saltmarsh Rush (*Juncus gerardii*). The saltmarsh structure is well-developed in this zone and there are frequent large salt pans present.

The mid-upper marsh is easily recognised as, although the site is not grazed by livestock, the vegetation is a low growing homogenous sward unlike the rest of the saltmarsh with tall vegetation characterised by Common Cordgrass. This community is also best-developed in the north-east corner. It is dominated by a small number of species such as Red Fescue (*Festuca rubra*), Sea Pink, Sea Plantain and Lax-flowered Sea Lavender. Other species present include Long-bracted Sedge (*Carex extensa*). Several clumps of Sea Rush (*Juncus maritimus*) are also present in this zone near the upper boundary but they do not occupy a large enough area to be mapped as Mediterranean salt meadows. Minor amounts of Glasswort are also present although they are usually confined to pans in the upper marsh.

3.4 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi) (H1420)

Although Perennial Glasswort is known from this site, the Annex I habitat has not previously been mapped at any of the sites in Bannow Bay cSAC. The presence of Perennial Glasswort as identified in the NPWS Rare Plant Database and recent Coastwatch survey was re-confirmed in the 2007 and the 2008 site visit. The number of plants recorded by this survey has increased the distribution of this species at this site compared to the distribution as mapped by the NPWS Rare Plant Database. The population seems to have increased in abundance and distribution during this period, although there are less large clumps of this species greater than 1 m present. This plant is probably under-recorded by this SMP survey and a longer period of time would be required to survey the whole of the marsh in detail for this plant.

Generally plants are less than 50 cm in diameter, but some larger clumps (> 1 m diameter) were recorded. The larger (and older) plants were generally woodier forms of the plant and are more readily identified on the marsh. It is generally confined to the lower marsh area, in a zone between mid-marsh and *Spartina* sward that has developed in pans to form

ASM/*Spartina* sward mosaics. Species commonly associated with and recorded around the Perennial Glasswort plants include Sea Pink, Common Saltmarsh-grass, Sea Purslane, Lax-flowered Sea Lavender and Sea Plantain.

3.5 *Spartina* swards

The intertidal zone of the marsh is dominated by *Spartina* sward. Pure sward accounts for 4.605ha of the total area mapped. The remainder comprises mostly vegetation transitions with Atlantic salt meadow – *Spartina* with some ASM and ASM/*Spartina* (50/50%) mosaic. This dominance is quite dramatic in light of the fact that Common Cordgrass has extensively spread in the past 40 years (B. Hickey, pers comm.).

While Common Cordgrass is typically the only species in the pure sward, transitions to firmer substrates are marked by the occurrence of other saltmarsh species. Indeed, the transition from intertidal mud onto a more consolidated substrate is characterised by the presence of Perennial Glasswort (*Sarcocornia perennis*) and is mapped as Halophilous scrubs. Elsewhere the species are more typical of ASM habitats which results in a complicated habitat mosaic. Species commonly found include Common Saltmarsh-grass, Sea Purslane, Sea Aster and Lax-flowered Sea Lavender. Common Cordgrass may have spread into more established saltmarsh that developed prior to the colonisation of this site by this species. However, there is frequent evidence that secondary succession of *Spartina* swards into ASM is occurring at this site.

On the southern side of the river estuary, a large area of the saltmarsh is dominated by Common Cordgrass, but is no longer on soft mud. This is mapped as *Spartina* with some ASM and may represent the initial stages of more established ASM development.

4 IMPACTS AND ACTIVITIES

This site is affected by several impacts and activities (Table 3.1). The main impacts are the presence of Common Cordgrass and eutrophication from the sewage outflow from Fethard Village. The site is not grazed and there are few other damaging activities. However, there are indications of natural grazing by wintering wildfowl but this is not considered to have any serious impact on the marsh. In earlier times, the marsh was a natural playground for children. It is still used as a shortcut to the beach and for recreational walkers. Some remnant tracks (501) can still be recognised, particularly towards the back of the marsh where the agricultural fields end. There is little obvious damage from walkers at this site.

There is a significant area of Common Cordgrass at this site that is now greater than the total area of the other established saltmarsh. This is an invasive species of saltmarsh and mudflats (954). First documented in Bannow Bay in the 1960's, (Nairn 1986) it is not known if *Spartina* was transplanted or arrived of its own accord. As the first record for *Spartina* in Ireland relates to the transplanted specimens in Cork Harbour in 1925, it is reasonable to suggest that it arrived in Bannow Bay after that time. It has since thrived within Bannow Bay

and is widespread in its distribution. All the evidence (anecdotal and documented) indicates that this species was not widespread at Fethard prior to the 1960's. The ASM saltmarsh is likely to have been established prior to the colonisation of the site by Common Cordgrass.

The *Spartina* sward has mainly developed on the lower intertidal mudflats adjacent to the more established saltmarsh fringe. There is significant development of ASM/*Spartina* mosaic in places. It is difficult to quantify whether there has been any loss of ASM saltmarsh due to the colonisation of this intertidal zone by Common Cordgrass. All the evidence (anecdotal and documented) indicates that this species was not widespread prior to the 1960's, but that does not clarify the true extent of the ASM prior to the spread of *Spartina* sward. It is likely that this species has spread into the established ASM to form areas of ASM/*Spartina* sward mosaic. For this reason, the impact of its presence is assessed as a moderate negative impact. There is also evidence of secondary succession where *Spartina* sward has developed more frequent cover of typical low zone ASM species such as Sea Purslane and Common Saltmarsh-grass. This natural succession can be assessed as a positive natural change (990).

Perennial Glasswort seems to co-exist happily with Common Cordgrass and is found growing through the sward in association with other species. Common Cordgrass has probably spread into some of the larger clumps recorded by the NPWS Rare Plant Survey and has probably disrupted them to some extent. However, the spread of Common Cordgrass and the subsequent succession of *Spartina* sward to ASM may actually be creating new suitable habitat for Perennial Glasswort. The increased distribution of this species is an indication it must be reproducing and spreading to new areas within the site.

The older established mid-upper ASM is less vulnerable to colonisation by this species as it is found on moderate slopes at elevations where Common Cordgrass is uncompetitive. Whatever the case, the presence of Common Cordgrass seedlings at the seaward side of the *Spartina* sward indicates that the sward is still expanding over the intertidal mudflats. This is occurring towards the road-bridge at the north-east corner of the site. A comparison of the OSI 2000 and 2005 series aerial photos shows that the *Spartina* sward has measurably expanded on the intertidal mud in this area during this period.

Unlike the saltmarsh at Grange which is less than 3 kilometres away, Erosion (900) is not a significant impact at Fethard, as it is situated behind the relative shelter of a growing sand bar. There are no indications of erosion at this site. Accretion (910) within the inlet within the past 100 years has promoted the development of this saltmarsh during this period. The restriction of tidal flow through the road bridge by the construction of one-way valves also is likely to have had a significant influence on the development of this saltmarsh. This is a young and dynamic site and is likely to be still accreting. However, there has been no measurable growth of saltmarsh during the current monitoring period. Accretion is also more likely to promote the expansion of *Spartina* sward at the expense of the mudflats. This also promotes the succession of ASM saltmarsh from *Spartina* sward. Changes in the position of

the main river channel through the marsh between the OSI 2000 and 2005 series aerial photos is one indication that this site is still quite dynamic and likely to continue to change in the future.

Another significant impact is the discharge of Fethard's sewage onto the marsh (701). The small primary treatment facility has not kept pace with the towns' growth. This discharge is also likely to have promoted the spread of Common Cordgrass. There are clear signs of nutrient enrichment through much of the marsh and some of the vegetation is quite rank. This may be affecting the diversity of some sections, particularly close to the outflow pipe. There are plans to relocate and upgrade the sewerage treatment plant, so that it does not discharge onto the saltmarsh.

Impacts and activities adjacent to the site are mainly related to farming (100, 102, 120, 140) and Fethard Town (401). There is also dispersed habitation (403) along the minor road (502) along the southern side of the inlet. These activities have little or no measurable impact on the saltmarsh habitats other than those already mentioned.

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

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
1310	954	C	-1	0.044	Inside
1330	501	C	0	0.005	Inside
1330	910	C	0	0.2	Inside
1330	954	B	-1	1.1	Inside
1330	990	C	+1	0.4	Inside
1420	954	C	0	0.121	Inside
1310	701	C	-1	0.005	Outside
1330	701	B	-1	1.0	Outside
1420	701	C	0	0.121	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 = repairable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence.

⁵ Location of activity: Inside = activities recorded within and directly impacting the 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 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. Previous assessments have concentrated on the

entire cSAC. As a result of this, there is very little detailed information with which to compare and quantify the findings. There is some more detailed baseline data available from the NPWS Rare Plant Survey carried out on the distribution of Perennial Glasswort. It is worth remembering that several separate saltmarshes are found within the Bannow Bay cSAC.

Fethard saltmarsh has several features of notable conservation interest, particularly the presence of a healthy population of Perennial Glasswort. This is also a relatively new marsh, has only developed in the past 100 years and several Annex I habitats are present. The spread of Common Cordgrass has had a significant impact on the site and has infilled a large part of the intertidal flats in the inlet. The *Salicornia* flats vegetation does not appear to have been greatly impacted by the spread of Common Cordgrass in the intertidal zone. The site is also affected by eutrophication caused by untreated sewage piped from Fethard into the site. The overall conservation status of the site is assessed as unfavourable-inadequate due to this impact. However, the impacts are not severe and the saltmarsh is generally in good condition.

This site is located within the Bannow Bay 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 Fethard.

Habitat	EU Conservation Status Assessment			Overall EU conservation status assessment
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	
<i>Salicornia</i> flats (H1310)	Extent Structure and functions	Future prospects		Unfavourable-Inadequate
Atlantic salt meadows (H1330)	Extent Future prospects	Structure and functions		Unfavourable-Inadequate
Mediterranean and thermo-Atlantic halophilous scrubs (H1420)	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*. Although *Salicornia* flats were recorded at this site, there is no accurate information as to its previous extent or condition and there are no indications it was more extensive in the past. Although large areas of the intertidal zone are dominated by Common Cordgrass, it does not seem to impact on the occurrence of *Salicornia* flats which is concentrated on small sandy bars in creeks. These patches of

habitat are likely to be quite dynamic and subject to sudden change in extent and distribution due to changing accretion patterns from year to year.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *favourable*. Three monitoring stops were carried out and all satisfied the target criteria for the habitat. The habitat is in relatively good condition. It is mainly found on sandbanks along the edge or within the main creeks. Common Cordgrass is not a significant feature of this vegetation in these areas, particularly as they are quite dynamic. Some of the vegetation is affected by the nutrient enrichment and there are some stands of rank Annual Sea-blite at the site. However, this does not seem to impact on the overall structure and functions 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 such as the spread of Common Cordgrass continue in the near future. It would appear that Common Cordgrass does not, or has not, become established in the areas where the *Salicornia* flats has developed and whilst the habitat is ephemeral and subject to changing sediment deposition patterns within the creeks, the annual species are likely to regenerate. However, some of this habitat is vulnerable to colonisation by this invasive species.

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 land-use changes within the current monitoring period. Anecdotal evidence suggests that ASM was once more extensive at Fethard, but that the spread of *Spartina* swards within the intertidal zone and onto firmer substrates. This has resulted in the development of extensive *Spartina*/ASM mosaic, which has ultimately reduced the area of pure ASM. However this has largely occurred prior to the current monitoring period and there are no indications that the extent of ASM has been reduced during the current monitoring period.

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 ASM and the ASM/*Spartina* sward mosaic. The ASM is generally in good condition. There is extensive Common Cordgrass scattered over the ASM and it dominates in patches within the ASM/*Spartina* sward. It is not known if it has spread by more than 10% during the current monitoring period due to the lack of accurate baseline data. However there are indications that it has spread somewhat when the condition of the site is compared to the descriptions from the NPWS Rare Plant Survey (1990).

Eutrophication has affected the sward structure and created patches of rank sward in places and possibly has affected the species diversity of these areas. This is the main reason for the revised assessment of structure and functions as *unfavourable-inadequate*. The nutrient enrichment from sewage piped into the site has also probably promoted the spread of Common Cordgrass at this site.

The ASM is well-developed in some sections and there are good examples of several typical ASM communities. Zonation between these communities is related to the natural topography of the saltmarsh surface. The saltmarsh topography is also well-developed and there is an intricate creek network and large salt pans present at this site.

5.3.3 Future prospects

The future prospects are rated as *unfavourable-inadequate*. This assessment assumes that the current management activities and level of impacts such as eutrophication continue in the near future. Most of the ASM is in adequate condition but there are currently some damaging impacts from nutrient enrichment. These are likely to continue while untreated sewage continues to flow into the site. The planned removal or upgrading of the sewage treatment plant (Anon 2006) in the future would probably have a positive impact. This is also a dynamic site and the habitat mosaic may change in the future with potentially more ASM developing from *Spartina* swards due to natural succession. This would be a positive indicator.

5.4 Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) (H1410)

5.4.1 Extent

The extent of this habitat is assessed as *favourable*. There are no indications of any measurable loss of habitat due to erosion or land-use changes within the current monitoring period. This habitat has not previously been defined from this site, although Perennial Glasswort was known to occur here. Indeed, its presence is more widespread than indicated by the NPWS Rare Plant Survey. And while in excess of 100 plants were recorded, it is likely that it was under-recorded owing to the density of the *Spartina* sward. The area of habitat at this site is based on the interpretation of the occurrence of Perennial Glasswort found at this site in summer 2007 and early 2008. Additional detailed surveys would likely increase the number of plants that could be found and thus further refine the habitat boundary. For these reasons, habitat extent is assessed as *favourable*.

5.4.2 Habitat structure and functions

The habitat structure and functions are assessed as *favourable*. The target criteria for this habitat is based upon that used for ASM. Two monitoring stops were made in this habitat, both of which passed on target criteria set out for ASM habitats. The earlier records indicate that the clumps were generally <1metre diameter. Most of the newly recorded plants are small or occur in tight clumps (5-30cm in diameter), suggesting that the Perennial Glasswort

is healthy and reproducing despite the abundance of Common Cordgrass. The impact of Common Cordgrass on this habitat is assessed as neutral.

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 eutrophication or spread of Common Cordgrass continue in the near future. Perennial Glasswort seems to co-exist happily with Common Cordgrass at this site and at others in Bannow Bay, so this invasive species is not seen as a threat. Eutrophication does not seem to be affecting the extent or distribution of this species. It should be noted that Fethard Saltmarsh is a relatively new saltmarsh and has only developed in the past 100 years, so it has been colonised by Perennial Glasswort during this time.

6 MANAGEMENT RECOMMENDATIONS

No active management of the saltmarsh habitat is recommended for this site. However, the planned removal of the sewerage plant at Fethard (Anon. 2006) to another location elsewhere in Fethard may have as yet unrealised impacts on the saltmarsh through the development of the additional homes above the saltmarsh.

7 REFERENCES

- Anon. (2006). *Strategic Environmental Assessment – Environmental Report 2007-2010*. Wexford County Council, Wexford.
- 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 saltmarshes of Ireland: An inventory and account of their geographical variation. *Biology and Environment: Proceedings of the Royal Irish Academy* **98B**, 87-104.
- Dubsky, K. (2006). *Unpublished correspondence concerning the distribution of *Sarcocornia perennis**. National Parks and Wildlife Service, Dublin.
- Ferguson, K. (1962 & 1964). *S. perennis* in Wexford. *Irish Naturalists Journal* **14**, 18-19 & 215.
- MPSU (2001). *Draft 2 Conservation Plan and aquaculture zoning for Bannow Bay cSAC 697 and SPA 33*. National Parks and Wildlife Service, Dublin.
- Nairn, R.G.W. (1986). *Spartina anglica* in Ireland and its potential impact on wildfowl and waders - a review. *Irish Birds*, **3**, 215-258.
- 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)				
			H1310	H1330	H1410	H1420	Spartina swards
1	1310 <i>Salicornia</i> flats	0.100	0.100				
2	<i>Spartina</i> swards	4.065					4.065
3	1330 Atlantic salt meadow	3.645		3.645			
4	1410 Mediterranean salt meadow						
5	ASM/MSM mosaic (50/50)						
6	ASM/ <i>Spartina</i> mosaic	1.186		0.593			0.593
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	1.572					
10	<i>Spartina</i> clump/mudflat mosaic (50/50)						
11	Isolated <i>Spartina</i> clumps on mud (5%)						
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	<i>Spartina</i> sward dominated, with some ASM	1.038		0.038			1.000
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some <i>Spartina</i>						
17	1330/sand dune mosaic						
18	Other SM (CM2)	0.593					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub	0.121					
21	1310/1330 mosaic						
	Total	12.32	0.100	4.28			5.66



Legend

- SAC Boundary
- 1310 Salicornia flats
- Spartina swards
- 1330 Atlantic salt meadows
- Atlantic/Spartina mosaic
- Spartina dom. some 1330
- 1420 Mediterranean scrubs
- Other Saltmarsh (CM2)
- other
- 1310 monitoring stops
- 1330 monitoring stops
- 1420 monitoring stops

<p>Comhaltas, Gníomhaireacht Náisiúnta Éireannais, Na Bóithé agus Na h-Éireannais National Parks and Wildlife Service</p>	<p>Saltmarsh Monitoring Project 2007-2008</p>	<p>Fethard Bannow Bay SAC (000697)</p>	<p>SMP code: SMP0047</p>	<p>0 50 100 150 200 250 Meters</p> <p>Date of production: 22/02/2009 Map version: 1</p>	<p>Original Drawing Size: 297 x 420 (A3) Scale 1:2750</p>
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Appendix IX – Grange site report and habitat map from the SMP (McCorry & Ryle 2009)

1 SITE DETAILS

SMP site name: Grange	SMP site code: 0046
Dates of site visit : 28/08/2007	CMP site code: 043
SM inventory site name: Grange	SM inventory site code: 215
NPWS Site Name: Bannow Bay	
NPWS designation cSAC: 697	MPSU Plan: Old Format – Draft 2 Consultation, 2001
pNHA: 697	SPA: 4033
County: Wexford	Discovery Map: 76 Grid Ref: 281400, 107500
Aerial photos (2000 series): O 5778-A, C	6 inch Map No: Wx 045, 050
Annex I habitats currently listed as qualifying interests for Bannow Bay cSAC:	
H1310 Salicornia and other annuals colonizing mud and sand	
H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	
H1410 Mediterranean salt meadows (Juncetalia maritimi)	
H1420 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticos)	
Other SMP sites within this SAC/NHA: Bannow Island, Clonmines, Fethard, Gorteens, Saltmills, Taulaght	
Saltmarsh type: Sandflats	Substrate type: Sand/Mud

2 SITE DESCRIPTION

Grange saltmarsh is located along the southern coast of Co. Wexford in Bannow Bay. This bay is a fairly large estuarine site which empties at low tide to expose extensive intertidal flats. The bay is sheltered somewhat by a narrow connection to the sea. Saltmarsh has developed around the bay at several locations where conditions allow. Grange or the Big Burrow as it is often referred to, is located to 2.5 km north-east of Fethard Village at Oyster Point. It is situated directly opposite Bannow Island at the mouth of Bannow Bay. The adjacent area is dominated by fertile farmland with improved grassland, tillage and arable crops all found in the area. The surrounding area is low-lying and there are gentle-moderate slopes along a seaward gradient to the shoreline. This part of Co. Wexford is quite rural and there is scattered habitation along minor roads in the area.

Over the past number of years, however, this coastal site has all but been eroded, a fact which was noted in the sand dune survey carried out in 2004 (Ryle *et al.* 2009). Anecdotal evidence has suggested that historically, the sand-flats around Grange and the back of Bannow Island were overlain with a thick band of shingle and cobble, much of which was removed over a number of decades for the purposes of building houses etc. This has

resulted in an “unquantified” acceleration of the erosion along much of the low cliffs and coastal habitats around Grange and further south to Fethard. These changes have also had a very significant impact of the coastal habitats found at this site and the site is currently quite dynamic.

It is unlikely that Grange was ever a substantial sand dune system. The development of the fore dunes was confined to a narrow strip. Much of the ground behind the dune ridge was highly disturbed and was at one time grazed by livestock (Wallace 1995). The water table was close to the surface of the low-lying ground which resulted in the development of dune slack vegetation. Although listed in the saltmarsh inventory, the saltmarsh at Grange was not extensive and was confined to low-lying areas around the water body at the north of the derelict sand hills.

Grange is one of 7 separate saltmarshes that are included within the Bannow Bay candidate Special Area of Conservation (cSAC 696). The cSAC takes in all of Bannow Bay and some land on the shoreline and extends down the coastline to Fethard. The main habitats within the cSAC are the extensive intertidal mudflats, which also support notable populations of wintering waders and wildfowl. Other notable coastal habitats found within the cSAC include the sand dune complexes at Bannow Island and Big Burrow on either side of the entrance to the bay. Two Annex I saltmarsh habitats were recorded at this site, Atlantic salt meadows (ASM) and Mediterranean salt meadows (MSM). Both habitats are listed as qualifying interests for this site.

Bannow Bay is one of two coastal sites where Perennial Glasswort (*Sarcocornia perennis*) has been recorded in Ireland (the other being Ballyteige Burrow further east along the shoreline in Co. Wexford). Mediterranean and thermo-Atlantic Halophilous scrubs (1420) (from here known as Halophilous scrubs) are the rarest of the four Annex I saltmarsh habitats found in Ireland. This habitat is characterized in Ireland by the presence of Perennial Glasswort on saltmarsh. This species is very rare in Ireland and is listed as a Red Data Book species (Curtis and McGough 1988) and is also listed on the Flora Protection Order. The presence of this rare and legally protected species was first noted in 1990 (Fitzgerald and Wallace 1990) who noted that it was locally abundant (in excess of 150 plants) in pans of the low-mid marsh communities. Wallace confirmed its presence a number of years later when carrying out research into its distribution as part of a M.Sc. dissertation (Wallace 1995).

The saltmarsh at this site is notable for the presence of Sharp Rush (*Juncus acutus*). This species is much more rarely found on saltmarshes compared to Sea Rush (*Juncus maritimus*). Stands of saltmarsh vegetation dominated by either Sea Rush or Sharp Rush can be classified as MSM. There are few saltmarshes in Ireland with the rarer MSM sub-type dominated by Sharp Rush present. Sharp Rush is generally found along the upper boundary of the saltmarsh/fixed dune interface, although it was previously more abundant as indicated by the eroded hags of its root system.

Despite its proximity to Fethard, Bannow Island and Gorteens (all of which support populations of Perennial Glasswort) which lies around the headland from Grange, the Perennial Glasswort was not located. Indeed, by the time of an earlier survey of the sand dune system in 2004 (Ryle *et al.* 2009), the extent of the saltmarsh had been greatly reduced, a fact which was also documented in a memo to NPWS (Dubsky 2006) who described that the site had been totally obliterated through erosion.

The entire saltmarsh habitat at this site is found within the digital cSAC boundary. The site was accessed via a small carpark that allows access to the shoreline.

3 SALTMARSH HABITATS

3.1 General description

The current saltmarsh is associated with a small sand dune system and brackish water-body that is found at the northern tip of Grange, towards Oyster Point. The original marsh had developed on a sheltered area behind the sand dune spit and the mainland. There was development of ASM at the northern end of this area and further south there were transitions to brackish habitats, dune slack and onto wet grassland. However this spit has been eroded significantly and the saltmarsh has also been significantly reduced in extent due to erosion.

Much of the remaining saltmarsh that was investigated during the course of this survey is considered to be derelict remnants of the original saltmarsh or possible secondary saltmarsh development. Indeed, much of this area had previously been characterised as largely consisting of dune slacks in 2004 (Ryle *et al.* 2009). It is mostly confined to peripheral locations around a brackish water-body that has developed at the northern tip of the site.

Sediment has accreted along the seaward side of the former saltmarsh with the development of a significant area of embryonic and mobile dunes on a large ridge in the northern section. Seaward of this ridge there is extensive sand flats. This ridge was beginning to grow in the 2004 survey but it has now cut off regular tidal inundation into saltmarsh and created a pool with standing water for long periods of time. This has caused the remaining marsh to develop brackish vegetation. There is a channel along the western side that connects to the marsh. This site is quite dynamic and there are frequent indicators that it is still changing. Much of the vegetation seems transitional in appearance and there are frequent open patches of bare substrate where some of the vegetation has died.

The brackish vegetation is dominated by extensive stands of Sea Club-rush (*Bolboschoenus maritimus*) and Grey Club-rush (*Schoenoplectus lacustris* spp. *tabernaemontani*) towards the landward side and there are also patches of open brackish water in the pool. These stands have been classified and mapped as CM2 or other Non-Annex saltmarsh vegetation in accordance with the SMP project classification. The Sea Club-rush is found in standing water. There is a zone dominated by a swampy area of Creeping Bent-grass around the landward (southern) side of the Sea Club-rush. The brackish influence seems to have

increased in the former dune slack area and there is lots of dead vegetation with newly colonising Sea Aster (*Aster tripolium*), Saltmarsh Rush (*Juncus gerardii*), False-fox Sedge (*Carex otrubae*), Silverweed (*Potentilla anserina*), Spear-leaved Orache (*Atriplex prostrata*), Celery-leaved Buttercup (*Ranunculus sceleratus*) and Sea Plantain (*Plantago maritima*). Further south there is a transition from brackish vegetation to diverse dune slack or wet grassland, where there is increased freshwater influence with species such as Purple Loosestrife (*Lythrum salicaria*), Marsh Arrowgrass (*Triglochin palustre*), Curled Dock (*Rumex crispus*), Twitch (*Elymus repens*), Lesser Spearwort (*Ranunculus flammula*), Soft Rush (*Juncus effusus*), Spike-rush (*Eleocharis* sp.), Common sedge (*Carex nigra*), Mint (*Mentha aquatica*), Anglica (*Angelica sylvestris*) and Yellow Flag (*Iris pseudacorus*) appearing. The occurrence of Atlantic salt meadow (ASM) vegetation is negligible in extent and the greatest area of saltmarsh vegetation is dominated by Sea Rush (*Juncus maritimus*). Clumps of Sharp Rush are mostly found on the edge of the dune-slack vegetation and the landward edge of the brackish vegetation.

Although a single clump of Common Cordgrass was recorded in this brackish pool, there are no mudflats at Grange. There is no development of *Salicornia* flats or indeed *Spartina* sward during the time of this survey.

Table 3.1. Area of saltmarsh habitats mapped at Grange.

EU Code	Habitat	Area (ha)
H1310	<i>Salicornia</i> and other annuals colonizing mud and sand	0
H1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)	0.014
H1410	Mediterranean salt meadows (<i>Juncetalia maritimi</i>)	0.040
H1420	Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)	0
	Total	0.054

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

3.2 Atlantic salt meadows (H1330)

Any semblance of Atlantic salt meadow (ASM) vegetation at this site has all but been decimated at this site due to the ongoing erosion and redistribution of the sediment. Notwithstanding this, a very small (Table 3.1) and highly disturbed patch of ASM vegetation was recorded at the northern side of the semi-permanent pool adjacent to the back of the embryonic dunes. The vegetation is quite open and there is frequent bare substrate.

The fragmentary vegetation largely consists of Creeping Bent (*Agrostis stolonifera*), Sea Milkwort (*Glaux maritima*), Sea Aster (*Aster tripolium*), Glasswort (*Salicornia* sp.), Sea Plantain, Saltmarsh Rush and Sea Arrowgrass (*Triglochin maritimum*). Other minor species included Long-bracted Sedge (*Carex extensa*), Orache spp. (*Atriplex* spp.), Hard-grass (*Parapholis strigosa*), clumps of Sea Rush and several clumps of Sharp Rush.

3.3 Mediterranean salt meadows (H1410)

The largest area of saltmarsh vegetation remaining at this site is composed of a narrow band of Sea Rush-dominated vegetation at the landward side of the brackish pool. Floristically poor, this linear patch of MSM vegetation was homogenous in appearance and as extensive (Table 3.1) as previously recorded in 2004 (Ryle *et al.* 2009). This MSM may be related to secondary development of saltmarsh along the edge of the semi-permanent pool. The sward height is quite tall (0.5-1 m high) and dense in places. There are some clumps of Sharp Rush present in this habitat. Other species present include Sea Aster, Spear-leaved Orache and Creeping Bent-grass. This habitat seems to be in a state of flux and there are patches within the habitat with bare substrate. There is no development of typical stable habitat with typical saltmarsh structure.

Sharp Rush is also found at this site. However, most clumps are scattered over the dune slack area. There are also some clumps scattered amongst the Sea Rush-dominated vegetation and along the upper limit of the brackish stands of Sea Club-rush mainly at its upper limit. The Sharp Rush is not found in a distinctive saltmarsh community. These clumps have colonised sandy substrate. Clumps are also scattered around the brackish pool and there are indications that the number of clumps has increased recently.

4 IMPACTS AND ACTIVITIES

The site at Grange is affected by several impacts and activities (Table 4.1) with by far the most significant impact being erosion (900). The sand spit with its associated habitats and saltmarsh has significantly eroded in the past 100 years when comparing the extent of the spit on the old 2nd edition 6 inch map to the current extent. Significant changes can also be seen between the 2001 and 2005 series OSI aerial photos in the profile and extent of the sand spit and associated habitat. Anecdotally the level of erosion has hastened over the past 20 years since the large deposits of cobble and shingle have been removed from the beach for construction purposes.

More recently, there has been a significant redistribution of the sediment from the seaward side of Grange, which has been redeposited at the northern tip of the site at Oyster Point extending into the inner parts of Bannow Bay. A large part of the original saltmarsh has been eroded and the remaining habitat is subject to dynamic natural changes caused by the re-deposited sediment that is currently creating brackish conditions around a semi-permanent pool. The structure of this area has also changed significantly since the 2004 survey (Ryle *et al.* 2009) and the semi-permanent pool has developed since then.

The impact of erosion is rated as A (high intensity with a irreparable negative influence). Habitat maps based on earlier surveys during this monitoring period indicates that about 2 ha of saltmarsh (ASM, MSM and Halophilous scrubs) were present at the site. Nearly all of this original saltmarsh has been destroyed. There is no possibility for the retreat of the saltmarsh

further west as it is confined by moderately slopes terrestrial farmland adjacent to the coastal system. Some saltmarsh may develop in the future if the site stabilises and there is no further erosion.

There are no other significant negative impacts affected this site. The site is not grazed, although it probably was in the past. There are some old tracks across the site but these do not cross the saltmarsh. Recreational use at Grange consists mostly of pedestrian traffic which has little impact or no on the remaining saltmarsh (622). A number of tracks (501) are visible the year 2000 series aerial photographs. Many of these have been eroded, although there is a trail alongside the MSM vegetation. As a result of the erosion and often waterlogged dune slacks, the majority of walkers walk along the beach. These activities have little or no impact on the site. Common Cordgrass was recorded from this site. This is an invasive species of saltmarsh and mudflats (954). However, very few clumps were recorded and this species has very little impact.

Impacts and activities adjacent to the site are mainly related to farming (100, 102, 120, 140). There is also dispersed habitation (403) along the minor road (502) on 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 Grange.

EU Habitat Code	Activity code	Intensity	Impact	Area affected (ha)	Location of activity
H1330	900	A	-2	0.014	Inside
H1330	954	C	0	0.014	Inside
H1410	501	C	0	0.001	Inside
H1410	622	C	0	0.001	Inside
H1410	900	A	-2	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.

5 CONSERVATION STATUS

5.1 Overall Conservation Status

The conservation status of a site is assessed on the condition of the site and on baseline information. The main source of baseline information for this site is the NHA survey, the 2000 and 2005 OSI aerial photo series. The baseline information from the NHA survey is generally limited to some descriptions of saltmarsh habitat and does not record the specific condition of the saltmarsh during the survey at this site. There is some more detailed baseline data available from the Rare Plant Survey (Fitzgerald 1990) and from a M.Sc. thesis (Wallace 1995) carried out on the ecology of Perennial Glasswort.

The site has changed radically when compared to these older descriptions of the saltmarsh at this site. The changes seen at this site represent the greatest changes recorded at any site during the Saltmarsh Monitoring Project. The small dune system along much of the front of this saltmarsh has been obliterated due to erosion probably enhanced by sediment removal in the past. There has been significant loss of sand dune and saltmarsh habitat compared to its original extent and the remaining area has changed significantly in structure and composition. Brackish marsh dominated by *Bolboschoenus maritimus*) is now much more prominent. This habitat has increased in extent since the 2004 survey of the sand dune habitats (Ryle *et al.* 2009). The current marsh may not be functioning as a saltmarsh with regular tidal inundation due to the position of a sandy ridge along the front of the former marsh, which has created a semi-permanent brackish pool. A small patch of *Salicornia* flats recorded by Ryle *et al.* (2009) has now disappeared as this area has been infilled by the sandy ridge. Perennial Glasswort was not re-found and is likely to be extinct.

The overall conservation status of the small area of saltmarsh is considered to be *unfavourable-bad*. This site is still highly dynamic and likely to continue to change and evolve in the future. In the long-term there may be some development of stable saltmarsh habitat if the sand dune system and changes in sediment distribution stabilises.

This site is located within the Bannow Bay 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 Grange.

Habitat	EU Conservation Status Assessment			Overall EU conservation status assessment
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad	
<i>Salicornia</i> 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	Unfavourable-Bad
Mediterranean and thermo-Atlantic halophilous scrubs (H1420)			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 *unfavourable-bad*. This habitat was not recorded at this site. The CMP survey recorded some *Salicornia* flats at this site in 2004 so erosion and sediment re-distribution during this period has had a significant negative impact.

5.2.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-bad*.

5.2.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-bad*.

5.3 Atlantic salt meadows (H1330)

5.3.1 Extent

The extent of this small patch of highly disturbed ASM is rated as *unfavourable-bad*. The extent of the original saltmarsh habitat has been reduced significantly and there has also been significant loss during the current monitoring period. There was no indication of ASM

vegetation during the 2004 sand dune survey (Ryle *et al.* 2009). The saltmarsh was estimated to be 2.5 ha in 1990 (NPWS Rare Plant Survey) and was reduced to about 0.5-0.75 ha in 2001.

5.3.2 Habitat structure and functions

The structure and functions of the ASM are assessed as *unfavourable-bad*. One monitoring stop was carried out in this habitat and it passed. All the attributes reached their targets for favourable status during the field survey. However, the small patch of ASM vegetation was highly disturbed and did not exhibit features that would be seen in more stable habitat, such as salt pans. The ASM habitat is likely to be secondary development of habitat with few features of the original habitat left. The saltmarsh vegetation is quite dynamic and there were no typical saltmarsh communities present at the site that indicate stable conditions. Therefore, the assessment is *unfavourable-bad*.

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 erosion continue in the near future. Erosion is likely to continue at this site in the near future and the ASM habitat is likely to be affected by the current natural dynamic changes that are affecting this site and are related to re-distribution of sediment.

5.4 Mediterranean salt meadows (H1410)

5.4.1 Extent

The extent of this MSM is rated as *unfavourable-bad*. It is not known what proportion of the original saltmarsh was MSM. However, the extent of the original saltmarsh habitat has been reduced significantly and there has also been significant loss during the current monitoring period so this is also likely to have reduced the extent of MSM. Comparison of the MSM distribution in the 2004 habitat map (Ryle *et al.* 2009) with the current survey reveals a considerable reduction in habitat extent. For this reason, habitat extent is assessed as *unfavourable-bad*.

5.4.2 Habitat structure and functions

The structure and functions of this habitat were visually assessed as *unfavourable-bad*. Monitoring stops were not carried out in this habitat during the field survey due to its position adjacent to a large brackish patch of habitat and a brackish semi-permanent pool that is not likely to be performing as a saltmarsh. The MSM was structurally homogeneous and had a species-poor flora. Sharp Rush is present at this site but does not form a distinctive saltmarsh community and clumps are scattered over brackish and dune slack vegetation.

5.4.3 Future prospects

The future prospects of the MSM habitat are rated as *unfavourable-bad*. This assessment assumes that the current management activities and level of impacts such as erosion continue in the near future. Unless the site experiences a severe erosion phase, it is unlikely that there will be a significant change in the extent of the remaining MSM vegetation at Grange, as a considerable sand bar has developed to the northern tip of the site, since 2004, which appears to limit the damage from tidal erosion from the northern approach to the habitat.

However, erosion is likely to continue at this site in the near future and the MSM habitat is likely to be affected by the current natural dynamic changes that are affecting this site and are related to re-distribution of sediment. The current marsh is not functioning as a typical saltmarsh as tidal inundation is restricted and a semi-permanent brackish pool has developed due to the development of a sand ridge along the front of the original marsh. It is not known how this site will develop in the future.

5.5 Mediterranean and thermo-Atlantic halophilous scrubs (H1420)

5.5.1 Extent

The extent of this habitat is assessed as *unfavourable-bad*. Perennial Glasswort was not refound at this site. Considering the significant changes that have occurred at this site it is likely to be extinct as its habitat (ASM vegetation) has been destroyed.

5.5.2 Habitat structure and functions

The structure and functions of this habitat are assessed as *unfavourable-bad*.

5.5.3 Future prospects

The future prospects of this habitat are assessed as *unfavourable-bad*.

6 Management Recommendations

This site has over the past number of years being decimated, to the extent that the saltmarsh habitats at Grange are of limited conservation value. Much of the frontline has been eroded with a loss of much of the sand-dune habitats that were recently recorded (Ryle *et al.* 2009). Given the redistribution of the sand to the northern end of the site, it is recommended that the site be revisited in the near future to monitor any further change to both the Annex I saltmarsh and sand dune habitats.

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 saltmarshes of Ireland: An inventory and account of their geographical variation. *Biology and Environment: Proceedings of the Royal Irish Academy* **98B**, 87-104.
- Dubsky, K. (2006). *Unpublished correspondence concerning the distribution of *Sarcocornia perennis**. National Parks and Wildlife Service, Dublin.
- MPSU (2001). *Draft 2 Conservation Plan and aquaculture zoning for Bannow Bay cSAC 697 and SPA 33*. National Parks and Wildlife Service, Dublin.
- Nairn, R.G.W. (1986). *Spartina anglica* in Ireland and its potential impact on wildfowl and waders - a review. *Irish Birds*, **3**, 215-258.
- Rare Plant Survey (1990). Series of NPWS surveys 1990-1994 of rare plant sites. Information held by NPWS.
- Ryle, T., Connolly, K., Murray, A. & Swann, M. (2009). *Coastal Monitoring Project. 2004-2006*. Report to the National Parks and Wildlife Service, Dublin.
- Wallace, E.F. (1995). *Aspects of the ecology of *Arthrocnemum perenne* in Ireland*. Unpublished M.Sc. thesis.

8 APPENDIX I

Table 8.1. Areas of SMP habitats mapped using GIS.

SM Habitat code	SM habitat description	Mapped Area (ha)	Area (ha)				
			H1310	H1330	H1410	H1420	<i>Spartina</i> swards
1	1310 <i>Salicornia</i> flats						
2	<i>Spartina</i> swards						
3	1330 Atlantic salt meadow	0.01429		0.014			
4	1410 Mediterranean salt meadow	0.040			0.040		
5	ASM/MSM mosaic (50/50)						
6	ASM/ <i>Spartina</i> mosaic						
7	1330/other SM (CM2) mosaic						
8	1330/coastal grassland mosaic						
9	Other (non saltmarsh)	5.265					
10	<i>Spartina</i> clump/mudflat mosaic (50/50)						
11	Isolated <i>Spartina</i> clumps on mud (5%)	0.00029					0.00001
12	pioneer 1330/1310/ <i>Spartina</i> mosaic						
13	1410/other SM (CM2) mosaic						
14	<i>Spartina</i> sward dominated, with some ASM						
15	1310/ <i>Spartina</i> mosaic						
16	ASM dominated with some <i>Spartina</i>						
17	1330/sand dune mosaic						
18	Other SM (CM2)	1.780					
19	1330/rocky shore mosaic						
20	1420 Mediterranean scrub						
21	1310/1330 mosaic						
	Total	7.10		0.014	0.040		0.00001



Legend

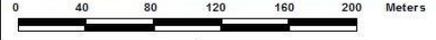
- SAC Boundary
- 1330 Atlantic salt meadows
- 1410 Mediterranean salt meadows
- Isolated Spartina clumps
- Other Saltmarsh (CM2)
- other
- 1330 monitoring stop



**Saltmarsh Monitoring
 Project
 2007-2008**

Grange
Bannow Bay SAC (000697)

SMP code:
 SMP0046



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 5983)

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

Original Drawing Size: 297 x 420 (A3)
 Scale 1:2500

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

SITE DETAILS

CMP04 site name: **Bannow Island** CMP04 site codes: **042** CMP Map No.: **39**

County: **Wexford** Discovery map: **76** Grid Reference: **S 733 078**

6 inch Digital Maps: **Wx 045, 046 & 050**

Aerial photographs (2000 series): **O 5778-A, B, C, D**

NPWS Site Name: **Bannow Bay**

NPWS designation: **NHA: 697** **cSAC: 697** **SPA: 4033**

Other Designation: **Nature Reserve - Wildfowl Sanctuary (2)**

Ranger Area: **Wexford South-West**

MPSU Plan: **N/A**

Report Author: **Tim Ryle**

SITE DESCRIPTION

Bannow Island lies at the mouth of the large south-facing estuary of Bannow Bay, on its eastern flank. It is one of two coastal sites from Bannow Bay, the other, Grange (CMP site 043) lies on the opposite side of the seaward opening to the Bay. The beach at Bannow Island beaches is popular throughout the year with recreational users, particularly walkers and birdwatchers. At Bannow Island picnickers and campers frequent the site. Bathing also occurs at the beach, but not to the same degree as many other beaches found in Wexford, possibly owing to the strong currents.

Both Bannow Island and Grange are found within the Bannow Bay candidate Special Area of Conservation (cSAC 697) which is of considerable conservation significance due to the occurrence of 11 Annex I coastal habitats that are found within the site, including the priority fixed dune habitat. It is typical of many coastal estuaries in that it contains large areas of mud and sand, the estuary alone comprising approximately 85 % (NATURA 2000 database estimate - 78%) of the total site area of 1313.802ha. The sand dune habitats occupy only a small fraction of the site (approximately 6%),

occurring as they do on either side of the estuary's mouth – Bannow Island on the east and Grange to the west.

Two red data book species - *Sarcocornia perennis* (perennial glasswort) and *Asparagus officinalis* var. *prostratus* (Wild Asparagus) are noted from the site, although neither was recorded during the 2004 survey. Another species typical of Saltmarshes is *Juncus acutus* (Sharp rush). Several large tussocks were recorded around the edge of the saltmarsh where it abuts the fixed dune grassland.

The beach at Bannow Island comes under the management of Wexford County Council who maintain public access to the beach. No other facilities such as those typically encountered in and around resort beaches are currently provided as they are more frequently used by walkers than holidaymakers.

Table 42A shows the relatively small areas of sand dune habitat that were recorded at Bannow Island. While both Bannow Island and Grange are sandy in nature, the area occupied by both varies considerably and is influenced by the tidal current in the estuary. The beach at Bannow Island is somewhat sheltered from the mouth of the estuary, and as a result undergoes less erosion than might be expected at the mouth of a Bay or Estuary. The sand dune habitats at Bannow Island only occupy 3.340ha, with a beach front of approximately 275 metres long. This represents only 0.25 % of the total area included in the cSAC. Other habitats that were recorded in close proximity to the small sand dune system include Atlantic Saltmarsh and agricultural land and scrub, some of which is invading at the expense of the fixed dune habitat.

Table 42A Areas of EU Annex I habitats mapped at Bannow Island

EU Code	EU Habitat	Area(ha)
H1210	Annual vegetation of driftlines	0.002
H2120	Shifting dunes along the shoreline with <i>Ammophila arenaria</i>	0.105
H2130	Fixed coastal dunes with herbaceous vegetation	3.233
	Total Sand dune	3.340

Fixed Dunes (H2130)

The fixed dunes at Bannow Island, which are relatively level, are characterised by a short, species-poor sward, which is strongly influenced by vehicle movements. The fixed dunes occupy an area estimated at 3.340ha (Table 42A). Typical species

recorded among the sward include *Festuca rubra* (Red fescue), *Galium verum* (Lady's bedstraw), *Carex arenaria* (Sand sedge), *Daucus carota* (Wild carrot), *Ononis repens* (Common restharrow), *Lotus corniculatus* (Common bird's-foot-trefoil) and *Arrhenatherum elatius* (False-oat grass). Taller *Ammophila arenaria* (Marram) dominates the front of the system and on sloping ground to the west. Other features of the habitat include areas of shrub dominated vegetation. A derelict cottage with a heavily overgrown garden is the source of many of the individual shrubs.

Mobile Dunes (H2120)

The front of the dune face at Bannow Island is being regularly reworked. As a result, only a narrow band of mobile dune vegetation was recorded at the front of the fixed dune habitat and is dominated by *Ammophila arenaria* (Marram). Other species include *Elytrigia juncea* (Sand couch) and *Euphorbia paralias* (Sea spurge). Typically the vegetation was rarely complete and the percentage of bare ground increased around areas where people access the beach. In total the mobile dunes occupied an area of 0.105ha (Table 42A).

Strandline (H1210)

Unlike Grange (CMP site 43), where the annual strandline is better developed and more extensive, only a very small area of strandline vegetation was recorded at Bannow Island (0.002ha), mainly in one small corner of the beach where accumulated tidal litter is not washed out. Typical species included a number of *Atriplex* spp. (Orache), *Cakile maritima* (Sea rocket) and *Honckenya peploides* (Sea sandwort).

IMPACTS

The main activities impacting the small sand dune system at Bannow Island are given in Table 42B. The impacts are broken into two categories, namely recreational and erosion. Other impacts that have been identified in the NATURA 2000 dataform such as the effects of agricultural runoff are less readily quantified, particularly in terms of sand dune habitats.

Despite its location at the mouth of Bannow Bay, tidal-mitigated erosion (code 900) is not serious at Bannow Island, as it is somewhat sheltered in a cove. However, erosion is evident at the front of the system, with strandline vegetation much reduced and

embryonic dunes non-existent at the time of survey. The fixed dune habitat is not undergoing significant loss, although it is not considered in good condition owing to the various impacts particularly vehicles parking there.

Table 42B Intensity and impact of various activities on sand dune habitats at Bannow Island

EU Habitat Code ¹	Activity Code ²	Intensity ³	Impact ⁴	Area affected/ha	Location of Activity ⁵
H1330	501	C	-1	0.01	Inside
H2130	501	B	-1	0.16	Inside
H2130	608	C	-1	0.06	Inside
H2130	900	C	0	Unknown	Inside

¹EU Codes as per Interpretation Manual. Code 21BB is an additional code used to signify the entire dune habitat.

² Description of activity codes are found in Appendix 5

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

⁴ Impact is rated as: -2 = irreparable negative influence, -1 = repairable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence

⁵ Location of activity: Inside = activities recorded within and directly impacting the sand dune habitat. Outside = activities recorded outside but adjacent to sand dune habitat that are impacting the sand dune habitat

Tracks and paths are visible on the aerial photographs (year 2000). The condition of the dune grassland e.g. low sward height is largely as a result of recreational use – walkers creating trails (code 501) and cars and caravans being driven onto fixed dunes (impact code 608).

CONSERVATION STATUS

Bannow Island and Grange, are both found within Bannow Bay whose dune systems have previously been classified as nationally important (Curtis 1991). The ecological information in the NATURA 2000 database relates to the whole site, rather than the individual sites of the current survey. Thus the conservation assessment, while including some baseline information from the NATURA forms, is largely based on the results of the current survey.

The conservation status of the individual sand dunes habitats recorded at Bannow Island is listed in Table 42C. The sand dune system at Bannow Island is not of significant ecological or structural interest, and it seems unlikely that any significant changes will occur in the near future.

Fixed Dunes (H2130)

The conservation status of the fixed dunes for Bannow Bay including Bannow Island and Grange was described as unfavourable-poor (*unfavourable-inadequate* in current terminology) in the NATURA 2000 database. The extent of the fixed dune habitat at

Bannow Island is considered *unfavourable-inadequate*. Natural erosion coupled with the spread of scrub species and the lack of any recreational management plan will continue to negatively impact the habitat.

Table 42C Conservation status of Annex I sand dune habitats at Bannow Island

Habitat ¹	EU Conservation Status Assessment			Overall EU conservation status assessment	Proposed Irish conservation status system ²
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad		
Fixed Dunes (H2130)	Structure & Functions	Extent / Future Prospects		Unfavourable - Inadequate	Unfavourable - Unchanged
Mobile Dunes (H2120)	Structure & Functions	Extent / Future Prospects		Unfavourable - Inadequate	Unfavourable - Declining

¹EU Codes as per Interpretation Manual

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

Although relatively species-poor and in places rank as the vegetation is not grazed, all four monitoring stops passed on structure and functions, resulting in a *favourable* rating (Table 42D). However, the use of the low-lying areas for parking and recreational purposes by visitors maintains a short sward, which adds to the structural interest of the habitat.

The future prospects are rated as *unfavourable-inadequate* as anthropogenic-induced threats such as erosion and littering are impacting on the fixed dunes and negatively influencing their conservation value.

Table 42D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Bannow Island

Habitat	Monitoring stops		Conservation status
	Pass	Fail	
Fixed Dunes (H2130)	4	0	Favourable
Mobile Dunes (H2120)	1	0	Favourable

Mobile Dunes (H2120)

The extent of the mobile dunes at Bannow Island is rated as *unfavourable-inadequate*. The morphological condition of the mobile ridge is poor as they occur only as a narrow band at the front of the eroding dune face.

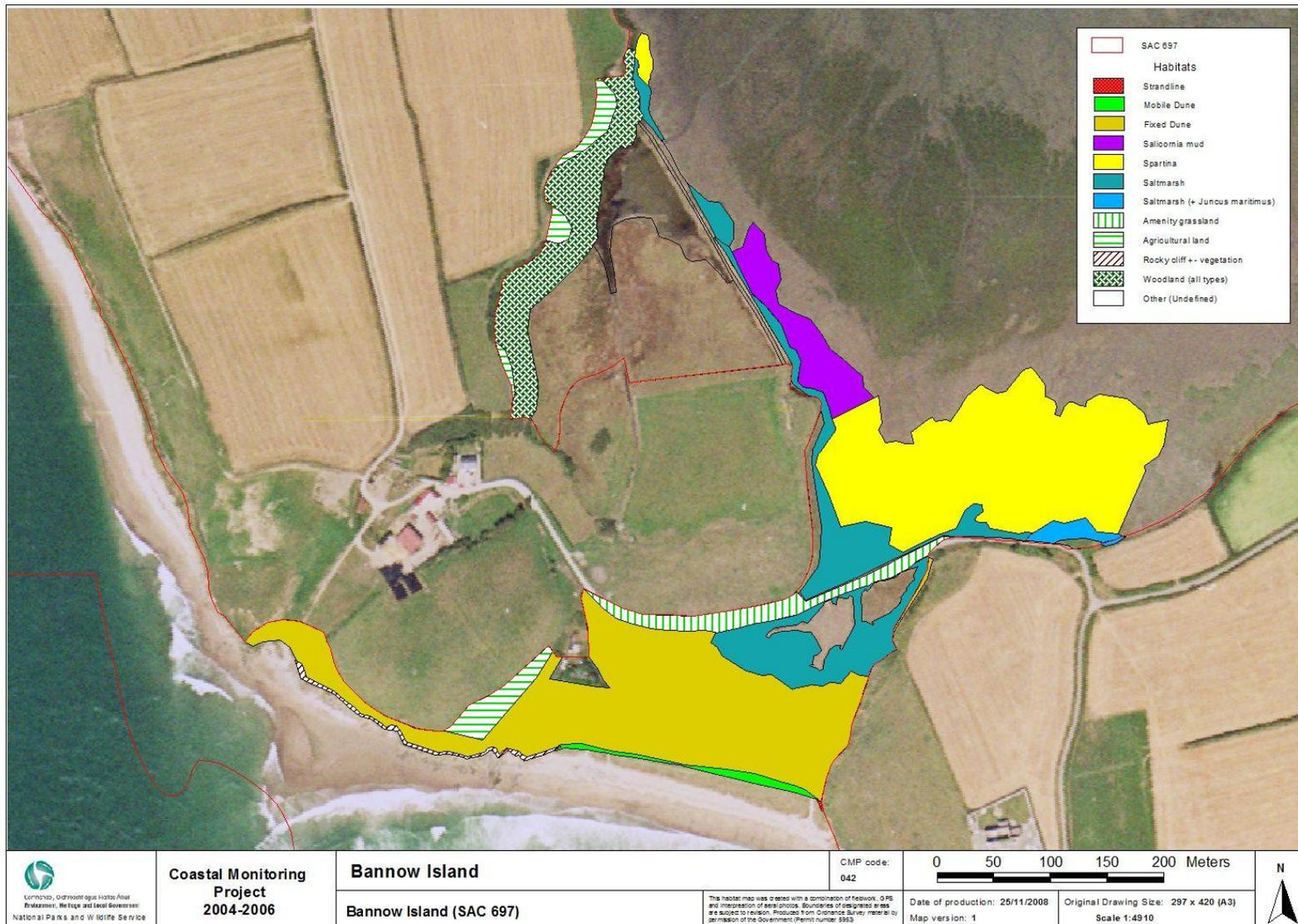
Although only a single monitoring stop was carried out (Table 42D), the structure and functions are rated as *favourable*. Although *Ammophila arenaria* accounted for only 20% (25% vegetation cover is required) of the stop, it passed on the other criteria., namely flowering and fruiting, and the absence of negative indicator species.

The future prospects are rated as *unfavourable-inadequate*, as the sheltered cove in which the mobile dunes were recorded does not appear to receive any great input of fresh sand.

The overall EU conservation assessment for the mobile dunes is *unfavourable-inadequate* at Bannow Island. This corresponds to *unfavourable-declining* under the proposed Irish conservation assessment system (Table 42C).

Strandline (H1210)

The strandline found at Bannow Bay was previously described as moderate. Owing to the relative lack of the habitat at Bannow Island, no conservation status assessment is made.



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

SITE DETAILS

CMP04 site name: **Grange** CMP04 site codes: **043** CMP Map No.: **40**

County: **Wexford** Discovery map: **76** Grid Reference: **S 805 064**

6 inch Digital Maps: **WX 045, 046 & 050**

Aerial photographs (2000 series):**O 5778-C**

NPWS Site Name: **Bannow Bay**

NPWS designation: NHA: **697** cSAC: **697** SPA: **4033**

Other designation: Nature Reserve **Wildfowl Sanctuary (2)**

Ranger Area: **Wexford South-West**

MPSU Plan: **N/A**

Report Author: **Tim Ryle**

SITE DESCRIPTION

Grange, located near the small village of Fethard-on-Sea in county Wexford, is situated on the opposite side of the estuary than Bannow Island (CMP site 42). The length of the beach at Grange is approximately 900 metres, and unlike Bannow Island, it is not sheltered, in that it is located at the mouth of the estuary. Consequently, it is subject to greater tidal impacts.

In terms of recreation the beach is mostly frequented by walkers, as the exposed condition and the fast flowing tides make swimming treacherous. Grange comes under the management of Wexford County Council, who maintain the public access to the beach. No other facilities such as those typically encountered in and around resort beaches are currently provided as they are more frequently used by walkers than holidaymakers.

The large south-facing estuary of Bannow Bay, of which both Grange and Bannow Island are constituent sites, is of considerable conservation significance. It has been proposed as a candidate Special Area of Conservation (cSAC 697) largely owing to

the occurrence of 11 Annex I coastal habitats found within the site, including the priority fixed dune habitat. It is typical of many coastal estuaries in that it contains large areas of mud and sand, the estuary alone comprising approximately 85% (NATURA 2000 database estimate - 78%) of the total site area of 1313.802 ha. Between them the sand dune habitats at Grange and Bannow Island are estimated to occupy approximately 6% of the cSAC (NATURA 2000 figures). It is also an important site for birds and is additionally designated as a Special Protection Area (SPA 4033).

Two red data book species - *Sarcocornia perennis* (perennial glasswort) and *Asparagus officinalis* var. *prostratus* (Wild Asparagus) are noted from the site, although neither was recorded during the 2004 survey.

Owing to the relatively species-poor vegetation and condition of the sandhills sandhills, Grange is notable for the range of Annex I habitats found in close proximity rather than its species diversity. There is also a greater variety of coastal habitats recorded here (Table 43A), and a sizeable area of brackish marsh (0.827ha) and an open body of water (0.577ha) found intimately associated with the fixed dune. This area of the water fluctuates greatly as water levels rise and fall throughout the year.

Overall, however, the area occupied by the coastal habitats at the site at Grange is in decline owing to the severity of natural erosion. Analysis of the year 2000 series aerial photographs reveals that at its widest point near the northern part of the site, the system has undergone over 180metres of erosion from its widest point since the summer of 2000 alone. The level of erosion is indicated by solitary remnant tussocks of dead *Juncus acutus* (Sharp rush) now standing at the front of the dune system.

Table 43A Areas of EU Annex I habitats mapped at Grange

EU Code	EU Habitat	Area(ha)
H1210	Annual vegetation of driftlines	0.101
H1220	Perennial vegetation of stony banks	0.054
H2110	Embryonic shifting dunes	1.439
H2120	Shifting dunes along the shoreline with <i>Ammophila arenaria</i>	0.649
H2130	Fixed coastal dunes with herbaceous vegetation	0.848
H2190	Humid dune slacks	2.762
	Total Sand dune	4.558

Fixed Dunes (H2130)

The sandhills at Grange are highly degraded and this remnant band of fixed dune represents a mere fraction of a once greater area of fixed dune habitat. The remaining fixed dunes are estimated to occupy only 0.848ha (Table 43A). In terms of their structural condition, all that remains is one narrow elevated ridge. Most of this small habitat is low lying and grades into dune slack. The vegetation is variable in appearance, with both tall and short turf and dune slack and brackish saltmeadow found in intimate association. While the dunes at Grange have been subject to morphological dynamism over the years, particularly at the back of the sandhills, they are constrained by a narrow band of Blackthorn-dominated (*Prunus spinosa*) scrub that separates them from the adjacent agricultural land.

The dunes are characterised by a large proportion of *Ammophila arenaria* (Marram), with many of the species typically associated with fixed dunes present. Species commonly recorded among the sward include *Festuca rubra* (Red fescue), *Galium verum* (Lady's bedstraw), *Carex arenaria* (Sand sedge), *Daucus carota* (Wild carrot), *Ononis repens* (Common restharrow). Bracken, *Pteridium aquilinum*, is spreading at the rear of the system, as were a number of individual Blackthorn bushes.

Dune Slacks (H2190)

By far the largest component of the sandhills at Grange was occupied by dune slack. It is estimated to occupy approximately 2.762ha (Table 43A) One large irregularly shaped slack is mapped (Map 40). However, the slack is variable in appearance and the vegetation is characterised by wetland species in places and is more analogous to rank grassland in others. This vegetation mosaic would seem to be influenced both by the groundwater and the degree of inundation of brackish water, whose levels can apparently fluctuate considerably over the course of the year.

The distinctive moss *Calliergonella cuspidata* is found alongside flowering herbs and grasses including *Carex flacca* (Glaucous sedge), *Hydrocoyle vulgaris* (Marsh pennywort), *Agrostis stolonifera* (Creeping bent), *Ranunculus flammula* (Lesser spearwort), *Potentilla anserina* (Silverweed), *Trifolium pratense* (Red Clover), *Succisa pratensis* (Devil's Bit scabious) and *Centaurea nigra* (Knapweed). Other

common species are indicative of the fixed dunes and agricultural landscape that surrounds the dune slacks.

The typical shrub of dune slacks, *Salix arenaria* ssp. *repens* (Creeping willow) was not recorded from the site, nor were many negative indicator species other than *Arrhenatherum elatius* (False-oat grass) and *Dactylis glomerata* (Cocksfoot). However, *Pteridium aquilinum* (Bracken) was noted along parts of the back boundary of the slack where the ground was becoming drier.

Mobile Dunes (H2120)

Examination of NATURA 2000 vegetation maps for Grange indicates that a significant area of mobile dune habitat has been lost to erosion.

Those dunes remaining are morphologically different from those at Bannow in that some are considerably taller and wider, and despite erosion, sand is accumulating in places. Again, marram is the main species, with minor contributions from the likes of *Euphorbia paralias* (Sea spurge) and *Elytrigia juncea* (Sand couch).

Embryonic Dunes (H2110)

The embryonic dunes are recorded as two distinct units - an eroding and an accreting zone. The majority of any embryonic dunes have been decimated at the northern end of the site. Accretion was recorded in two areas. At the north-western corner, small, disturbed embryonic dunes had formed, although it is likely that they would be washed away in winter storms as indicated by the breach in front of the small brackish waterbody. Lyme grass, *Leymus arenarius*, is frequent here along with *Elytrigia juncea* (Sand couch) and species more typical of saltmarshes or strandline habitats. At the southern end of the site, the beach was actively accreting, with a wide embryonic dune, nearly 30 metres at its widest point. Again *Elytrigia juncea* (Sand couch) and *Leymus arenarius* (Lyme grass) are typically dominant.

Shingle Vegetation (H1220)

A small area of shingle vegetation was recorded at the front of the eroded face of the fixed dunes at the northern tip of the site. Eroded remnants of *Juncus acutus* (Sharp rush) were stark reminders that this area was previously some distance inland.

Strandline (H1210)

The strandline is a little more extensive at Grange than at Bannow Island, a short distance across the estuary. In total it accounts for less than 1ha of the site. The vegetation is not extensive owing to the tidal conditions. It is characterised by the presence of *Honckenya peploides* (Sea sandwort), *Cakile maritima* (Sea rocket) and *Salsola kali* (Prickly saltwort).

6 IMPACTS

Activities that were considered to be impacting upon the sand dunes at Grange are listed in Table 43B. Whilst NPWS documents indicate that commercial extraction of beach material occurred in the 1970's at Grange and may have contributed to erosion, no evidence for this activity was found during the survey.

Table 43B Intensity and impact of various activities on sand dune habitats at Grange

EU Habitat Code ¹	Activity Code ²	Intensity ³	Impact ⁴	Area affected/ha	Location of Activity ⁵
H1330	501	C	-1	0.01	Inside
21BB	501	C	-1	0.06	Inside
21BB	900	A	0	0.4	Inside

¹EU Codes as per Interpretation Manual. Code 21BB is an additional code used to signify the entire dune habitat.

²Description of activity codes are found in Appendix 5

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

⁴Impact is rated as: -2 = irreparable negative influence, -1 = repairable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence

⁵Location of activity: Inside = activities recorded within and directly impacting the sand dune habitat. Outside = activities recorded outside but adjacent to sand dune habitat that are impacting the sand dune habitat

Natural erosion is the greatest threat affecting Grange (code 900). Its intensity is a reflection of the natural dynamic of a sand dune at the open mouth of an estuary and has resulted in sizeable loss of sand dune habitat (compare the aerial photographs from year 2000 with the current vegetation map for Grange. Recreational pressures (code 501) are less severe at Grange, although the number of walkers has had some impact on the site overall with a number of tracks present including through the saltmeadow at the back of the brackish marsh.

CONSERVATION STATUS

Both Bannow Island and Grange are found within Bannow Bay, whose dune systems have previously been classified as nationally important (Curtis 1991). The ecological information in the NATURA 2000 database relates to the whole site, rather than the individual sites of the current survey. The current conservation assessment, while

making reference to the baseline information from the NATURA 2000 forms, is based on the results of the current survey.

Grange, although small in comparison to many sand dune systems in Wexford and elsewhere, is notable for the range of sand dune habitats recorded there. Examination of the aerial photographs and a range of maps show it to be a highly dynamic system. No information regarding future, if any, plans for coastal protection works were available at the time of this survey. Notwithstanding the severity of the erosion and natural loss of habitat, a large area of apparently freshly accumulating sand is resulting in an apparent increase in embryonic and mobile dune vegetation, and thus habitat. It may be, however, that some of the habitat loss recorded from at the mouth of the estuary will be reclaimed in time. The conservation status of the individual sand dunes habitats recorded at each site is listed in Table 43C.

Table 43C Conservation status of Annex I sand dune habitats at Grange

Habitat ¹	EU Conservation Status Assessment			Overall EU conservation status assessment	Proposed Irish conservation status system ²
	Favourable	Unfavourable - Inadequate	Unfavourable - Bad		
Fixed Dunes (H2130)		Structure & Functions	Extent / Future Prospects	Unfavourable - Bad	Destroyed – Partially Destroyed
Dune Slacks (H2190)	Extent / Structure and Functions / Future Prospects			Favourable	Favourable - Maintained
Mobile Dunes (H2120)		Structure & Functions / Future Prospects	Extent	Unfavourable - Bad	Destroyed – Partially Destroyed
Embryonic Dunes (H2110)	Extent / Structure & Functions	Future Prospects		Unfavourable - Inadequate	Unfavourable - Recovering

¹EU Codes as per Interpretation Manual

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

Fixed Dunes (H2130)

Despite the diversity of coastal habitats surrounding the fixed dunes at Grange, the dunes are relatively small in area (3.23 ha) and their extent determined by a number of limiting factors. Erosion has been a major feature at the site and resulted in a serious loss of habitat as indicated previously. The fixed dune grassland occupies less than

1ha., and continues to lose ground to both erosion and the gradual spread of bracken and scrub species. Therefore the extent is rated as *unfavourable-bad* (Table 43C).

The structure and functions of the habitat are assessed as *unfavourable-inadequate*. Three of four monitoring stops passed on structure and functions (Table 43D). A lack of species diversity and absence of a management such as grazing has resulted in some spread of Blackthorn and Gorse. Simultaneously, bracken is spreading into older or decalcified parts of the fixed dune habitat.

The future prospects for this habitat are not good and are rated as *unfavourable-bad* on the basis that tidal attrition will continue to erode at the dune grassland.

The conservation status of the fixed dunes for the entire cSAC was described as average (*unfavourable-inadequate*) in the NATURA 2000 dataform. Currently, the conservation status of the fixed dunes at Grange is *unfavourable-bad* (Table 43C). This corresponds to *destroyed-partially destroyed* under the proposed Irish conservation assessment scheme.

Table 43D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Grange

Habitat	Monitoring stops		Conservation status
	Pass	Fail	
Fixed Dunes (H2130)	3	1	Unfavourable - Inadequate
Dune Slacks (H2190)	4	0	Favourable
Mobile Dunes (H2120)	3	1	Unfavourable - Inadequate
Embryonic Dunes (H2110)	4	0	Favourable

Dune Slacks (H2190)

The extent of the dunes slacks is rated as *favourable*. There is no previous record of this habitat in the NATURA 2000 database. Its occurrence adds greatly to the floristic and habitat diversity of the site, while the levels of brackish water, which also influence the distribution of saltmarsh/saltmeadow vegetation, control its persistence.

The structure and functions of the habitat are rated as *favourable*. Four monitoring stops were carried out, all of which passed (Table 43D). Although there was no

evidence of dune slack morphology e.g. early, building and mature reflecting slack, the slack is floristically diverse.

The future prospects are considered to be *favourable*. Although large in extent relative to the rest of the sandhills, some erosion was noted at the northern tip of the site that could result in the future loss of habitat.

The conservation status of the dune slacks is considered *favourable*, in light of all three qualifying criteria passing (Table 43C). The Irish conservation status assessment that is analogous to that is *favourable-maintained*.

Mobile Dunes (H2120)

Most of mobile dune habitat has been lost to erosion at Grange, although there is some evidence of recent consolidation at the southern end of the site. It is, as yet, too early to assess the perseverance of this newly created habitat. The extent of the habitat is rated as *unfavourable-bad* (Table 43C).

The structure and functions parameter is rated as *unfavourable-inadequate*. A total of four monitoring stops were carried out, three of which passed (Table 43D). The stop that failed had an excessive amount (10%) of the Negative indicator species *Senecio jacobaea* (Common ragwort) present. This was indicative of the impacts of pedestrian traffic and plant material/seeds having being unwittingly spread.

Despite the fact that sand is accumulating at the southern end of the site, resulting in a build-up of embryonic dunes at the front of the mobile dunes, the future prospects are rated as *unfavourable-inadequate*. This is due to the ongoing erosion of the taller and exposed mobile dunes to the north of the site.

Mobile dunes were previously listed as being of average or unfavourable-poor (unfavourable-inadequate in current terminology). This ranking has been downgraded to *unfavourable-bad* owing to significant loss of habitat and the condition of the remaining mobile dunes. The corresponding Irish conservation assessment is *destroyed-partially destroyed* (Table 43C).

Embryonic Dunes (H2110)

The extent of the embryonic dunes is rated as *favourable* (Table 43C). Severe erosion has decimated the embryonic dunes at the mouth of the estuary at Grange. However, further south, a large area of accumulating sand supported embryonic dune vegetation, which suggests that there has not been any real change in the extent of the habitat.

The structure and functions parameter is rated as *favourable*. A total of four monitoring stops were placed in the embryonic dunes and all four passed (Table 43D).

The future prospects are considered *unfavourable-inadequate* (Table 43C). There has been some expansion of foredunes particularly at the south-western edge of the site, although it was too early to ascertain the stability of this recently accumulated sand and hence the perseverance of the habitat, relative to the large area that has been become eroded.

The NATURA 2000 database previously listed the habitat as being of unfavourable-poor conservation ranking. The current EU conservation status assessment for the highly dynamic foredunes at Grange is considered *favourable*. The Irish conservation status assessment is rated as *unfavourable-recovering*.

Perennial shingle vegetation (H1220)

The perennial shingle vegetation was described as having a poor conservation status in the NATURA 2000 forms. There is no conservation status assessment for this habitat as it is very limited in extent owing to erosion.

Strandline (H1210)

No conservation status assessment is made for this habitat owing to its limited extent. Although there was evidence of potential increase of strandline at the north-western tip of Grange, its endurance through winter storms seems unlikely.



Coastal Monitoring Project 2004-2006

Grange
Bannow Bay (SAC 697)

CMP code:
043

0 90 180 270 360 450 Meters
 Date of production: 25/11/2008
 Map version: 1
 Original Drawing Size: 297 x 420 (A3)
 Scale 1:8686



This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Products from Ordnance Survey material by permission of the Government (Permit number 1993).