Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (site code 627) Conservation objectives supporting document -coastal habitats

NPWS

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Please note that the opinions expressed in the site reports from 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 (2013). Conservation Objectives: Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC 000627. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

1 Introduction

Achieving Favourable Conservation Status (FCS) is the overall objective to be reached for all Annex I habitat types and Annex II species of European Community interest listed in the Habitats Directive 92/43/EEC (Commission of the European Communities, 2007). It is defined in positive terms, such that a habitat type or species must be prospering and have good prospects of continuing to do so.

Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC is a large coastal site, extending from Cullamore in the north-west to Killaspug in the south-west, and from Sligo town in the south-east to Drumcliff village in the north-east. It includes two large shallow bays, Drumcliff Bay and Sligo Harbour. The site is largely underlain by carboniferous limestone, but acidic rocks are also found on the Rosses Point peninsula. This large site supports an impressive range of habitats, including woodland, saltmarsh, sandy beaches, boulder beaches, shingle, fen, freshwater marshes, rocky sea cliffs and lakes. The site also supports important populations of waterfowl and seabirds and overlaps with two separate Special Protection Areas: Drumcliff Bay SPA 4013 and Cummeen Strand SPA 4035). It also supports a number of rare species, including Annex II snail species *Vertigo angustrior* and the nationally protected round-leaved wintergreen (*Pyrola rotundifolia*).

Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (site code: 627) is designated for a range of coastal habitats, particularly sand dunes. The following three coastal habitats are included in the qualifying interests for the site (* denotes a priority habitat):

- Embryonic shifting dunes (2110)
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (2120)
- Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130)*

These three habitats are all associated with sand dune systems and are found in close association with each other. Other Annex I coastal habitats (*Salicornia* flats, ASM, MSM, vegetated shingle, annual vegetation of driftlines, dunes with *Salix repens*, humid dune slacks) were also recorded site by the Coastal Monitoring Project (CMP) (Ryle *et al.,* 2009), Saltmarsh Monitoring Project (SMP) (McCorry & Ryle 2009) and the National Shingle Beach Survey (NSBS) (Moore & Wilson, 1999), but these are not listed as qualifying interest for the site.

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

The CMP surveyed the following four sub-sites within Cumeeen Strand/Drumcliff Bay (Sligo Bay) SAC (Ryle *et al*., 2009):

1. Strandhill
2. Coney Island
3. Rosses Point
4. Yellow Strand

The distribution of sand dune habitats within Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC is presented in Appendix I. As part of the Coastal Monitoring Project (CMP) detailed individual reports and habitat maps were produced for each sub-site and these are included in a set of Appendices to this document (Appendices II to V).

Strandhill sand dune system is contained within two SACs: Cummeen Strand/Drumcliff Bay SAC (627) and Ballysadare Bay SAC (622). This document deals with the northern section of Strandhill dune system, which is contained within Cummeen Strand/Drumcliff Bay SAC. This northern part of Strandhill also contains an airport, a sewage treatment plant and a low density plantation on fixed dunes. The EU Annex I sand dune habitats recorded at Strandhill by the CMP include, Fixed dunes, Dune slack, Dunes with *Salix repens*, Mobile dunes, Embryonic dunes, Perennial vegetation of stony banks and Annual vegetation of driftlines. The dunes at Strandhill in particular are important as they support a population of the Annex II species *Vertigo angustior*. A species listed on the Flora (Protection) Order 1999 - round-leaved wintergreen (*Pyrola rotundifolia*) has also been recently recorded from the site (K. Gaynor, pers. comm.).

Coney Island is situated in Sligo Bay and lies at the mouth of Sligo Harbour, alongside Oyster Island. The sand dunes of Coney Island cover the south and west of the island. They comprise tall fixed dune ridges along the southern edge which slope gently landward to low-lying dunes, which grade into wet agricultural fields. The eastern edge of the dunes is bordered by a narrow strip of saltmarsh. The more exposed western edge of the dunes is eroding, resulting in a steep sandy cliff which is fronted by an unvegetated cobble beach. The EU habitats recorded at Coney Island by the CMP include Annual vegetation of driftlines, Embryonic shifting dunes, Shifting dunes along the shoreline with *Ammophila arenaria*, Fixed coastal dunes with herbaceous vegetation and Humid dune slacks (Ryle *et al*., 2009).

Rosses Point peninsula is located just north of Sligo Harbour. Most of the sand dune system is developed as a golf course by County Sligo Golf Club. The club is long established at the site and the dunes are ungrazed. As a result, the ecological value of the site has been significantly reduced. The managed area of the golf course has been excluded from the site, however, a number of unmanaged areas within the Golf Club property have been retained within the SAC boundary (Gaynor & Browne, 1999). This includes an area of fixed dunes directly north of the course and a small area in the southwest corner. Another area retained

within the SAC is a gravel hill that contains species-rich fixed dunes with juniper (*Juniperus communis*). The sand dune habitat within the site consists of a narrow band of fixed dune that fringes the golf course and an area of embryonic dunes that extend the length of the sand spit on the northern edge of Rosses Point peninsula. The EU Habitats recorded at Rosses Point include Embryonic Shifting dunes, Shifting dunes along the shoreline with *Ammophilla arenaria* and Fixed coastal dunes with herbaceous vegetation (Ryle *et al*., 2009).

Yellow Strand dunes are located in the townland of Ballintemple in the northwestern part of the SAC. The sand dunes stretch from the old pier at Knocklane southeast to a small headland at Lackaneena. The foredunes in the west have been breached by severe winter storms in the past and sand has blown inland some distance. The sandy plain in the southeastern part of the site has been described in the past as machair (Goodwillie, 1972). However, like the rest of the site, this area has been significantly altered by agricultural improvement. The EU Annex I Habitats recorded at Yellow Strand are Embryonic Shifting dunes, Shiftings dune along the shoreline with *Ammophila arenaria* and Fixed coastal dunes with herbaceous vegetation.

The conservation objectives for the sand dune habitats in Cummeen Strand-Drumcliff Bay (Sligo Bay) are based on the findings of the individual reports for each of these four sub-sites, combined with the results of Gaynor (2008). There are two additional small dune systems noted to occur at Lissadell strand and on Maguin's Island, but these were not surveyed durign the CMP. It is thought that the four sub-sites as surveyed by the CMP represent approximately 90% of the total area of sand dunes within Cummeen Strand-Drumcliff Bay (Sligo 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 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 nine sand dune habitats (including annual vegetation of drift lines) listed under Annex I of the EU Habitats Directive (92/43/EEC) (* denotes a priority habitat):

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

Five dune habitats were recorded by Ryle *et al*. (2009) and three of these (in bold above) are listed as Qualifying Interests for Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC. These habitats include mobile areas at the front, as well as more stabilised parts of dune systems.

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

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

which act as an impediment to airborne sand. Strandline species can remain a persistent element of the vegetation.

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

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

All of the dune habitats indicated above occur as a complex mosaic of constantly changing and evolving vegetation communities. They are inextricably linked in terms of their ecological functioning and should be regarded as single geomorphological units. As such, no dune habitat should be considered in isolation from the other dune habitats present at a site, or the adjoining semi-natural habitats with which they often form important transitional communities.

The CMP surveyed four sub-sites within Cummeen Strand-Drumcliff Bay (Sligo Bay) SAC:

1. Strandhill (Appendix II)
2. Coney Island (Appendix III)
3. Rosses Point (Appendix IV)
4. Yellow Strand (Appendix V)

Detailed descriptions from the Coastal Monitoring Project (CMP) (Ryle *et al.,* 2009) of each sand dune habitat found at each sub-site are presented in Appendices II to V. A total of 133.85ha of sand dune habitat was mapped within Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, of which 131.41ha was of Qualifying Interest.

3.1 Overall objectives

The overall objective for 'Embryonic shifting dunes' in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC is to 'maintain the favourable conservation condition'.

The overall objective for 'Shifting dunes along the shoreline with *Ammophila arenaria*' in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC is to 'restore the favourable conservation condition'.

The overall objective for 'Fixed coastal dunes with herbaceous vegetation' in Cummeen Strand/ Drumcliff Bay (Sligo Bay) SAC is to 'restore the favourable conservation condition'.

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

3.2 Area

3.2.1 Habitat extent

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. A baseline habitat map was produced for the sand dune habitats at each sub-site in Cummen Strand/Drumcliff Bay (Sligo 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 extent of the embryonic dunes is rated as Favourable at three of the four sub-sites, athough they are limited in extent at all sub-sites. At Strandhill they occur along the seaward edge of the spit and at the tip but are absent along the eroding northern part of the site (Ryle *et al*., 2009). Patches of embryo dunes occur along the south and western edge of the fixed dune habitat at Coney Island. At Yellow Strand the embryonic dunes occur as a narrow band fronting the eroding fixed dunes.

The embryo dunes at Rosses Point sub-site were rated as unfavourable-inadequate during the CMP due to erosion along the western edge, which appeared to be compounded by recreational activities such as horse riding and the use of motorised vehicles in the northern part of the site (Ryle *et al.,* 2009). However, the scale of this activity is considered to be on a small scale and manageable.

At the Strandhill sub-site the extent of mobile dunes is considered unfavourable-inadequate owing to the impacts of natural erosion which is compounded in places by human disturbance mainly from trampling. Mobile dunes are almost absent from the northern section of the site where fixed dunes are fronted by a steep eroding ridge (Ryle *et al.,* 2009).

The mobile dune habitat at Yellow Strand has a very limited extent (Ryle *et al*., 2009).
The mobile dunes at Rosses Point are limited in extent and rated unfavourable-bad owing to the level of disturbance, mainly from recreational activities. The dumping of rubble was also recorded in mobile dune habitat by the CMP (Ryle *et al.,* 2009).

Inaccessibility of Coney Island means that the only impact affecting the mobile dunes is natural erosion which is not considered unfavourable (Ryle *et al.,* 2009).

The extent of the fixed dunes at all four sub-sites was rated as Unfavourable-Inadequate. At the Strandhill sub-site, this rating was primarily due to the presence of the plantation, as well as natural erosion that appeared to be compounded by recreational activities (Ryle *et al.,* 2009). At Coney Island, the decline in area was attributed to increased rates of erosion caused by overgrazing and rabbit burrowing (Ryle *et al*., 2009). The decline at Yellow Strand was also due to erosion accelerated by overgrazing, trampling and rabbit burrowing (Ryle *et al*., 2009). Finally, the extent of the fixed dunes at Rosses Point was negatively affected by a combination of the presence of a golf course and a car park, as well as the impacts of trampling (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. The large discrepancy between the figures in the second and third column is largely due to the fact that the areas used for the Strandhill sub-site by the CMP also include the area of Strandhill dunes that is included in another SAC (Ballysadare Bay, site code: 622).

Habitat	**Total area (ha) of habitat from CMP**	**Total area (ha) of habitat within SAC boundary***
Embryonic shifting dunes	34.726	33.95
Shifting dunes along the shoreline with *Ammophila arenaria*	6.596	1.20
Fixed coastal dunes with herbaceous vegetation	187.373	96.26
Total	**228.695**	**131.41**

The general target for this attribute is that there should be 'no decrease in extent from the established baseline' and so the area should be stable or increasing. This is the case for the 'embryonic shifting dunes'. However, in the case of 'shifting dunes along the shoreline with *Ammophila arenaria' and 'fixed coastal dunes with herbaceous vegetation'* losses were reported during the baseline survey (Ryle *et al*., 2009). Therefore, the conservation objective for these habitats is that they should be increasing in extent. Bearing in mind that coastal systems are naturally dynamic and subject to change, this target is always assessed subject to natural processes, including erosion and succession.

3.3 Range

3.3.1 Habitat distribution

The distribution of sand dune habitats as mapped by Ryle *et al.* (2009) is presented in Appendix I. Additional areas of dune habitats have been noted to occur at Lissadell Strand and on Maguin's Island, but these were not surveyed during the CMP.

Embryonic, mobile and fixed dunes occur at all four sub-sites surveyed within Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC during the CMP.

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

3.4 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 Cummeen Stand/Drumcliff Bay (Sligo Bay) SAC, in terms of structure and functions, depends on a range of attributes for which targets have been set as outlined below.

3.4.1 Physical structure: 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, which increases 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.

Erosion is evident on the north shore of the dunes at Strandhill, as a result, the front of the system is represented by a narrow band of *Ammophila*-dominated vegetation at the top of a steep sandy cliff. At this sub-site, coastal protection works in the form of rock armour have been installed on the seaward edge of the carpark and golf course since 2000 (Ryle *et al*., 2009).

Erosion is also evident along the western face of Rosses Point, while there is good sediment accretion on the northern side, along with good development of embryo dunes and Marram dunes. This part of the site, however, was formerly indicated as sandhills on the early 1900s Ordnance Survey Map, which were evidently destroyed in the recent past. Coastal protection works at Rosses Point include hard coastal protection measures that have been installed along the north western edge of the golf course (Ryle *et al.,* 2009)

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.

3.4.2 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.

At Rosses Point sub-site, saltmarsh habitats occur alongside the sand dune habitats. In particular, saltmarsh occurs along the east and south of the spit, while channels containing saltmarsh species traverse the lower part of the embryo dunes (McCorry & Ryle, 2009; Ryle *et al*., 2009).

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 structure: bare ground

This target only applies to the fixed dunes. It does not apply to the other habitats present where high levels of bare sand are a natural component of the habitat (e.g. mobile dunes). In the fixed dune 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.

Some large areas of bare sand have been created in the fixed dunes at Yellow Strand and Coney Island as a result of erosion caused by overgrazing, trampling and rabbit burrowing (Ryle *et al*., 2009). The dunes at Strandhill are not grazed but are subject to recreational pressure which has led to some areas of bare sand in the form of tracks.

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

3.4.4 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).

The four sub-sites experience very different management regimes, leading to different problems. The dunes at Yellow Strand are fenced and grazed by cattle with some overgrazing in places. Rabbit grazing is also prevalent at this sub-site (Ryle *et al*., 2009). At Coney Island, the dunes are impacted by overgrazing by cattle, sheep and rabbits and rabbit burrowing,

resulting in large areas of bare sand across the fixed dunes (Ryle *et al*., 2009). The dunes at Strandhill are ungrazed by livestock and a small population of rabbits is doing little to prevent the vegetation from developing into one that is dominated by rank grasses and scrub. The absence of grazers at Rosses Point has also resulted in poor quality fixed dune habitat dominated by rank grasses and poor species diversity (Ryle *et al*., 2009). The last two sites could benefit from the introduction of a grazing regime.

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

3.4.5 Vegetation composition: plant health of dune grasses

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

At Rosses Point and Strandhill, the CMP noted that the embryo dunes are dominated by healthy dune grasses typical of this habitat (Ryle *et al*., 2009).

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

3.4.6 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 embryonic dunes at Strandhill are dominated by sand couch (*Elytrigia juncea*) along with sea sandwort (*Honckenya peploides*), while the typical species marram (*Ammophila arenaria*), lyme grass (*Leymus arenarius*) and sea sandwort (*Honckenya peploides*) are present in the mobile dunes. The fixed dunes are ungrazed and are dominated by rank grasses, though areas with high species diversity were recorded by the CMP particularly in low lying areas.

Typical species were recorded by the CMP in the embryonic and mobile dunes at Yellow Strand (Ryle *et al,* 2009). The fixed dunes contain a number of wet hollows with marsh pennywort (*Hydrocotyle vulgaris*) and water mint (*Mentha aquatica*).

At Coney Island, marram dominated the mobile areas, along with some fixed dune species such as red fescue (*Festuca rubra*), birdsfoot trefoil (*Lotus corniculatus*) and dandelion (*Taraxacum officinale*). The embryo dunes are dominated by sand couch (*Elytrigia juncea*) (Ryle *et al.,* 2009) Typical species were recorded at fixed dunes of Coney Island.

The species diversity of the fixed dunes is low at Rosses Point. A limestone escarpment runs out to the coast (at Bomore Point) from fixed dunes at the southern part of the golf course. This area is covered with a very thin layer of sand that is colonised by species of dry grassland and heath including common juniper (*Juniperus communis*) and wild thyme (*Thymus polytrichus*). Ivy broomrape (*Orobanche hedera*), a species listed in the Red Data Book because of its scarcity in Northern Ireland, occurs at Rosses Point. Hoary whitlowgrass (*Draba incana*), another Red Data Book species, also occurs within this SAC. The mobile dunes are typically dominated by marram (*Ammophila arenaria)* and sand couch (*Elytrigia juncea*) dominates the embryo dune vegetation (Ryle et al. 2009).

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

3.4.7 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.

The most common negative indicator species at Strandhill are common ragwort (*Senecio jacobaea*) and creeping thistle (*Cirsium arvense*) (Ryle *et al*., 2009).

Common ragwort (*Senecio jacobaea*) and spear thistle (*Cirsium vulgare*) are the most commonly recorded negative indicator species at Coney Island (Ryle *et al*., 2009).

At Yellow Strand, creeping thistle (*Cirsium arvense*), perennial rye grass (*Lolium perenne*) and common ragwort (*Senecio* jacoabea) are abundant throughout the fixed dunes. Creeping thistle (*Cirsium arvense*) occurs occasionally in the embryo dunes (Ryle *et al.,* 2009).

Occasional creeping thistle (*Cirsium arvense*) occurs in the mobile dunes at Rosses Point (Ryle *et al*. 2009)

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

3.4.8 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 Strandhill there is a low density plantation of pine trees within the fixed dune habitat, where the nationally protected round-leaved wintergreen (*Pyrola rotundifolia* ssp. *maritima*) has recently been recorded from within a clearing (K. Gaynor, pers. comm.). The marked similarities in the habitat for this species at Strandhill with its other locations at The Raven Point Nature Reserve (site code 710) and the dunes at Mullanasole within Donegal Bay SAC (site code 133), suggests that the trees may play a role in influencing the water table and producing the conditions that lead to the drying of dune slacks and the establishment of vegetation communities that support this rare species, which is considered a local feature of distinctiveness for this site. Therefore, until the ecological requirements of this species are better understood, clearance of the woodland is not recommended.

At Rosses Point, isolated individuals of sycamore (*Acer pseudoplatanus*) are present in the northern part of the fixed dunes.

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

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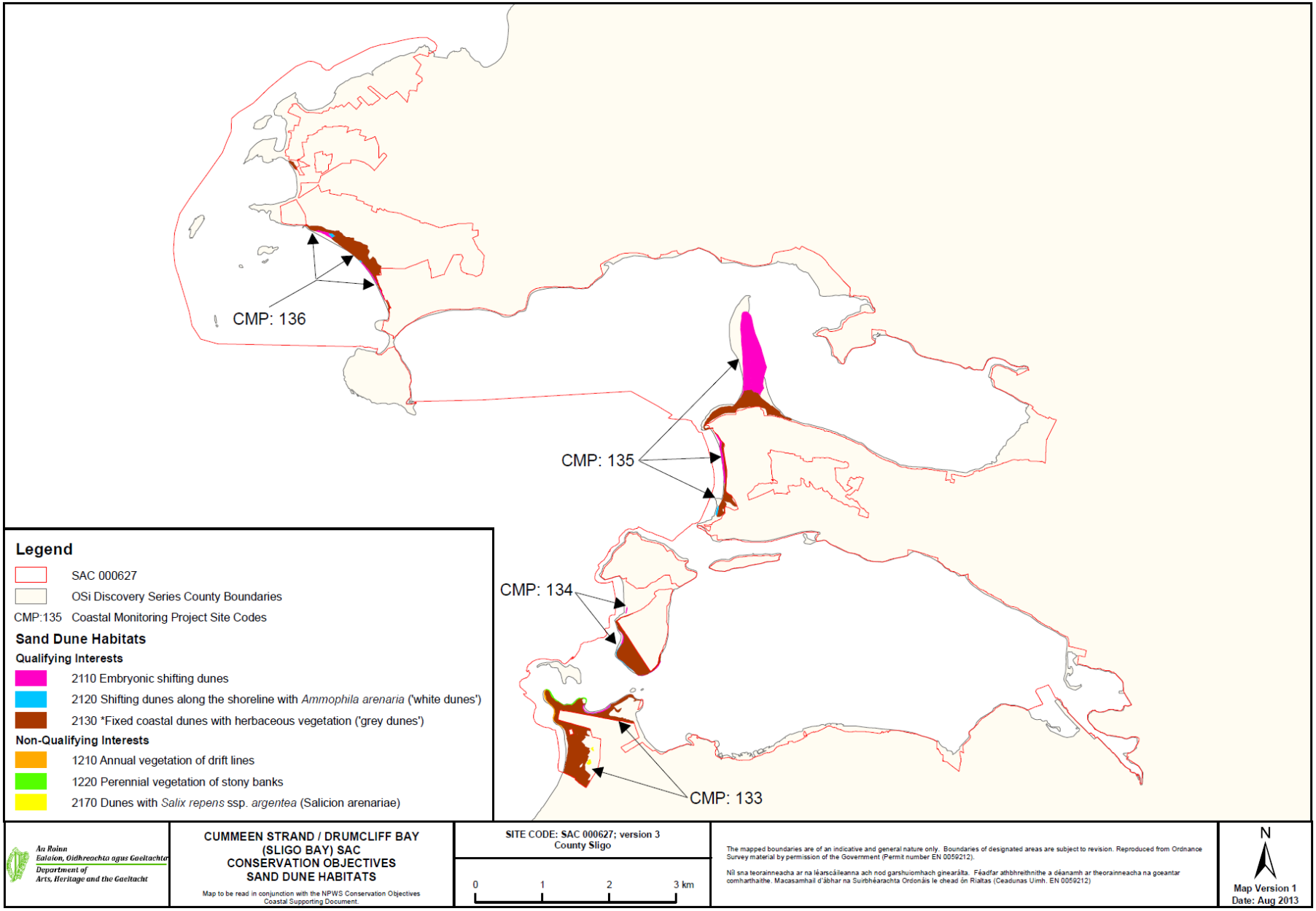
Appendix I – Distribution map of sand dune habitats within Cummeen Strand/ Drumcliff Bay (Sligo Bay) SAC, as mapped by the Coastal Monitoring Project (Ryle *et al*., 2009).



Appendix II – Strandhill site report and habitat map from the Coastal Monitoring Project (Ryle *et al*., 2009)

SITE DETAILS

CMP06 site name: **Strandhill** CMP06 site code: **133** CMP Map No.: **130**

County: **Sligo** Discovery map: **25** Grid Reference: **G 605 345**

6 inch Map No.: **Sl 13 & 14**

Aerial photographs (2000 series): **O1009 B,D;O1010 A,C;O1068 B;O1069A**

NPWS Site Name: **1)Ballysadare Bay and 2)Cumeen Strand and Drumcliff Bay**

NPWS designation: pNHA: **622 & 627** cSACs:**622 & 627** SPA: **4129**

Other designation: **Blue Flag**

Ranger Area**: Sligo**

MPSU Plan**: cSAC 622 &cSAC 627 Draft II – Consultation (2000)**

Report Author: **Anne Murray**

SITE DESCRIPTION

Strandhill sand dune system is contained within two cSACs - Cumeen Strand and Drumcliff Bay cSAC and Ballysadare Bay cSAC. It is located in the southwest of Sligo Harbour and stretches from Killaspug Point in the north to Portcurry Point in the south.

The northern section of Strandhill dune system is contained within the cSAC of Cumeen Strand and Drumcliff Bay which is designated for the EU Annex I sand dune habitats Fixed dunes –priority habitat and Embryonic dunes. Six sand dune systems occur within this cSAC. For the purpose of this project the cSAC is divided into four main sites listed in the inventory of the sandy coasts of Ireland (Curtis, 1991). These are Strandhill (site 133), Coney Island (site 134), Rosses Point (site 135) and Yellow Strand (site 136). Two very small sand systems noted in the Conservation Plan (MPSU, 2000) are at Lissadell Strand and on Maguin's Island, but these were not listed for this project. This cSAC encompasses the coastline from Trawbane (near Ballinfull) in the north to Strandhill in the south. It consists of two of the three sea inlets that make up the eastward end of Sligo Bay. The northern inlet is referred to as

Drumcliff Bay and the central inlet is termed Sligo Harbour. The southern inlet, Ballysadare Bay, is part of another cSAC and a section of Strandhill sand dune system is contained within this cSAC, it is described below.

The southern part of the Strandhill sand dune system is contained in Ballysadare Bay cSAC. Located in Sligo Bay this is designated for the EU Annex I sand dune habitats Fixed dunes – priority habitat, Mobile dunes and Embryonic dunes. The dunes occur on a sand spit that extends in a southwesterly direction across Ballysadare Bay, linking a moranic outlier to the shore. The sand dune system is considered an important example of a large, dynamic and intact system. This cSAC is designated for the EU Annex II species of snail – *Vertigo angustior*. This rare snail occurs in dune slacks or hollows at Strandhill.

The EU Annex I sand dune habitats recorded at Strandhill dunes during this survey include Fixed dunes, Dune slack, Dunes with *Salix repens*, Mobile dunes, Embryonic dunes, Perennial vegetation of stony banks and Annual vegetation of driftlines. The total area of sand dune habitat mapped at Strandhill comprises 127ha (Table 133A).

Fixed Dunes (H2130)

The fixed dunes at Strandhill comprise 106ha (Table 133A). The fixed dunes are eroding along the western edge and are fronted by a cobble beach with some strandline vegetation in places. The dunes are fragmented by the presence of Sligo airport and a sewage treatment plant in the northern section. These are excluded from the cSAC. There is also a low density plantation of pine trees on the fixed dunes in the north of the site, owned and managed by Coillte. This plantation covers 10ha of the fixed dune habitat.

Table 133A Areas of EU Annex I habitats mapped at Strandhill

EU Code	EU Habitat	Area (ha)
H1210	Annual vegetation of driftlines	0.987
H1220	Perennial vegetation of stony banks	1.533
H2110	Embryonic shifting dunes	0.943
H2120	Shifting dunes along the shoreline with *Ammophila arenaria*	5.476
H2130	Fixed coastal dunes with herbaceous vegetation (including the dune plantation area of 10ha)	105.846
H2170	Dunes with *Salix repens* ssp. *argentea* (Salicion arenaria)	10*
H2190	Humid Dune Slacks	2.050
	Total Sand dune	**127****

*This is an estimation of the area of Dunes with *Salix repens*, as part of this habitat occurs in a mosaic with the fixed dune habitat.
**The total sand dune area includes the estimation of Dunes with *Salix repens.*

A large part of the dunes (44ha), south of Strandhill town has been developed as a golf course by Strandhill Golf Club and this is outside of the cSAC. However, there are plans to revise the layout of the existing golf course and extend it southwards into the fixed dune and dune slack area of the cSAC.

The dunes at Strandhill are ungrazed and are dominated by rank grasses including *Ammophila arenaria* (Marram grass), *Arrhenatherum elatius* (False oat-grass) and *Festuca rubra* (Red fescue). Species diversity is greatest in low lying areas of the dunes. One particular area noted during this survey for high species diversity and an abundance of orchids occurs south of Shelly Valley (a large blowout adjacent to the golf course). This area is of high ecological interest due to the number of locally rare plant species present including *Epipactus palustris* (Marsh helleborine) and also due to the rarity of such diverse areas in this sand dune system. This area is described under the dune slack habitat below.

The dunes contain an abundant scrub of *Salix repens* (Creeping willow) especially in the northern section which highlights the need for grazers at the site. The typical fixed dune species include the following: *Anthyllis vulneraria* (Kidney vetch), *Arrhenatherum elatius* (False oat-grass), *Carex arenaria* (Sand sedge), *Euphrasia officinalis* agg. (Eyebright), *Festuca rubra* (Red fescue), *Galium verum* (Lady's bedstraw), *Hypochaeris radicata* (Cat's ear), *Luzula campestris* (Field wood-rush), *Lotus corniculatus* (Bird's-foot trefoil), *Pilosella officinarum* (Mouse-ear hawkweed), *Plantago lanceolata* (Ribwort plantain), *Poa pratensis* (Smooth meadow-grass), *Rhinanthus minor* (Yellow rattle), *Taraxacum* agg. (Dandelion), *Thymus polytrichus* (Wild Thyme), *Trifolium repens* (White clover), *Veronica chamaedrys* (Germander speedwell), *Viola* spp. Typical mosses *Rhytidiadelphus squarrosus, Rhytidiadelphus triquestrus and Hypnum cupressiforme* and lichens *Peltigera* spp. are abundant especially in the southern part of Strandhill.

Other species present in the fixed dune habitat are: *Ammophila arenaria* (Marram grass), *Heracleum sphondylium* (Hogweed), *Holcus lanatus* (Yorkshire fog), *Leontodon saxatilis* (Lesser Hawkbit), *Leucanthemum vulgare* (Oxeye daisy),

Ranunculus spp., *Trifolium pratense* (Red clover) and the moss *Homalothecium lutescens*.

The southern part of the fixed dunes at Strandhill contains an abundance of orchids, mainly *Anacamptis pyramidalis* (Pyramidal orchid), *Epipactus palustris* (Marsh helleborine) and *Dactylorhiza* spp.

Common twayblade (*Listera ovata*), an orchid typical of base soils is common in the dunes in the northern part of the site.

The negative indicator species *Senecio jacobaea* (Common ragwort) and *Cirsium arvense* (Creeping thistle) occur throughout the fixed dune but are rare.

Two very large blowouts occur in the fixed dunes south of the golf course at Strandhill. The largest of these is known as Shelly Valley and this covers 5.4ha. The total area of the two blowouts is 6ha and these are currently impacted by recreational activities. Sligo County Council has installed fencing to discourage visitors from accessing the blowouts and have placed signs along the main access route. However, the fencing is not maintained and has been damaged by visitors who continue to use the blowouts for recreational activities.

There is evidence of a lot of badger activity including the presence of badger setts in the fixed dunes.

Dunes with *Salix repens* **(H2150)**

The EU Annex I habitat - Dunes with *Salix repens* is considered a dune slack type community and is typical of older drier slacks. It often occurs in a mosaic with fixed dunes and dune slack where it develops on the drier slopes of the dune slack. This habitat has not been noted previously at this site.

The dunes with *Salix repens* occur in a mosaic with fixed dune and the dune plantation in the northern part of the site. There is some difficulty in discerning boundaries between these habitats as all the habitats occur close together. Also, *Salix repens* (Creeping willow) appears to be spreading through the fixed dunes due to lack

of grazing and changes in hydrology that may be due to the presence of dune plantation. Although it was possible to map some discrete areas of this habitat totalling 0.6ha, the overall area which includes the mosaic habitat is estimated at 10ha.

The typical species of the dunes with *Salix repens* at Strandhill include: *Salix repens* (Creeping willow), *Carex arenaria* (Sand sedge), *Carex flacca* (Glaucous sedge), *Carlina vulgaris* (Carline thistle), *Euphrasia officinalis* agg., (Eyebright), *Festuca rubra* (Red fescue), *Galium verum* (Lady's bedstraw), *Lotus corniculatus* (Bird's foot trefoil) and *Pilosella officinarum* (Mouse-ear hawkweed) along with other typical species of fixed dune including: *Anthyllis vulneraria* (Kidney vetch), *Arrhenatherum elatius* (False oat-grass), *Linum catharticum* (Fairy flax), *Plantago lanceolata* (Ribwort plantain), *Prunella vulgaris* (Selfheal), *Taraxacum* agg. (Dandelion), *Thymus polytrichus* (Wild Thyme), *Viola* spp. and the mosses *Rhytidiadelphus triquetrus* and *Rhytidiadelphus squarrosus*. The orchids *Epipactis palustris* (Marsh helleborine), *Dactylorhiza* spp. and *Listera ovata* (Common twayblade) occur throughout this habitat.

Other species present include: *Agrostis stolonifera* (Creeping bent), *Ammophila arenaria* (Marram grass), *Anthoxanthum odoratum* (Sweet vernal grass), *Carex pulicaria* (Flea sedge) and *Holcus lanatus* (Yorkshire fog).

The lack of grazing and the presence of the dune plantation have impacted negatively on this rare habitat. The conservation value of this habitat would be greatly enchanced by the removal of the dune plantation and the introduction of an appropriate grazing regime. The diversity of plant species is excellent and the habitat is functioning fairly well considering the number of activities impacting negatively on this part of the site.

An area of wet marshy ground containing *Calluna vulgaris* (Heather) was recorded during this survey within the dunes with *Salix repens*/dune plantation mosaic. This may be the result of the presence of the pine trees which, over time, artificially raise the acidity of the soil. Other species present include *Anagallis tenella* (Bog pimpernel), *Antennaria dioica* (Mountain everlasting), *Cirsium palustre* (Marsh thistle), *Epipactus palustris* (Marsh helleborine), *Gymnadenia conopsea* subsp.

conopsea (Fragrant orchid) and *Sagina nodosa* (Knotted pearlwort). The grass *Briza media* (Quaking grass) is common in this area.

Dune Slacks (H2190)

Dune slack has been noted in the ASI survey in an area adjacent to the dune plantation in the northern part of Strandhill. One dune slack directly southwest of the plantation was noted as showing signs of drying up at the time of the ASI survey and this may have been caused by the presence of the plantation. Dune slack is also mentioned in the Conservation plan where it is noted at the back of the fixed dunes in the north of Strandhill. Dune slack was not recorded in this part of the site during this survey.

In addition, a dune slack/drying hollow was noted in the vicinity of the large blowout in the southern part of Strandhill. This dune slack area comprises 2ha (Table 133A). It occurs south of the golf course adjacent to the large blowout. It consists of a large hollow that appears to dry during summer months and flood briefly in winter. The fluctuating ground water levels maintain the short and open immature sward with plenty of patches of bare sand. Its open character is also dependent upon trampling by visitors in the absence of grazers at the site and there are numerous tracks throughout this slack. The presence of the large blowouts and shifting dunes adjacent to the dune hollow may be affecting the development of the slack. The redeposition of these mobile sands onto the slack in drier conditions would repeatedly create new bare places for renewed colonisation by pioneer species. Bare sand accounts for approximately ten percent of the dune slack. The presence of patchy turf of grasses and herbs would indicate that the slack is becoming drier and stabilising in places.

The typical pioneer bryophyte species *Bryum pseudotriquetrum* is frequent throughout the dune slack along with *Homalothecium lutescens*. Another typical species present is the locally important orchid *Epipactis palustris* (Marsh Helleborine). Although not listed as typical species of dune slack, other species present that are considered part of the grassier sub-community of pioneer slacks include: *Anthyllis vulneraria* (Kidney vetch), *Blackstonia perfoliata* (Yellow-wort), *Euphrasia officinalis* agg. (Eyebright), *Festuca rubra* (Red fescue), *Lotus corniculatus* (Bird's-foot trefoil) and *Pilosella officinarum* (Mouse-ear hawkweed). The absence of *Salix repens* (Creeping willow) is

noteworthy as this species is present in other parts of the site. Typically the occurrence of this species is patchy in pioneer slacks.

Other species include *Ammophila arenaria* (Marram grass), *Galium verum* (Lady's bedstraw), *Hypochaeris radicata* (Cat's ear), *Leontodon saxatilis* (Lesser hawkbit), *Rhinanthus minor* (Yellow rattle), *Thymus polytrichus* (Wild Thyme) and *Trifolium repens* (White clover).

There are no negative indicator species present in the dune slack.

This is the only dune slack/hollow that has been noted at the site during this survey and offers a unique area of interest within the rank fixed dunes of Strandhill. A hydrological study of the area would give a better insight into the functioning of the dune slack area.

Mobile Dunes (H2120)

The mobile dune habitat edges the seaward side of the spit in the southern part of Strandhill. Marram grass (*Ammophila arenaria*) has colonised the bare sand along the east side of the large blowout at Shelly Valley. The mobile dunes have been impacted mainly by natural erosion that is compounded by recreational activity. The total mobile dune habitat comprises 5.5ha in area (Table 133A).

The typical species *Ammophila arenaria* (Marram grass) dominates with *Leymus arenarius* (Lyme grass) and *Honckenya peploides* (Sea sandwort) also present in the mobile dunes. The negative indicator species *Senecio jacobaea* (Common ragwort) occurs in this habitat but is rare.

Embryonic Dunes (H1220)

The embryonic dunes occur as a narrow band edging the fixed dunes in the inner part of Culleenamore Strand and the southern seaward edge of the spit. There is no embryonic dune along the northern eroding seaward edge of the sand dune system. A total area of 1ha of embryonic dunes was mapped at Strandhill (Table 133A).

The embryonic dunes are dominated by *Elytigia juncea* (Sand couch) along with *Honckenya peploides* (Sea sandwort). No negative indicator species were recorded in the embryonic zone.

Perennial vegetation of stony banks (H1220)

A cobble beach edges most of the site and this is vegetated mainly in the inner part of Culleenamore Strand where it is interspersed with both annual strandline vegetation and some saltmarsh hummocks. It comprises a total area of 1.5ha (Table 133A).

The shingle is colonised by *Rumex crispus* (Curled dock) and *Honckenya peploides* (Sea sandwort). There is also a very small area of vegetated shingle just east of Killaspug Point. Where sand overlays the shingle, some ephemeral species of strandline also occur including *Cakile maritima* (Sea rocket) and *Atriplex* spp. (Orache spp.).

No negative indicator species were recorded in this habitat. The main negative influence on this habitat would be trampling by walkers.

Annual Strandline (H1210)

The strandline is confined mainly to the north of the site at Killaspug Point. There are also some small patches of annual strandline along the inner bay at Culleenamore Strand where sand has gathered over shingle. The main area of strandline is small totaling 1ha (Table 133A) and is dominated by *Atriplex* spp. No negative indicator species were recorded in this habitat.

IMPACTS

The impacts for Strandhill are listed in Table 133B. The site has a well developed recreational infrastructure. It is impacted heavily by urbanisation and associated impacts including the construction of houses next to the dunes (code 401) and a sewage treatment plant (code 490) located on the fixed dunes. Sligo airport (code 505) traverses the northern end of the fixed dunes. These developments are excluded from the site but continue to impact the site through related activities.

There is easy access to the site and it is a very popular recreational location. It is a well known surfing beach. A golf course (code 601) and caravan park (608) are located at the main access point to the site.

Impacts associated with recreational activities such as golfing (601), walking (code 622), picnicing, horse riding (code 622) and swimming are contributing to the overuse of the dune system in certain areas. This is evident especially in the southern part of Strandhill where trampling (code 720) has resulted in the formation of numerous tracks. These tracks are concentrated at the large blowout at Shelly Valley and the dune slack/hollow adjacent to the blowout. If the plans to extend the golf course into the fixed dune and dune slack area are implemented, they would impact negatively on these habitats.

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

EU Habitat Code[1]	Activity Code[2]	Intensity[3]	Impact[4]	Area affected/ha	Location of Activity[5]
H2130	149	A	-1	90	Inside
H2170	149	A	-1	10	Inside
H2130	160	A	-1	10	Inside
H2130	401	B	-2	2	Outside
H2130	490	B	-2	Unknown	Outside
H2130	505	B	-2	Unknown	Outside
H2130	601	B	-2	4	Outside
H2130	608	C	-1	1	Outside
H2130	622	A	-1	10	Inside
H2120	622	A	-1	1	Inside
H2130	720	A	-1	10	Inside
H2120	720	A	-1	1	Inside
H2130	790	C	-1	2	Inside
H2130	871	B	-1	Unknown	Inside
H2130	900	B	-2	10	Inside
H2120	900	B	-2	1	Inside

[1] EU Codes as per Interpretation Manual. Code 21BB is an additional code used to signify the entire dune habitat.
[2] Description of activity codes are found in Appendix 3
[3] Intensity of the influence of an activity is rated as: A= high, B = medium, C = low influence and D = unknown.
[4] Impact is rated as: -2 = irreparable negative influence, -1 = repairable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence
[5] Location of activity: Inside = activities recorded within and directly impacting the sand dune habitat. Outside = activities recorded outside but adjacent to sand dune habitat that are impacting the sand dune habitat

It is noted in this survey that access to the site is mainly directed towards the south of the site. A dedicated walkway from the car park runs along the seaward edge of the golf course, leading to and ending at the blowout at Shelly Valley. This walkway should be redirected down onto the beach away from the dunes and the blowout. Fencing in the form of chestnut paling has been installed around the seaward edge of

the blowout with signs requesting visitors to avoid this area. However the fencing is not maintained and has been damaged in places. The signs are small and not obvious. The blowout is so large, it has become an focal point and recreational area for visitors. It may be prudent to divert pedestrian traffic away from the area by reinstating the fences and placing larger educational signs to indicate the role the public can play in protecting the susceptible areas of the dunes. Perhaps, a formal and convenient walkway across the dunes would reduce the level of trampling and human induced erosion occurring at the site. Any changes in public access to the dunes would need to be compatible with conservation of the mollusc *Vertigo angustior.*

Littering and burning from beach parties is evident in the fixed dunes, this has been classed under the category 'other pollution or human activities' (code 790).

The influence of forestry management (code 160) is significant on the fixed dunes, principally through loss of natural area. Impacts associated with the modification of hydrographic functioning or management of water levels arising from forestry management regimes, are not included, as the affects of these activities are not reliably estimated.

The fixed dune and dunes with *Salix repens* are strongly impacted by undergrazing (code 149) due to the absence of stock grazers at this site and the very low populations of rabbits. This has resulted in a gradual decline in the quality, in particular, of the fixed dune, where there is a predominance of rank grasses and scrub of *Salix repens* (Creeping willow) and low species diversity. The introduction of a grazing regime for this site would require consideration of the recreational activities of the site but would improve greatly the condition of this habitat. Given the extent of the fixed dune and dunes with *Salix repens* at this site some areas could be fenced off for containment of grazing stock. It is not envisaged that the total area of sand dune would be grazed, thereby allowing public access to certain parts of the sand dune. The aims of the grazing practice could be explained on large signposts placed in prominent places for the public to read. The introduction of a grazing regime at Strandhill would need to be undertaken with regard for the location and vulnerability of populations of *Vertigo angustior*. It may also need to consider badgers and badger setts present on the dunes.

Natural erosion (code 900) is impacting the fixed and mobile dunes. Natural erosion is most notable at the northern part of the site, where mobile habitat is largely absent and the fixed dunes are fronted by an eroding face. In the southern part of the site natural erosion is compounded by trampling (code 720) by visitors.

Coastal protection works in the form of rock armour have been installed on the seaward edge of the car park and golf course (code 871) since 2000. It is too soon to determine the impacts of this and so area affected is described as 'unknown' in Table 133B.

CONSERVATION STATUS

The conservation status of a site is assessed on the current condition of the site and on baseline information. The main source of baseline information for this site was from the ASI survey, NATURA 2000 report and the most recent Conservation Plans for the two cSAC sites within which it occurs (MPSU, 2000). An ecological report by J.Conaghan (2004) also provided information on the dune slack habitat.

The northern section of the site (Cummen Srand & Drumcliff Bay) is mainly designated for Fixed dunes and the southern part of the site (Ballysadare Bay) is designated for Fixed, Dune Slack, Mobile and Embryonic dunes. Dunes with *Salix repens*, Annual vegetation of strandlines and Perennial vegetation of stony banks that occur at Strandhill are not listed for the cSAC and therefore are not assessed in NATURA 2000. The fixed dune habitat occurs at a number of other sites within the cSACs, therefore the NATURA 2000 assessment is not specific to this habitat at Strandhill. As a result, best scientific judgement was used to assess some of the parameters of conservation status for these habitats (Table 133C).

Fixed Dunes (H2130)

The extent of the fixed dune under the EU conservation status is *unfavourable-inadequate*. As all of the developments at the site are excluded, currently the main impact on the extent of the fixed dunes is the presence of the plantation and natural erosion that appears to be compounded by recreational activities.

The EU conservation status for structure and function is *unfavourable – inadequate*. Twelve monitoring stops were placed in fixed dune area (Table 133D), two of the five

placed in the northern section failed and none of the seven in the southern part of Strandhill failed.

Table 133C Conservation status of Annex I sand dune habitats at Strandhill

Habitat[1]	EU Conservation Status Assessment			Overall EU conservation status assessment	Proposed Irish conservation status system[2]
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**		
Fixed Dunes (H2130)		Extent, Structure & Functions, Future prospects		**Unfavourable-inadequate**	**Unfavourable-declining**
Dunes with *Salix repens* (H2190)	Structure& Functions	Extent, Future prospects		**Unfavourable-inadequate**	**Unfavourable-declining**
Dune Slack (H2170)		Extent, Structure & Functions, Future prospects		**Unfavourable-inadequate***	**Unfavourable-declining**
Mobile Dunes (H2120)		Extent, Structure & Functions, Future prospects		**Unfavourable-inadequate**	**Unfavourable-declining**
Embryonic Dunes (H2110)	Extent, Structure & Functions, Future prospects			**Favourable**	**Favourable-maintained**
Perennial vegetation of stony banks (H1220)	Extent, Structure & Functions	Future prospects		**Unfavourable-inadequate**	**Unfavourable-unchanged**
Annual vegetation of strandlines (H1210)	Extent, Structure & Functions, Future prospects			**Favourable**	**Favourable-maintained**

[1]EU Codes as per Interpretation Manual
[2] Ratings are Favourable (Enhanced, Maintained, Recovered, Declining), Unfavourable (Recovering, Unchanged, Declining) and Destroyed (Partially destroyed, Completely destroyed and Unknown)
*This rating is based on best scientific judgement see text

Table 133D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Strandhill

	Monitoring stops		
Habitat	**Pass**	**Fail**	**Conservation status**
Fixed Dunes (H2130)	12	2	**Unfavourable-inadequate**
Dunes with *Salix repens* (H2190)	4	0	**Favourable**
Dune Slack (H2170)	0	1	**Unfavourable-inadequate**
Mobile Dunes (H2120)	5	1	**Unfavourable-inadequate**
Embryonic Dunes (H2110)	4	0	**Favourable**
Perennial vegetation of stony banks (H1220)	3	0	**Favourable**
Annual vegetation of strandlines (H1210)	3	0	**Favourable**

The two monitoring stops that did not pass, failed to reach the target for the attributes of typical species, sward height and flowering and fruiting. This is mainly on account of undergrazing.

The Conservation Plan for cSAC Cumeen Drumcliff (the northern part of Strandhill) contains a strategy for the management of the coniferous plantation located on the fixed dunes. It states:

Following harvesting (which will be outside of the time frame of this conservation plan), the dune area should not be re-planted.

This strategy, if implemented will facilitate the restoration of this habitat. This Conservation Plan also states that the dunes will remain without active management unless monitoring indicates that a grazing regime is required. The results of the monitoring program as part of this project would indicate that a sustainable grazing regime should be implemented. The control of human induced erosion in the southern part of Strandhill is addressed in the Conservation Plan for the cSAC Ballysadare Bay. It states that if erosion becomes a problem, action will be taken entailing the use of boardwalks and limiting human access to the dunes. The issue of undergrazing in the south is not addressed in the Conservation Plan for cSAC Ballysadare Bay. Until the issues of undergrazing (in both the north and south of Strandhill) and human induced erosion are actively managed, the future prospects are considered *unfavourable-inadequate* (Table 133C).

None of the fixed dune areas of the cSAC 627 Cumeen Drumcliff (the northern part of Strandhill) are considered particularly good examples of this habitat type in NATURA 2000. The fixed dunes are given a rating of *average or reduced* conservation status. The fixed dunes in the southern part of the site (cSAC of Ballysadare Bay) are given a rating of *good* conservation status in NATURA 2000. Currently, the overall EU conservation status of the entire fixed dune habitat is *unfavourable – inadequate* (Table 133C). This is mainly due to undergrazing and human induced erosion.

Under the Irish scheme, the conservation status for fixed dune at this site is *unfavourable – declining*.

Dunes with *Salix repens* (2170)

The extent of the dunes with *Salix repens* is rated as *unfavourable–inadequate* (Table 133C). This is based on best scientific judgement as there is no previous information available on this habitat at Strandhill. It is largely confined to the north of the site. This habitat occurs in a mosaic with fixed dunes and dune plantation. It is likely that the presence of the plantation has affected the extent of this habitat.

The structure and functions parameter is rated as *favourable*. Four monitoring stops were placed in the dunes with *Salix repens* and all of these passed (Table 133D). However, it is important to note that these are trial monitoring stops for this habitat. Further studies are required for the development of targets for this habitat (See main report). The main threat to the structure and functions of this habitat is from undergrazing, but otherwise this habitat appears to be functioning well with a high diversity of species present.

The future prospects for this habitat are considered *unfavourable-inadequate.* Dunes with *Salix repens* are not described or designated in the Conservation Plan (MPSU, 2000) for Strandhill. At present, there are no conservation management strategies for this habitat. The most urgent action needed is the introduction of grazing at a sustainable level for this habitat. This part of the site is also under on-going threats from development.

The conservation status of this habitat was not assessed in the NATURA 2000 survey. The current overall EU conservation status of dunes with *Salix repens* at Strandhill is *unfavourable-inadequate* (Table 133C). It should be noted that further study of this habitat in Ireland is required in order to assess it fully.

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

Dune Slack (H2190)

The extent is rated as *unfavourable-inadequate* as there is an apparent decline in the number of dune slacks since the ASI survey. This may be due to the presence of the plantation, which may be impacting on the local hydrology. The remaining dune slack is heavily trampled and suffering erosion in places. An estimated loss of dune slack area of 1ha is given based on the ASI survey. It is unclear if dune slack habitat was present in the plantation area before its development.

One monitoring stop was placed in dune slack and failed due to the lack of typical species and excessive bare ground cover (Table 133D). However, given the low number of pioneer slacks encountered during this survey and the lack of information on monitoring of this type of slack, the targets for each attribute are not fully developed. Therefore, the structure and functions parameter is rated as *unfavourable-inadequate* in preference to *unfavourable–bad*.

The future prospects for this site are considered *unfavourable-inadequate* on the basis that there are no strategies outlined in the Conservation Plan (2000) for this habitat. Currently, the viability of this habitat is threatened by the presence of the golf course, which may be impacting on the local hydrology. Also, the plans to expand the golf course include the development of this habitat as part of the new golf course. If the golf course extends into this area it will result in the total loss of this habitat at Strandhill.

The conservation status of this habitat was described as *average or reduced* in the NATURA form. The current overall EU conservation status of dune slack at Strandhill is *unfavourable-inadequate* (Table 133C).

Under the Irish scheme, the conservation status for fixed dune at this site is *unfavourable – declining*.

Mobile Dunes (H2120)

The mobile habitat at Strandhill appears highly susceptible to natural erosion and it is almost absent from the northern section of the site where the fixed dunes are fronted by a steep eroding ridge. The NATURA 2000 form noted that there were good areas of mobile dunes running the length of the spit in the south of Strandhill. The total area of this habitat appears to have declined since the NATURA survey. Natural erosion is compounded by human disturbance in the southern part of the site, mainly due to trampling. Therefore, extent is considered *unfavourable-inadequate*.

Six monitoring stops were placed in the mobile dunes and one of these failed (Table 133D). The stop that failed contained a large amount of unhealthy *Ammophila arenaria* (Marram grass). Therefore, the structure and functions parameter is given a conservation status rating of *unfavourable-inadequate*. The area of mobile habitat at the tip of the spit is in good condition and is freshly accreting.

The mobile dunes are affected by natural and human induced erosion. The plans to control human induced erosion are discussed in the Conservation Plan (cSAC Ballysadare Bay) in relation to the protection of the fixed dunes and these plans could also include the other sand dune habitats. However, there is currently no active management in place. Until the issue of human induced erosion is actively managed at the site, the future prospects are considered *unfavourable-inadequate*.

The mobile dunes are rated as *good* in the overall conservation status assessment in the NATURA 2000 form. The mobile dunes are currently regarded as *unfavourable-inadequate* under the overall EU conservation status and *unfavourable-declining* under the Irish conservation status system (Table 133C). This unfavourable rating is due to some loss of extent caused by negative impacts from human pressures.

Embryonic Dunes (H2110)

The extent of the embryonic habitat is rated as *favourable* (Table 133C). This is based on best scientific judgement. The embryonic dunes occur along the seaward edge of the spit and at the tip and are absent along the eroding northern part of Strandhill.

There appears to be no current impact on the extent. This is one of the few developed embryonic habitats found along the west coast.

The structure and functions parameter is rated as *favourable*. Four monitoring stops were placed in the embryonic habitat and all of these passed. Where embryonic habitat occurs, it is dominated by healthy typical embryonic species *Elytrigia juncea* (Sand couch) with no negative indicator species present. Overall this habitat appears to be functioning well.

The future prospects of the embryonic habitat are considered *favourable*, as despite the potential threat from recreational pressures at this site these do not appear to impact this habitat. This may be related to the location of the embryonic dunes further south of the main informal access point at Shelly Valley.

The conservation status is rated as *good* in the NATURA 2000 notes. The present overall EU conservation status for embryonic dunes is considered *favourable*.

The overall Irish conservation status is *favourable-maintained* (133C).

Perennial vegetation of stony banks (H1220)

Shingle beaches were noted previously at Strandhill in the Conservation Plans for the site, most notably at Culleenamore Strand. There is no apparent decline in the extent of this habitat and therefore it is rated as *favourable*. Given the lack of detailed information on this habitat at Strandhill, the assessment is based on best scientific judgement.

Three monitoring stops were placed in this habitat and these passed. Based on an overall visual assessment of this habitat and presence/absence of typical species, the conservation status of the structure and functions is rated as *favourable.*

Future prospects are considered *unfavourable-inadequate.* This is attributed to recreational activities, mainly trampling from walkers and horseriding along the edge of the inner bay at Culleenamore. This impact is very difficult to quantify. However the succulent nature of many shingle plant species makes them very susceptible to

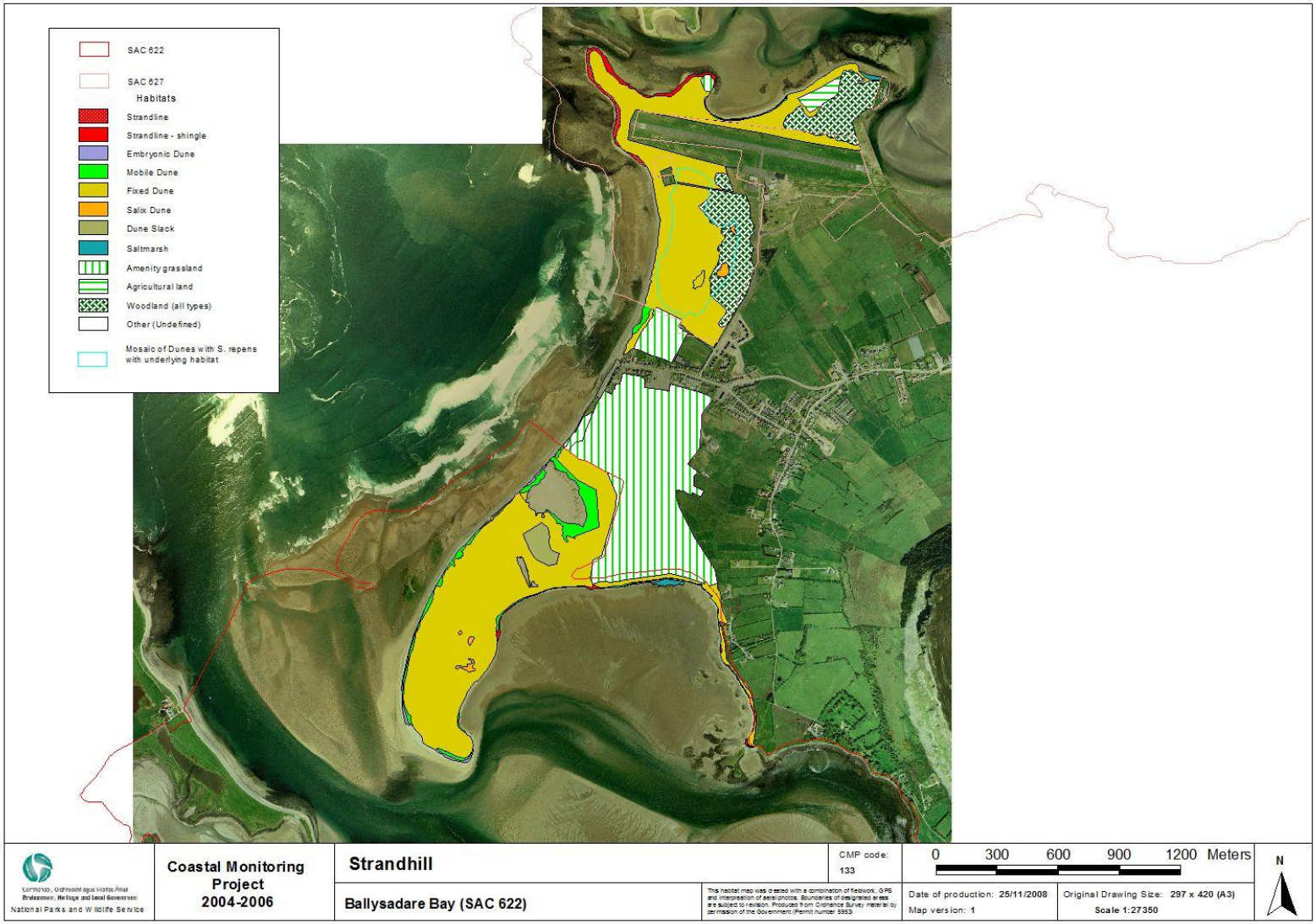
trampling. Trampling also compacts the cobble habitat restricting the germination of some seeds. If the plans to control human induced erosion are implemented perhaps the management of pedestrian traffic along the beach could also take into consideration the impacts on the shingle vegetation. Until this is addressed future prospects of this habitat are rated as *unfavourable-inadequate*.

The overall EU conservation status is currently regarded as *unfavourable-inadequate* and the Irish conservation status is *unfavourable-unchanged* (Table 133C).

Annual Strandline (H1210)

Annual vegetation of strandlines is confined to a narrow strip at Killaspug Point. Given the limited area of this habitat and the overlap of this habitat with Perennial vegetation of stony banks, the conservation status assessment is partly based on scientific judgement. Changes in the extent of the strandline habitat are difficult to assess, due to the ephemeral nature of the habitat. However it is rated as *favourable* based on the presence of tidal litter and strandline habitat that supports the typical annual species. The three monitoring stops passed and there is no apparent threat to the future of this habitat. Therefore, all three parameters and the overall EU conservation status of this habitat is rated as *favourable* (Table 133C).

The overall Irish conservation status is *favourable-maintained* (133C).


SAC 622
SAC 627
Habitats
Strandline
Strandline - shingle
Embryonic Dune
Mobile Dune
Fixed Dune
Salix Dune
Dune Slack
Saltmarsh
Amenity grassland
Agricultural land
Woodland (all types)
Other (Undefined)
Mosaic of Dunes with S. repens with underlying habitat
Coastal Monitoring Project 2004-2006
National Parks and Wildlife Service
Strandhill
Ballysadare Bay (SAC 622)
CMP code: 133
This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953).
0 300 600 900 1200 Meters
Date of production: 25/11/2008
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:27350
N

Appendix III – Coney Island site report and habitat map from the Coastal Monitoring Project (Ryle *et al*., 2009)

SITE DETAILS

CMP06 site name: **Coney Island** CMP06 site code: **134** CMP Map No.: **131**

County: **Sligo** Discovery map: **25** Grid Reference: **G 612 390**

6 inch Map No.: **Sl 7 & 8 & 13 & 14**

Aerial photographs (2000 series): **O 0951 A, B, C & D**

NPWS Site Name: **Cummeen Strand / Drumcliff Bay (Sligo Bay)**

NPWS designation: pNHA: **627** cSAC: **627** SPA: **4035**

Ranger Area**: Sligo**

MPSU Plan**: Draft II Consultation**

Report Author: **Anne Murray**

SITE DESCRIPTION

Coney Island sand dune system is part of a large coastal cSAC site that extends from Cullamore in the northwest to Killaspug in the southwest, Sligo town in the southeast and Drumcliff village in the northeast. The site is designated for the EU Annex I sand dune habitats – Fixed dunes, Mobile dunes and Embryonic dunes. Other habitats for which the site is designated are; Large shallow inlets and bays, Mudflats and sandflats not covered by seawater at low tide and Estuaries.

Six sand dune systems occur within the cSAC. For the purpose of this project the cSAC is divided into four main sites listed in the inventory of the sandy coasts of Ireland (Curtis, 1991). These are Strandhill (site 133), Coney Island (site 134), Rosses Point (site 135) and Yellow Strand (site 136). Two very small sand systems noted in the Consevation Plan (MPSU, 2000) are at Lisadell Strand and on Maguin's Island, these were not listed for this project.

Table 134A Areas of EU Annex I habitats mapped at Coney Island

EU Code	EU Habitat	Area (ha)
H1210	Annual vegetation of driftlines	0.021
H2110	Embryonic shifting dunes	0.672
H2120	Shifting dunes along the shoreline with *Ammophila arenaria*	0.455
H2130	Fixed coastal dunes with herbaceous vegetation	37.262*
H2190	Humid Dune Slacks	0.239
	Total sand dune	**38.649**

*21ha of fixed dune lies outside the cSAC

Coney Island is situated in Sligo Bay and lies at the mouth of Sligo Harbour alongside Oyster Island. The sand dunes of Coney Island cover the south and west of the island. They comprise tall fixed dune ridges along the southern edge which slope gently landward to lowlying dunes grading into wet agricultural fields. The eastern edge of the dunes is bordered by a narrow strip of saltmarsh. The more exposed western edge of the dunes are eroding, resulting in a steep sandy cliff which is fronted by a cobble beach (unvegetated).

EU Annex I sand dune habitats recorded during this survey at Coney Island are Fixed dunes (priority habitat), Dune slack, Mobile dunes, Embryonic dunes and Annual vegetation of driftlines. The total sand dune area is 38.649ha (Table 134A).

Fixed Dunes (H2130)

Fixed dunes are the main sand dune habitat (97% of the total area) at Coney Island covering 37.262ha (Table 134A). Approximately 21ha of the fixed dune area is fenced and lies outside of the cSAC north of the boundary, which is delineated on the ground by an old stone wall. The fixed dune is grazed by cattle, sheep and rabbits. The local rabbit population appears very high and rabbit burrows dominate the dune system. The dunes are overgrazed in the main with agricultural weeds abundant throughout.

The typical fixed dunes species recorded at Coney Island include *Carex arenaria* (Sand sedge), *Cerastium fontanum* (Common mouse-ear), *Euphrasia officinalis* agg (Eyebright), *Festuca rubra* (Red fescue), *Galium verum* (Lady's bedstraw), *Geranium molle* (Dove's-foot crane's-bill), *Hypochaeris radicata* (Cat's ear), *Linum catharticum* (Fairy flax), *Luzula campestris* (Field wood-rush), *Lotus corniculatus* (Common bird's-foot-trefoil), *Plantago lanceolata* (Ribwort plantain), *Poa pratensis* (Smooth meadow-grass), *Prunella vulgaris* (Selfheal), *Taraxacum* agg. (Dandelion), *Thymus polytrichus* (Wild thyme), *Trifolium repens* (White clover), *Veronica chamaedrys* (Germander speedwell) and the mosses - *Tortula ruraliformis*, *Rhytidiadelphus squarrosus* and *Rhytidiadelphus triquetrus*.

Other species present in the fixed dune include: *Agrostis stolonifera* (Creeping bent), *Ammophila arenaria* (Marram grass), *Bellis perennis* (Daisy), *Myosotis arvensis*

(Field forget-me-not), *Ranunculus bulbosus* (Bulbous buttercup) and *Rumex acetosella* (Sheep's sorrel).

The negative indicator species *Senecio jacobaea* (Common ragwort) and *Cirsium vulgare* (Spear thistle) are abundant throughout the fixed dunes.

Dune Slacks (H2190)

Three small areas of wet dune slack occur in the northern part of the fixed dunes comprising a total area of 0.239ha. These are heavily grazed and the negative indicator species *Cirsium vulgare* (Spear thistle) is common.

The typical dune slack species present are *Hydrocotyle vulgaris* (Marsh pennywort) *Galium palustre* (Marsh bedstraw), *Potentilla anserina* (Silverweed), *Prunella vulgaris* (Selfheal) and the moss - *Calliergonella cuspidata*.

Other species present include, *Agrostis stolonifera* (Creeping bent), *Anagallis tenella* (Bog pimpernel), *Carex flacca* (Glaucous sedge), *Cerastium fontanum* (Common mouse-ear), *Lotus corniculatus* (Common bird's-foot-trefoil), *Ranunculus repens* (Creeping buttercup) and *Trifolium repens* (White clover).

Mobile Dunes (H2120)

A narrow band of mobile dunes front the southwestern edge of the fixed dunes at Coney Island and comprise a total area of 0.455ha. These have formed from sand recycled from the eroding fixed dunes.

The mobile dunes are dominated by the typical species *Ammophila arenaria* (Marram grass) as well as some fixed dunes species including *Festuca rubra* (Red fescue), *Lotus corniculatus* (Common bird's-foot-trefoil) and *Taraxacum* agg. (Dandelion).

The negative indicator species *Senecio jacobaea* (Common ragwort) and *Cirsium vulgare* (Spear thistle) occur occasionally in the mobile habitat.

Embryonic Dunes (H2110)

Patches of embryonic dune occur along the south and western edge of the fixed dune habitat and the total area of 0.672ha. This is probably an overestimation as the habitat is significantly discontinuous along the frontline. The typical species *Elytrigia juncea* (Sand couch) dominates with no other species present.

Annual Strandline (H1210)

A very small area of annual strandline edges the southeast corner of the dunes and covers 0.021ha. The typical species present include *Atriplex* spp. (Orache spp.), *Cakile maritima* (Sea rocket) and *Honckenya peploides* (Sea sandwort). There are no negative indicator species present.

IMPACTS

The main activities impacting the sand dune system on Coney Island are listed in Table 134A. Grazing (code 140) is the main land-use activity on the dunes. Some parts of the fixed dune (mainly outside of the cSAC) are fenced into fields (code 150) and intensively managed. These fields contained a poor diversity of typical fixed dune species. Overgrazing by sheep, cattle and rabbits (code 142,143 and 146 respectively) has damaged the dunes and exacerbated natural erosion.

Table 134B Intensity and impact of various activities on sand dune habitats at Coney Island

EU Habitat Code[1]	Activity Code[2]	Intensity[3]	Impact[4]	Area affected/ha	Location of Activity[5]
H2130	103	C	-1	15	Inside
H2130	140	A	+2	21	Inside/Outside
H2130	142	A	-1	15	Inside/Outside
H2190	142	B	-1	0.2	Inside/Outside
H2130	143	A	-1	15	Inside/Outside
H2130	146	A	-1	15	Inside/Outside
H2130	150	A	-1	15	Inside
H2130	720	A	-1	15	Inside
H2130	900	B	0	Unknown	Inside
H2120	900	B	0	Unknown	Inside
H2130	954	A	-1	15	Inside

[1]EU Codes as per Interpretation Manual. Code 21BB is an additional code used to signify the entire dune habitat.
[2] Description of activity codes are found in Appendix 3
[3] Intensity of the influence of an activity is rated as: A= high, B = medium, C = low influence and D = unknown.
[4] Impact is rated as: -2 = irreparable negative influence, -1 = repairable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence
[5] Location of activity: Inside = activities recorded within and directly impacting the cSAC. Outside = activities recorded outside but adjacent to sand dune habitat that are impacting the cSAC

The predominance of agricultural weeds (code 954) in the sand dunes has reduced the diversity of typical species. Rabbit burrows have undermined the structure of the dunes and induced erosion.

Natural erosion (code 900) is impacting the more exposed western edge of the sand dune system.

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 ASI survey and the NATURA 2000 survey.

The method of assessment of conservation status differed in the NATURA 2000 survey and the various sand dune systems within the cSAC are assessed together, whereas each system is treated individually in this survey. Therefore, only broad comparisons between the conservation status of the two surveys was possible. The conservation status of the Annex I sand dune habitats on Coney Island are given in Table 134C.

Fixed Dunes (H2130)

The extent of fixed dunes at Coney Island is *unfavourable-inadequate*. Part of the fixed dune area lies outside of the cSAC and has not been mapped in previous surveys. The decline in area is due to erosion induced by overgrazing and rabbit burrowing which has resulted in large areas of bare sand across the fixed dunes.

Table 134C Conservation status of Annex I sand dune habitats at Coney Island

Habitat[1]	EU Conservation Status Assessment			Overall EU conservation status assessment	Proposed Irish conservation status system[2]
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**		
Fixed Dunes (H2130)		Extent	Structure & Functions/ Future prospects	**Unfavourable-bad**	**Unfavourable-declining**
Dune Slack (H2190)	Extent/ Structure & Functions	Future prospects		**Unfavourable-inadequate**	**Unfavourable-declining**
Mobile Dunes (H2120)	Extent/ Structure & Functions	Future prospects		**Unfavourable-inadequate**	**Unfavourable-declining**

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

Table 134D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Coney Island

	Monitoring stops		
Habitat	**Pass**	**Fail**	**Conservation status**
Fixed Dunes (H2130)	4	2	**Unfavourable-bad**
Dune Slack (H2190)	1	0	**Favourable**
Mobile Dunes (H2120)	2	0	**Favourable**

Six monitoring stops were placed in the fixed dunes (Table 134D). Two of the monitoring stops were placed in the fixed dune outside of the cSAC and four within the cSAC. Two of the monitoring stops within the cSAC failed due to the high cover of bare ground and negative indicator species (agricultural weeds). The structure of the fixed dunes is undermined due to the high number of rabbit burrows in the habitat. Therefore, the structure and functions is rated *unfavourable-bad.*

The future prospects are *unfavourable-bad*. The habitat is largely destroyed by rabbit burrows and the impacts of overgrazing. The problem of overgrazing is recognised in the conservation plan and is described as 'slightly above ideal'. Monitoring is recommended in order to ensure a suitable grazing regime for the dunes. However the threats of overgrazing and rabbit burrowing are on-going. A reduction of the rabbit population is urgently required to alleviate the pressures on this habitat.

The conservation status of fixed dunes in the NATURA 2000 survey is rated as *average or reduced conservation*. None of the fixed dune areas of the cSAC including those at Coney Island are considered to be particularly good examples of this habitat. Currently, the overall EU conservation status of this habitat is *unfavourable-bad* (Table 134C) and this is attributable to the on-going threats of overgrazing and rabbit burrowing.

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

Dune Slacks (H2190)

The extent of dune slack on Coney Island is rated as *favourable* as there is no indication that the area has declined in recent times. This is based on best scientific judgement as this area of dune slack is not indicated on any of the previous maps available for this site and it is not mentioned in the MPSU conservation plan.

The structure and functions parameter is rated as *favourable*. One monitoring stop was placed in the dune slack area and this passed (Table 134D). Although the dune slacks are not overgrazed, poaching by sheep is evident and agricultural weeds have invaded some of the slack areas. This is taken into consideration in the future prospects of the habitat.

The future prospects for the dune slack are considered *unfavourable-inadequate.* Although it is not apparent in the monitoring stop, an overview of the entire habitat indicates that the current agricultural management is inappropriate for the dune slack. This threatens the viability of this habitat.

Currently, the overall EU conservation status of dune slack is *unfavourable-inadequate* (Table 134C), as the slack area is currently under pressure from agricultural activities..

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

Mobile Dunes (H2120)

The extent of mobile dunes at Coney Island is rated as *favourable* (Table 134C). Even though the mobile dunes are limited in extent, they appear intact. There are few visitors due to inaccessibility of the island and so the main impact on the mobile dunes is natural erosion which is not considered unfavourable.

Two monitoring stops were placed in the mobile dunes and these passed (Table 134D). Therefore, the structure and functions is rated as *favourable*.

The future prospects of the mobile dunes are considered *unfavourable-inadequate*. The activities currently impacting the rest of the dune system are likely to have repercussions for the future of the mobile dunes especially the intensity of rabbit burrowing.

The conservation status of fixed dunes in the NATURA 2000 survey is rated as *average or reduced conservation*. Currently, the overall EU conservation status of this habitat is *unfavourable-inadequate(*Table 134C).

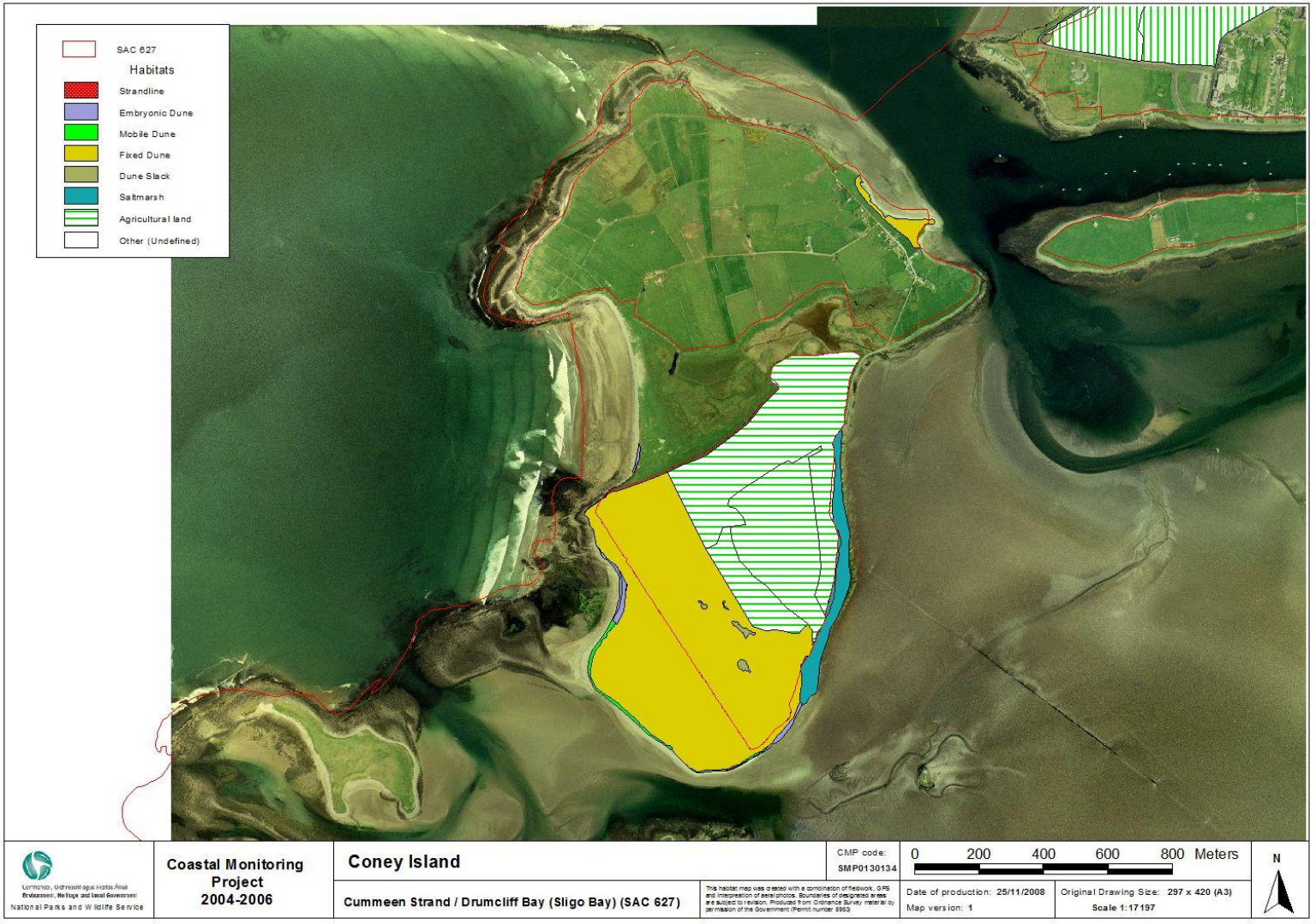
The Irish conservation status is rated as *unfavourable-declining*.

Embryonic Dunes (H2110)

The area of embryonic dunes is small and a conservation assessment is not required.

Annual Strandline (H1210)

The area of annual strandline is small and a conservation assessment is not required.


SAC 627
Habitats
Strandline
Embryonic Dune
Mobile Dune
Fixed Dune
Dune Slack
Saltmarsh
Agricultural land
Other (Undefined)
Coastal Monitoring Project 2004-2006
Coney Island
Cummeen Strand / Drumcliff Bay (Sligo Bay) (SAC 627)
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Date of production: 25/11/2008
Map version: 1
Original Drawing Size: 297 x 420 (A3)
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Appendix IV – Rosses Point site report and habitat map from the Coastal Monitoring Project (Ryle *et al*., 2009)

SITE DETAILS
CMP06 site name: **Rosses Point** CMP06 site code: **135** CMP Map No.: **132**

County: **Sligo** Discovery map: **16** Grid Reference: **G 626 405**

6 inch Map No.: **Sl 8**

Aerial photographs (2000 series):**O 0847B;O 0848C;O 0895B,D;O 0896A,C;**

O 0951B

NPWS Site Name: **Cummeen Strand / Drumcliff Bay (Sligo Bay)**

NPWS designation: pNHA: **627** cSAC: **627**

Blue Flag Beach: **Rosses Point**

Ranger Area**: Sligo**

MPSU Plan**: Draft II 2000**

Report Author: **Anne Murray**

SITE DESCRIPTION

Rosses Point sand dune system is part of a large coastal cSAC site that extends from Cullamore in the northwest to Killaspug in the southwest, Sligo town in the southeast and Drumcliff village in the northeast. The site is designated for the EU Annex I sand dune habitats – Fixed dunes and Embryonic dunes. Other habitats for which the site is designated are; Large shallow inlets and bays, Mudflats and sandflats not covered by seawater at low tide and Estuaries.

Six sand dune systems occur within the cSAC. For the purpose of this project the cSAC is divided into four main sites listed in the inventory of the sandy coasts of Ireland (Curtis, 1991). These are Strandhill (site 133), Coney Island (site 134), Rosses Point (site 135) and Yellow Strand (site 136). Two very small sand systems noted in the Consevation Plan (MPSU, 2000) are at Lisadell Strand and on Maguin's Island, these were not listed for this project.

Table 135A Areas of EU Annex I habitats mapped at Rosses Point

EU Code	EU Habitat	Area (ha)
H2130	Fixed coastal dunes with herbaceous vegetation	22.181
H2120	Mobile dunes	0.174
H2110	Embryonic shifting dunes	32.274*
	Total Sand dune	**54.629***

* This is an overestimation of the embryonic habitat and therefore of the total sand dune habitat (see text).

Rosses Point peninsula is located just north of Sligo Harbour. Most of the sand dune system has been modified by the presence of a golf course and is excluded from the site. The sand dune habitat within the cSAC comprises a narrow band of fixed dune that fringes the golf course and an area of embryonic dunes that extends the length of a sand spit on the northern edge of Rosses Point peninsula. This spit partially encloses Drumcliff Bay. Sandhills were noted on the early 1900s Ordnance Survey maps, along the north of the spit. These have since disappeared and have been replaced by hummocks of *Elytigia juncea* (Sand couch). An area of Meditteranean saltmarsh occurs in close association with the embryonic and fixed dunes along the southeastern edge of the spit.

The spit is noted as an important roosting area for waders including *Charadrius hiaticula* (Ringed Plover), *Calidris alba* (Sanderling) and *Calidris alpina* (Dunlin) and is partially included in Drumcliff Bay SPA 4013 and wildfowl sanctuary.

Marsh fritillary (*Eurodryas aurinia*), a butterfly species listed in Annex II of the E.U. Habitats Directive, has been recorded at Rosses Point.

EU Annex I sand dune habitats recorded during this survey at Rosses Point are Fixed dunes (priority habitat), Mobile dunes and Embryonic dunes. The total sand dune area is 55ha (Table 135A).

Fixed Dunes (H2130)

The priority habitat fixed dune comprises 22ha of the total sand dune habitat at Rosses Point (Table 135A). The golf course area is mapped as 93ha, however the boundary is not defined on the ground and a small area (approximately 1.5ha) to the south appears to lie within the cSAC boundary as indicated on the digital map **(CMP Map No. XX).** The area of fixed dune on the western edge of the golf course is undergoing natural erosion and this is compounded by recreational activities. Coastal protection in the form of rock armour, planting of *Phormium tenax* (New Zealand Flax), the installation of sand trapping fences and planting of *Elytrigia juncea* (Sand couch) have been carried out along this eroding edge. The success of these measures has been limited as the dunes are continuing to erode southwards towards Bomore Point. The area of fixed dune on the northern edge of the golf course is bound by an accreting sand spit and remains intact. However, there is no grazing and the fixed dunes are

rank, dominated by grasses *Arrhenatherum elatius* (False oat-grass) and *Festuca rubra* (Red fescue), with a thick carpet of moss underfoot.

The species diversity is low in the fixed dunes at Rosses Point. The typical species include: *Arrhenatherum elatius* (False oat-grass), *Anthyllis vulneraria* (Kidney vetch), *Daucus carota (*Wild carrot*), Festuca rubra* (Red fescue), *Galium verum* (Lady's bedstraw), *Hypochaeris radicata* (Cat's ear), *Lotus corniculatus* (Bird's foot trefoil), *Plantago lanceolata* (Ribwort plantain), *Taraxacum* agg. (Dandelion), *Trifolium repens* (White clover) and *Trifolium pratense* (Red clover) as well as the moss - *Rhytidiadelphus squarrosus.* Other species present are *Anacamptis pyramidalis* (Pyramidal orchid) and *Leucanthemum vulgare* (Oxeye daisy). Isolated *Acer pseudoplatanus* (Sycamore) trees are present on the northern part of the fixed dunes.

A limestone escarpment runs out to the coast (at Bomore Point) from fixed dunes at the southern part of the golf course (at the main access area to the dunes). This area is used as a viewing point for visitors with benches provided. As a result the area is heavily trampled and contains large amounts of bare sand and exposed rock. The lifeguard hut is also located here. This area is covered with a very thin layer of blowing sands that is colonised by species of dry grassland and heath including: *Aira praecox* (Early hair-grass), *Anthyllis vulneraria* (Kidney vetch), *Arrhenatherum elatius* (False oat-grass), *Bellis perennis* (Daisy), *Briza media* (Quaking-grass), *Carex arenaria* (Sand sedge), *Dactylis glomerata* (Cock's foot), *Danthonia decumbens* (Heath-grass), *Euphrasia officinalis* agg. (Eyebright), *Galium verum* (Lady's bedstraw), *Juniperus communis* (Common juniper), *Lotus corniculatus* (Bird's foot trefoil), *Salix cinerea* subsp. *cinerea* (Grey willow) and *Thymus polytrichus* (Wild thyme). This area is indicated on the digital map as a Juniper information point (See Main Report).

Mobile Dunes (H2120)

The total mobile dune comprises a very small area of 0.174 ha (Table 135A). The mobile dunes are confined to the beach between Bomore Point and Deadman's Point where it fronts the car park. The front slope of the mobile dunes is naturally eroding and heavily impacted by disturbance from recreational activities.

There are some small hummocks of *Ammophila arenaria* (Marram grass) on the spit at the northern section of the site at Rosses Point but these have not developed into a typical mobile zone.

The typical species *Ammophila arenaria* (Marram grass) dominates with other species present, including *Elytrigia juncea* (Sand couch) and *Eryngium maritimum* (Sea-Holly).

The negative indicator species *Cirsium arvense* (Creeping thistle) occurs in the mobile dunes but is not common.

Embryonic Dunes (H2110)

The mapped area of embryonic dunes at this site is 32ha. An area of 27ha of embryonic habitat is mapped on the spit at the northern part of the site. The tip of the spit is covered by freshly accreting sand and hummocks of the typical species - *Elytrigia juncea* (Sand couch). The western edge of the spit also comprises embryonic habitat. The neck of the spit is disturbed by natural forces of winter storms on the seaward edge, as a result *Ammophila arenaria* (Marram grass) dominated hummocks and fragmented patches of fixed dune species occur in mosaic with embryonic habitat. Saltmarsh occurs along the east and south of the spit and channels containing saltmarsh species traverse the lower part of the embryonic habitat. Overall the embryonic habitat is in good condition.

There is also a man-made ridge of sand, with the species - *Elytrigia juncea* (Sand Couch) forming an embryonic habitat on the western side of the golf course towards the headland of Rosses Point.

There are no negative indicator species in the embryonic dunes.

IMPACTS

The site has been impacted heavily by natural erosion and human activity. The impacts are listed in Table 135B. Rosses Point has well developed recreational infrastructure (code 530), with a large car park, public toilets and a lifeguard station behind the beach. There is also a scenic walking path with benches at Bomore Point

and Deadman's Point. Deadman's Point is stop no. 2 on "Yeat's Country Tour", a self guided driving tour published by Bord Failte.

There is easy access to the site and the recreational facilities of a Blue Flag beach along with the adjacent golf course (code 601) and caravan park (608), make it very popular. Impacts associated with recreational activities such as golfing (601), walking (code 622), picnicing, horse riding (code 622) and swimming are contributing to the overuse of the dune system in certain areas. This is evident at the access point near Bomore Point where trampling (code 720) and damage to vegetation is concentrated.

A car park and a shed (code 440), which holds equipment for the county council are also located on the fixed dunes at Bomore Point. These should be excluded from the cSAC, along with other sheds and buildings that have remained within the cSAC e.g. Sligo Yacht Club storehouse and clubhouse.

Table 135B Intensity and impact of various activities on sand dune habitats at Rosses Point

EU Habitat Code[1]	Activity Code[2]	Intensity[3]	Impact[4]	Area affected/ha	Location of Activity[5]
H2130	149	A	-1	20	Inside
H2130	421	C	-1	0.1	Inside
H2130	530	B	-1	4	Outside
H2130	601	A	-2	93	Outside
H2130	601	A	-1	1.5	Inside
H2130	608	B	-2	Unknown	Outside
H2130	622	C	-1	2	Inside
H2110	622	B	-1	Unknown	Inside
H2110	720	B	-1	Unknown	Inside
H2130	790	C	-1	0.4	Inside
H2130	871	B	-1	2	Inside
H2110	871	A	-1	2	Inside
H2130	600	C	-2	0.1	Inside
H2130	900	B	0	2	Inside
H2110	900	B	0	6	Inside

[1] EU Codes as per Interpretation Manual. Code 21BB is an additional code used to signify the entire dune habitat.
[2] Description of activity codes are found in Appendix 3
[3] Intensity of the influence of an activity is rated as: A= high, B = medium, C = low influence and D = unknown.
[4] Impact is rated as: -2 = irreparable negative influence, -1 = repairable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence
[5] Location of activity: Inside = activities recorded within and directly impacting the cSAC. Outside = activities recorded outside but adjacent to sand dune habitat that are impacting the cSAC.

The fixed dune is also impacted by undergrazing (code 149) due to the absence of grazers at this site. This has resulted in a poor quality fixed dune habitat dominated by rank grasses and poor species diversity. The introduction of a grazing regime for this

site would require consideration of the recreational activities of the site and the limited area of fixed dune. It may be best suited to one or two horses or ponies.

Littering and burning from beach parties is evident in the fixed dunes, this has been classed under the category 'other pollution or human activities' (code 790).

Natural erosion (code 900) is impacting both the embryonic and fixed dunes along the western side of the golf course and this is compounded by trampling (code 720) by visitors and also by horse riding (code 622). Protection works have been installed including hard coastal protection measures (code 871)) along the northwestern edge of the golf course.

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 ASI survey, Golf survey (Gaynor and Browne) and NATURA 2000 survey.

The method of assessment of conservation status differed in the NATURA 2000 survey and the current survey, so direct comparisons between the conservation status of the two surveys were not possible.

Fixed Dunes (H2130)

The extent of fixed dunes is rated as *unfavourable-inadequate* (Table 135C). This is based on scientific judgement as there is no previous information on the extent of this habitat at Rosses Point. There is an estimation of 5ha for the entire cSAC (NATURA 2000). A large part of the fixed dune area is now excluded from the site as it is occupied by a golf course, however an area of fixed dune contained within the cSAC at the southern part of this site appears to have been modified by the golf course. The fixed dune next to Bomore Point is affected by trampling from visitors and the physical presence of a car park. Therefore, loss of extent of the fixed dune is due to both natural erosion and recreational activities.

Table 135C Conservation status of Annex I sand dune habitats at Rosses Point

Habitat[1]	EU Conservation Status Assessment				
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**	**Overall EU conservation status assessment**	**Proposed Irish conservation status system[2]**
Fixed Dunes (H2130)		Extent, Structure & functions, Future prospects		**Unfavourable-inadequate**	**Unfavourable-declining**
Mobile dunes (H2120)			Extent, Structure & functions, Future prospects	**Unfavourable-bad**	**Partially destroyed**
Embryonic Dunes (H2110)	Structure & functions	Extent, Future prospects		**Unfavourable-inadequate**	**Unfavourable unchanged**

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

The structure and functions parameter is rated as *unfavourable-inadequate*. This is based on best scientific judgement. Although the four monitoring stops placed in the fixed dunes passed (Table 135D), overall the functioning of the fixed dune is poor due impacts associated with the presence of the golf course. Other recreational activities are restricted to the remaining fixed dune outside of the golf course, thus concentrating recreational impacts on the fixed dune within the cSAC and reducing the possibility of grazing at the site. One attribute that failed at three of the stops is the sward height indicating the lack of grazers at the site. There are some tracks through the fixed dunes but these are currently having a minor impact on the habitat and are probably contributing to the diversity of species albeit poor.

The future prospects for this habitat are considered *unfavourable-inadequate.* The main threat to the future of the habitat is the natural retreat of the coastline on the western edge of the golf course and the management of protection works by the golf course and county council in relation to natural erosion. Rosses Point has a well developed recreational infrastructure resulting in high amenity use of the beach and dunes that is likely to continue to impact negatively on the dunes.

The conservation status of the fixed dune was described as *average or reduced* in the NATURA 2000 survey. The current overall EU conservation status of fixed dunes at Rosses Point is *unfavourable-inadequate* (Table 135C). This reflects the impact of undergrazing and the high amenity use of this site resulting in loss of extent and reduction in the quality of this habitat.
The overall Irish conservation status is *unfavourable-declining.*

Table 135D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Rosses Point

	Monitoring stops		
Habitat	**Pass**	**Fail**	**Conservation status**
Fixed Dunes (H2130)	4	0	**Unfavourable-inadequate***

*This conservation status is based upon best scientific judgement (see text)

Mobile Dunes (H2120)

Given the limited area of this habitat the conservation status assessment is based on best scientific judgement. The parameters and overall EU conservation status of this habitat is rated as *unfavourable-bad*, as the area is very disturbed by recreational activities. The area is heavily trampled, as it is located at the main access to the site just below the car park and caravan park. Some dumping of rubble is also evident along the top ridge of the mobile dune.

The overall Irish conservation status is *partially-destroyed.*

Embryonic Dunes (H2110)

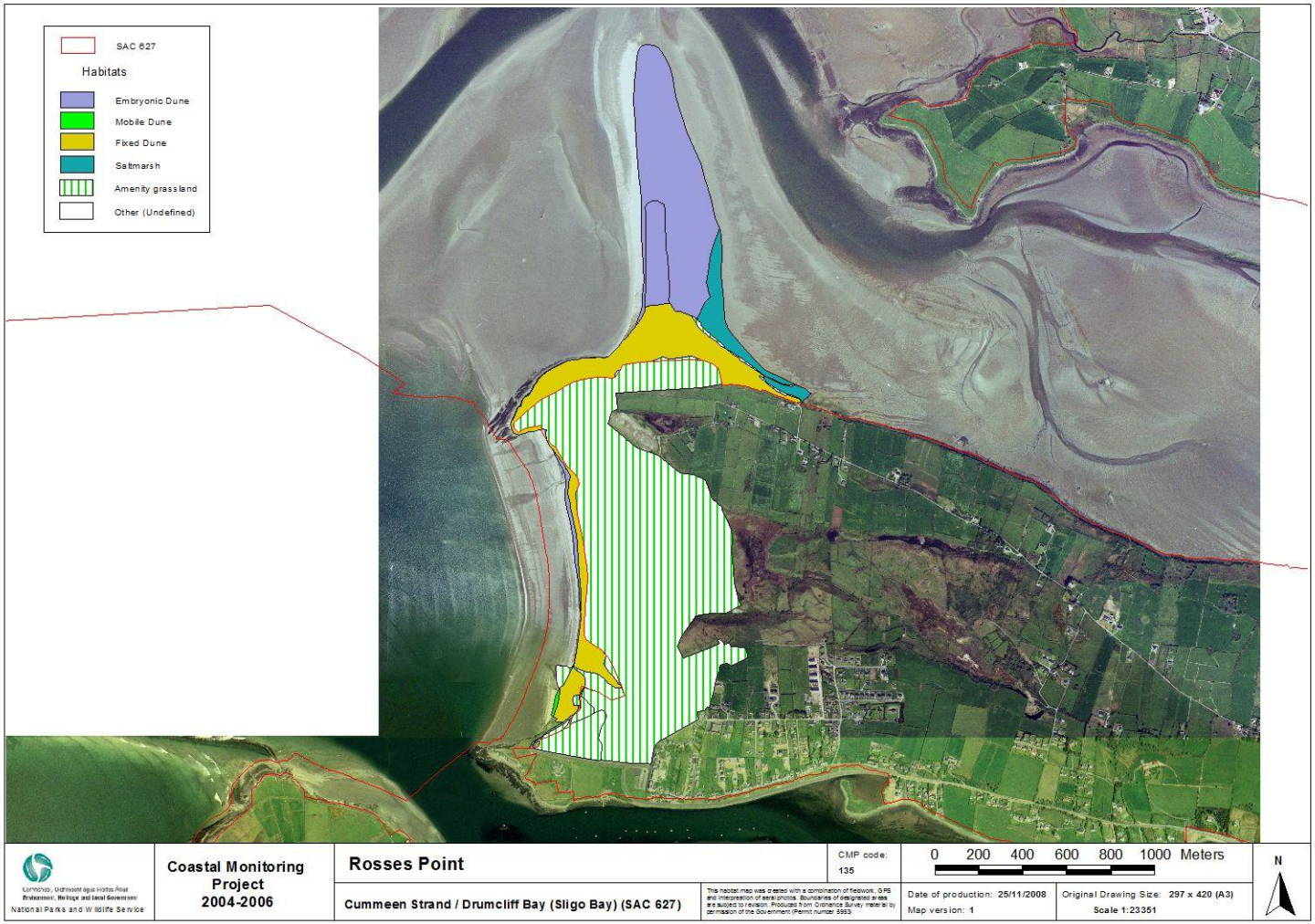
The extent of the embryonic habitat is rated as *unfavourable-inadequate*. This is based on best scientific judgement. An estimated area of less than 1ha is given in the NATURA 2000 survey. Natural erosion is occurring along the western edge of Rosses Point and this appears to be compounded by recreational activity mainly horse riding and the use of motorised vehicles in the northern part of the site (Table 135C).

The structure and functions parameter is rated as *favourable*. No monitoring stops were placed in the embryonic habitat, due to equipment failure on the day of survey. Where embryonic habitat occurs it is dominated by healthy typical embryonic species with no negative indicator species present.

The future prospects of the embryonic habitat are considered *unfavourable-inadequate*, as there is no active management prescribed in the conservation plan for this part of the cSAC. The impact of horse riding and motorised vehicles on this site (especially on the spit) should be examined and addressed. It is not possible to assess the extent or intensity of these impacts based on one site visit given the ephemeral nature. Therefore, the extent is given as ‘unknown in Table 135B.

The conservation status is rated as *good* in the NATURA 2000 notes. The present overall EU conservation status for embryonic dunes is considered *unfavourable-inadequate*. This is attributable to the impacts of human activity at the site

The overall Irish conservation status is *unfavourable-unchanged.*


SAC 627
Habitats
Embryonic Dune
Mobile Dune
Fixed Dune
Saltmarsh
Amenity grassland
Other (Undefined)
Coastal Monitoring Project 2004-2006
National Parks and Wildlife Service
Rosses Point
Cummeen Strand / Drumcliff Bay (Sligo Bay) (SAC 627)
CMP code: 135
This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953)
0 200 400 600 800 1000 Meters
Date of production: 25/11/2008
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:23351
N

Appendix V – Yellow Strand report and habitat map from the Coastal Monitoring Project (Ryle *et al*., 2009)

SITE DETAILS

CMP06 site name: **Yellow Strand** CMP06 site code: **136** CMP Map No.: **133**

County: **Sligo** Discovery map: **16** Grid Reference: **G 576 437**

6 inch Map No.: **Sl 7**

Aerial photographs (2000 series): **O 0846 A & C; O 0847 D; O 0848 C; O 0894 A; O 0895 B**

NPWS Site Name: **Cummeen Strand / Drumcliff Bay (Sligo Bay)**

NPWS designation: pNHA: **627** cSAC: **627**

Ranger Area**: Sligo**

MPSU Plan**: Draft II Consultation**

Report Author: **Anne Murray**

SITE DESCRIPTION

Yellow Strand sand dune system is part of a large coastal cSAC site that extends from Cullamore in the northwest to Killaspug in the southwest, Sligo town in the southeast and Drumcliff village in the northeast. The cSAC is designated for the EU Annex I sand dune habitats – Fixed dunes, Mobile dunes and Embryonic dunes. Other habitats for which the site is designated are; Large shallow inlets and bays, Mudflats and sandflats not covered by seawater at low tide and Estuaries.

Six sand dune systems occur within the cSAC. For the purpose of this project the cSAC is divided into four main sites listed in the inventory of the sandy coasts of Ireland (Curtis, 1991). These are Strandhill (site 133), Coney Island (site 134), Rosses Point (site 135) and Yellow Strand (site 136). Two very small sand systems noted in the Consevation Plan (MPSU, 2000) are at Lisadell Strand and on Maguin's Island, these were not listed for this project.

Table 136A Areas of EU Annex I habitats mapped at Yellow Strand

EU Code	EU Habitat	Area (ha)
H2110	Embryonic shifting dunes	0.837
H2120	Shifting dunes along the shoreline with *Ammophila arenaria*	0.491
H2130	Fixed coastal dunes with herbaceous vegetation	22.084
	Total sand dune	**23.412**

Yellow Strand dunes are located in townland of Ballintemple in the northwestern part of the cSAC. The sand dunes stretch from the old pier at Knocklane southeast to a small headland at Lackaneena. A road delineates the landward edge of the site. The higher (50-100m) peaty ground slopes from the road seaward to wet grassland and a sandy lowlying plain fronted by a narrow strip of dune ridges. The foredunes in the west have been breached by severe winter storms in the past and sand has blown inland some distance. The breach is now colonised by *Ammophila arenaria* (Marram grass). The sandy plain in the southeastern part of the site has been described as machair by Goodwillie (1972) and again by Eakin (1995). Similar to the rest of the site, the machair has been striped and altered by agricultural improvement. Interesting plant species noted by Eakin (1995) include *Spiranthes spiralis* (Autumn lady's tresses) and *Blackstonia perfoliata* (Yellow-wort), which occur at the very north of their range in Ireland.

The fields at Ballintemple are used by the Annex I bird species - Barnacle goose (*Branta leucopsis*) which occurs in internationally important numbers in the adjacent SPA of Drumcliff Bay. Ballintemple fields are locally known to have been the first fields in which the geese arrived each year and the last fields to be left.

Machair (H21A0)

Machair was noted at Yellow Strand in the ASI survey (Eakin 1995). It was described as dry calcareous grassland comprising of flat areas of rank vegetation interspersed with raised sandy hummocks of short grazed turf. The machair was agriculturally improved in places and supplementary feeding was also evident.

The short sward consisted of species including *Antennaria dioica* (Mountain everlasting), *Euphrasia officinalis* agg (Eyebright), *Linum catharticum* (Fairy flax), *Pilosella officinarum* (Mouse-ear-hawkweed) and *Thymus polytrichus* (Wild thyme). In the wetter machair areas other species included *Hydrocotyle vulgaris* (Marsh pennywort), *Mentha aquatica* (Water mint) and *Ranunculus flammula* (Lesser spearwort). Plant species of note also present in the machair were *Spiranthes spiralis* (Autumn lady's tresses) and *Blackstonia perfoliata* (Yellow-wort) as discussed above.

On the day of the site visit (during this survey) access was denied to the fields beyond the fenceline of the fixed dunes. Heavy rains hampered a visual assessment (from the fenceline) of the area denoted as machair on the ASI map. The machair fields appeared improved for the most part with grazing and supplementary feeding evident. The total area of machair is approximately 30-50ha (based on the ASI map). The habitat would require closer examination in order to establish the current condition of the habitat and to assign a conservation status to the habitat. It is mentioned in the conservation plan under the heading 'sand dunes (other than fixed dune)'. However, the cSAC is not designated for this habitat and therefore there is no conservation assessment of this habitat in the NATURA 2000 form.

Fixed Dunes (H2130)

A narrow strip of fixed dunes fronted by a steep cliff face edges Yellow Strand and comprises an area of 22.084ha. The foot of the eroding face is colonised by both *Ammophila arenaria* (Marram grass) and *Elytrigia juncea* (Sand couch). The frontline consists of an upper cobble beach and a lower sandy beach. The fixed dunes have been breached in the past due to winter storms and the breach is now revegetating. The fixed dunes are fenced and are grazed by cattle. Agricultural weeds dominate the vegetation which is relatively species poor.

The typical fixed dunes species recorded at Yellow Strand include *Agrostis capillaris* (Common bent), *Carex arenaria* (Sand sedge), *Cerastium fontanum* (Common mouse-ear), *Festuca rubra* (Red fescue), *Galium verum* (Lady's bedstraw), *Hypochaeris radicata* (Cat's ear), *Linum catharticum* (Fairy flax), *Luzula campestris* (Field wood-rush), *Lotus corniculatus* (Common bird's-foot-trefoil), *Plantago lanceolata* (Ribwort plantain), *Taraxacum* agg. (Dandelion), *Trifolium repens* (White clover), *Veronica chamaedrys* (Germander speedwell) and the moss -*Rhytidiadelphus triquetrus*.

Other species present in the fixed dune include: *Ammophila arenaria* (Marram grass), *Bellis perennis* (Daisy), *Carex nigra* (Common sedge), *Dactylis glomerata* (Cocksfoot), *Holcus lanatus* (Yorkshire fog) and *Ranunculus repens* (Creeping buttercup).

The negative indicator species *Cirsium arvense* (Creeping thistle), *Lolium perenne* (Perennial rye-grass) and *Senecio jacobaea* (Common ragwort) are abundant throughout the fixed dunes..

Mobile Dunes (H2120)

A small area of 0.491ha of mobile dunes has formed in the breach in the western part of the dunes and extends into the fixed dune area. The area is dominated by the typical species *Ammophila arenaria* (Marram grass) and is fronted by embryonic dunes.

Embryonic Dunes (H1220)

The embryonic dunes form a thin band edging the front eroding face of fixed dunes, widening to fill the breach at the western end of the strand. The total area of this habitat is 0.837ha and it is formed from recycled sand of the eroding fixed dunes.

The typical species Elytrigia juncea (Sand couch) dominates with *Ammophila arenaria* (Marram grass), *Festuca rubra* (Red fescue) and *Honckenya peploides* (Sea sandwort) also present.

The negative indicator species *Cirsium arvense* (Creeping thistle) occurs in the embryonic habitat but is rare.

IMPACTS

The main activities impacting the sand habitats at Yellow Strand are given in Table 136B. The dominant farming activity is grazing and most of the site is fenced into fields that run perpendicular to the coastline (code 150). The intensive agricultural management of the fields has led to overgrazing in places, mainly by cattle (code 143). Rabbit grazing (code 146) and burrowing is also evident. Agricultural improvement (code 103) and stock feeding (code 171) has resulted in a high cover of agricultural grasses and weeds. There is also an animal house and shelter (code 430) located on the fixed dunes. Natural erosion (code 900) is exacerbated by poaching and trampling of the dunes by livestock as well as rabbit burrowing.

Table 136B Intensity and impact of various activities on sand dune habitats at Yellow Strand

EU Habitat Code[1]	Activity Code[2]	Intensity[3]	Impact[4]	Area affected/ha	Location of Activity[5]
H2130	103	A	-1	15	Inside
H2130	143	A	-1	15	Inside
H2130	146	A	-1	15	Inside
H2130	150	A	-1	20	Inside
H2130	171	C	-1	1	Inside
H2130	430	B	-2	0.5	Inside
H2130	900	A	0	Unknown	Inside
H2120	900	A	0	Unknown	Inside
H2110	900	A	0	Unknown	Inside

[1]EU Codes as per Interpretation Manual. Code 21BB is an additional code used to signify the entire dune habitat.
[2] Description of activity codes are found in Appendix 3
[3] Intensity of the influence of an activity is rated as: A= high, B = medium, C = low influence and D = unknown.
[4] Impact is rated as: -2 = irreparable negative influence, -1 = repairable negative influence, 0 = neutral, +1 = natural positive influence and +2 = strongly managed positive influence
[5] Location of activity: Inside = activities recorded within and directly impacting the cSAC. Outside = activities recorded outside but adjacent to sand dune habitat that are impacting the cSAC.

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 ASI survey, the NATURA 2000 survey and the most recent MPSU plan.

The method of assessment of conservation status differed in the NATURA 2000 survey as the various sand dune systems within the cSAC are assessed together, whereas each system is treated individually in this survey. Therefore, only broad comparisons between the conservation status of the two surveys were possible. The conservation status of the Annex I sand dune habitats on Yellow Strand are given in Table 136C.

Table 136C Conservation status of Annex I sand dune habitats at Yellow Strand

Habitat[1]	EU Conservation Status Assessment			Overall EU conservation status assessment	Proposed Irish conservation status system[2]
	Favourable	**Unfavourable - Inadequate**	**Unfavourable - Bad**		
Fixed Dunes (H2130)		Extent	Structure & Functions/ Future prospects	**Unfavourable-bad**	**Partially destroyed**
Embryonic Dunes (H2110)	Extent/ Structure & Functions/ Future prospects			**Favourable**	**Favourable-maintained**

[1]EU Codes as per Interpretation Manual
[2] Ratings are Favourable (Enhanced, Maintained, Recovered, Declining), Unfavourable (Recovering, Unchanged, Declining) and Destroyed (Partially destroyed, Completely destroyed and Unknown)
*This assessment is based on best scientific judgement (see text)

Table 136D Pass/Fail results of monitoring stops for Annex I sand dune habitats at Yellow Strand

	Monitoring stops		
Habitat	**Pass**	**Fail**	**Conservation status**
Fixed Dunes (H2130)	1	3	**Unfavourable-bad**
Embryonic Dunes (H2110)	4	0	**Favourable-**

Fixed Dunes (H2130)

The extent of fixed dunes at Yellow Strand is *unfavourable-inadequate* (Table 136C). The decline in area is due to erosion induced by overgrazing, trampling and rabbit burrowing which has resulted in numerous areas of bare sand across the fixed dunes. The presence of animal housing has also reduced the extent of the dunes.

Four monitoring stops were placed in the fixed dunes and three of these failed. The monitoring stops failed to reach the targets for a number of different attributes including typical species, the cover of bare ground, sward height and negative indicator species (agricultural weeds). Therefore, the structure and functions is rated *unfavourable-bad* (136D).

The future prospects are *unfavourable-bad*. The habitat has been modified by agricultural improvement and the impacts of overgrazing. The management of the Yellow Strand dunes by grazing is one of the objectives stated in the conservation plan. However, it would appear that a suitable grazing regime and stocking density has yet to be established. Agricultural improvement of the dunes is another on-going threat at this site.

The conservation status of fixed dunes in the NATURA 2000 survey is rated as *average or reduced conservation*. None of the fixed dune areas of the cSAC including those at Yellow Strand are considered to be particularly good examples of this habitat. Currently, the overall EU conservation status of this habitat is *unfavourable-bad* (Table 136C) and this is attributable to the on-going threats of overgrazing and agricultural improvement.

The Irish conservation status is rated as *partially destroyed*.

Mobile Dunes (H2120)

Given the small area of mobile dunes at Yellow Strand, a conservation assessment is not required.

Embryonic Dunes (H2110)

The extent of the embryonic dunes is rated as *favourable*. There is a narrow band of embryonic fronting the eroding fixed dunes. Given the more exposed nature of the west coast to Atlantic Ocean, the embryonic habitat on the west/northwest coast of Ireland differs from the wider more accreting embryonic zones of the east coast. The embryonic dunes tend to occur as a narrow band on the slopes of actively eroding sand dune or machair habitat. These are undergoing natural erosion at Yellow Strand, a process that is not considered unfavourable in relation to extent of habitat. Most of the sand available for foredune development is coming from the eroding fixed dunes.

Structure and functions is rated as *favourable*. Four monitoring stops were placed in the embryonic dunes and all of these passed.

The future prospects of the embryonic dunes are considered *favourable*. There appear to be few threats to this habitat as it is fenced off from the agricultural activities of the rest of the site. Recreational use of the beach and dunes is low given the remoteness of the beach and the strong currents of the sea here.

Embryonic dunes are not mentioned in the NATURA 2000 form. The current overall EU conservation assessment is rated as *favourable* and the Irish conservation status is rated as *favourable- maintained*.


SAC 627
Habitats
Embryonic Dune
Mobile Dune
Fixed Dune
Agricultural land
Other (Undefined)
Coastal Monitoring Project 2004-2006
Yellow Strand
CMP code: 136
0 200 400 600 800 Meters
N
Cummeen Strand / Drumcliff Bay (Sligo Bay) (SAC 627)
This habitat map was created with a combination of fieldwork, GPS and interpretation of aerial photos. Boundaries of designated areas are subject to revision. Produced from Ordnance Survey material by permission of the Government (Permit number 5953)
Date of production: 25/11/2008
Map version: 1
Original Drawing Size: 297 x 420 (A3)
Scale 1:19437
National Parks and Wildlife Service