

NPWS

Omey Island Machair SAC
(site code: 001309)

**Conservation objectives supporting document-
Coastal habitats**

Version 1

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Please note that the opinions expressed in the site reports from the Sand Dunes Monitoring Project (SDM) 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 (2017) Conservation Objectives: Omey Island Machair SAC 001309. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

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 (European Commission, 2013). 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.

Omey Island lies 9km north-west of Clifden, off the Connemara coast of Co. Galway. An area of sandflats some 300m wide separates this small island from the mainland. These sandflats are exposed at low tide making the site temporarily accessible. Most of the northern and western sides of the island support unfenced machair, on a shallow sandy substrate, and dry sandy grassland, while the remainder of the island is dominated by small agricultural holdings. The bedrock geology of the island consists of granite, which frequently outcrops through the shallow sandy soil (NPWS, 2013).

A large calcareous lake, Lough Fahy, separates the machair plain from the granite massif, but the open water is gradually being reduced as sand blows in (Crawford *et al.*, 1998).

The SAC contains one of the few remaining machair sites in Co. Galway that has not experienced severe erosion by the sea. Because of this, and despite its small size, the machair is considered to be one of the best examples in the county (NPWS, 2014).

Other habitats in the SAC include lakes, rocky, sandy and boulder beaches and other sand dune habitats.

In 1998, a population of petalwort (*Petalophyllum ralfsii*) was recorded on Omey Island for the first time. This maritime species of liverwort is of high conservation importance as it is listed on Annex II of the EU Habitats Directive (Campbell *et al.*, 2015).

Corncrake (*Crex crex*) have been recorded on the island and it is one of a suite of sites along the western seaboard that is regularly utilised by breeding corncrake. Chough (*Pyrrhocorax pyrrhocorax*) regularly feed on the machair and dry grassland. Both corncrake and chough are listed on Annex I of the EU Birds Directive.

Omey Island Machair SAC (site code: 001309) is selected for hard water lakes, petalwort and machair. The following coastal habitat is included in the list of Qualifying Interests for the SAC (*denotes a priority habitat):

21A0 Machairs (* in Ireland)

The distribution of sand dune habitats in Omey Island Machair SAC, including machair, is presented in Appendix I.

2 Conservation Objectives

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

This supporting document sets out the conservation objective for machair in Omev Island Machair SAC, which is defined by a list of parameters, attributes and targets. The main parameters are (a) Range (b) Area and (c) Structure and Functions, the last of which is broken down into a number of attributes, including physical structure, vegetation structure and vegetation composition.

The targets set for machair are based primarily on the results of the Sand Dune Monitoring Project (SDM) (Delaney *et al.*, 2013) and this document should be read in conjunction with that report. It is also recommended that this document be read in conjunction with the final report from the Coastal Monitoring Project (CMP) report (Ryle *et al.*, 2009). The CMP was a comprehensive national baseline survey of all known sand dune systems in Ireland, including that at Omev Island. The SDM reviewed and modified the methodology used during the CMP to map and assess the conservation status of dune habitats. A subset of 40 sites (including Omev Island) was selected as a representative sample of the national dune resource for the SDM survey. As part of the SDM, a detailed individual report and habitat maps (a revised baseline habitat map and an updated habitat map) were produced for each site in the subset and those for the Omev Island sub-site (SDM site ID: 104) are included in Appendix II.

The conservation objectives for the machair habitat in Omev Island Machair SAC are based on the findings of the SDM, combined with the results of Crawford *et al.* (1998), Gaynor (2006, 2008) and Ryle *et al.* (2009). It is thought that the sub-site as surveyed by the SDM represents the entire area of sand dunes within Omev Island Machair SAC.

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. 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* (white dunes) (2120)

- Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130) *
- Decalcified dunes with *Empetrum nigrum* (2140) *
- Atlantic decalcified fixed dune (Calluno-Ulicetea) (2150) *
- Dunes with *Salix repens* subsp. *argentea* (Salicion arenariae) (2170)
- Humid dune slacks (2190)
- **Machairs (21A0) ***

Two sand dune habitats were recorded by Delaney *et al.* (2013) from Omev Island Machair SAC, one of which, machair, indicated in **bold** above, is listed as a Qualifying Interest for the SAC. Embryonic shifting dunes were also noted as occurring, as was another coastal habitat, perennial vegetation of stony banks; however, these habitats are not selected as Qualifying Interests for the SAC.

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.

Machair is a highly specialised and complex dune habitat that is confined globally to the north-west coasts of Ireland and Scotland. It comprises a flat or gently undulating sandy plain that develops in an oceanic location with a cool moist climate. Machair systems are highly calcareous, the sediments usually containing a high percentage of shell fragments and having pH values in excess of 7. The vegetation is herbaceous, with a low frequency of sand-binding species (Gaynor, 2006). Irish machair is a priority habitat under the EU Habitats Directive.

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

Detailed descriptions from the Sand Dune Monitoring Project (Delaney *et al.*, 2013) of each sand dune habitat found at the Omev Island sub-site are presented in Appendix II. A total of 46.07ha of sand dune habitat was mapped within Omev Island Machair SAC, of which 45.26ha (98.2%) represents machair, a Qualifying Interest for this particular SAC.

3.1 Overall objective

The overall objective for 'Machairs' in Omev Island Machair SAC is to 'restore the favourable conservation condition'.

This objective is based on an assessment of the recorded condition of the 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 area

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 in Omev Island Machair SAC during the Coastal Monitoring Project (CMP) (Ryle *et al.*, 2009) and was revised and updated by the Sand Dune Monitoring Project (SDM) (Delaney *et al.*, 2013). The revised and updated habitat maps are included with the individual site report from the SDM in Appendix II at the end of this document. The total area of machair habitat within the Omev Island sub-site as estimated by Delaney *et al.* (2013) is presented in the second column of the following table. The total area of machair habitat within the boundary of Omev Island Machair SAC is presented in the third column.

Habitat	Total area (ha) of habitat from SDM	Total area (ha) of habitat within SAC boundary
Machairs 21A0	45.80	45.26

The 45.80ha of machair within the SDM sub-site includes 5.12ha of a field composed of machair grading into wet grassland which was not included in Table 2 in the SDM site report in Appendix II. Of the total area of machair, 45.26ha is included within the SAC boundary.

Machair habitat had increased slightly in area since the CMP baseline survey from 45.63ha to 45.80ha, due to accretion and succession in the north of the sub-site (Delaney *et al.*, 2013).

The target for this attribute is that the area of machair habitat should be stable, or increasing. Bearing in mind that coastal systems are naturally dynamic and subject to change, this target is always assessed subject to natural processes, including erosion and succession.

3.3 Range

3.3.1 Habitat distribution

The distribution of sand dune habitats, including machair, within Omev Island Machair SAC, as mapped by Delaney *et al.* (2013), is presented in Appendix I.

Machair habitat on Omev Island is split into three separate areas, with the largest found west of Fahy Lough, in the centre of the island between two large rocky outcrops. The machair extends westward from Lough Fahy, to an area of dry/wet grassland that occurs amongst outcropping granite at Gooreen. Another small area of fenced machair occurs on the north-eastern edge of the island (Ryle *et al.*, 2009).

The target is that there should be no decline or change in the distribution of the machair habitat, 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 the machair habitat in Omey Island Machair 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, thus increasing biodiversity. The construction of physical barriers can interfere with the sediment circulation by cutting the dunes off from the beach resulting in fossilisation or over-stabilisation of dunes.

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

3.4.2 Physical structure: hydrological and flooding regime

Typically, the true machair plain represents the area where wind erosion has eroded a dune system to a level just above the water table, where the wet consistency of the sand prevents further erosion. In general, the degree of flatness depends on the age of the system, as well as the underlying topography, geology, outcropping of local rocks and historical management. As is the case in Omey Island Machair SAC, machair plains can be terminated on the landward side by a lake or associated marsh/fen (Gaynor, 2006). Consequently, the condition and conservation of the machair habitat can be inextricably linked to the local hydrology.

Wet machair can essentially be compared to humid dune slacks due to the periodic fluctuations and the proximity of the groundwater table to the surface throughout the year. The frequency and duration of periods of flooding or inundation determines the vegetation composition. The water table depth has been identified as the primary determining factor in vegetation variation, followed by weak trends in calcium and sodium availability. Other contributing factors include stage of development, precipitation, distance from the sea, the grazing regime, recreational pressure, nature of the sediment, soil pH and the porosity of the sediment.

Machair is highly sensitive to human influences on hydrology, either through water abstraction, drainage works or increased nutrient inputs. Water abstraction interferes with the local hydrology, potentially having serious implications for the plant and animal communities of wet machair communities.

The target is to ensure that the hydrological regime continues to function naturally and that there are no increased nutrient inputs in the groundwater.

3.4.3 Vegetation structure: zonation

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

The presence of a shallow lake, Fahy Lough, adjacent to the machair adds to its overall value. This combination of machair and lake is a relatively rare feature on small machair systems (NPWS, 2014).

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

3.4.4 Vegetation structure: bare ground

This target applies to machair habitat whereas it does not apply to the other coastal habitats where high levels of bare sand are a natural component. In the less exposed 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 such as petalwort (*Petalophyllum ralfsii*) and a range of invertebrates, helping to increase biodiversity.

Bare sand can be exposed from the actions of grazing animals, however, it must be borne in mind that even with a moderate grazing regime, some localised damage is to be expected, because the impact of grazing animals is not applied at the same intensity throughout the site.

At Omey Island, the north-eastern part of the machair is fenced into individual fields and some of these fields have been reported as being overgrazed (Ryle *et al.*, 2009). Throughout the site, natural erosion is exacerbated by the effects of grazing by livestock as well as rabbits (Delaney *et al.*, 2013).

It is likely that impacts from recreational activities, mainly during summer months, such as trampling from walkers, are also affecting the proportion of bare ground on the machair. Horse riding is popular along the strand and machair and the use of vehicles has added to damage in places. Bare sand was recorded by the SDM as covering 3.9% of the habitat in the sub-site, is expanding and undergoing further erosion and is decreasing plant diversity (Delaney *et al.*, 2013).

The target is not to exceed 10% bare sand. This target is assessed subject to natural processes.

3.4.5 Vegetation structure: sward height

Within the more fixed habitats, including machair, 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).

Machairs are extensively used in both Ireland and Scotland as commonage areas for grazing. Many machair sites are grazed by cattle, or sheep, or both. In Scotland, sheep are most common grazing animal, but the grazing density and sheep to cattle ratio is vital in determining the quality and diversity of the machair (Angus, 1994).

At Omey Island Machair SAC, part of the machair is fenced into fields, while the main area of machair is commonage.

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

3.4.6 Vegetation composition: typical species and 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 bird's-foot trefoil (*Lotus corniculatus*), wild thyme (*Thymus polytrichus*), kidney vetch (*Anthyllis vulneraria*), wild pansy (*Viola tricolor*) and biting stonecrop (*Sedum acre*).

The vegetation of machair is often composed of both wet and dry communities and although there is generally an obvious distinction between the dry and wet types, transitional communities are common (Gaynor, 2006). No suite of species is unique to machair and the vegetation can best be described as a mosaic of calcareous fixed dune, mesotrophic grassland and dune slack communities (Gaynor, 2006).

The following table lists the dominant species listed in dry and wet Irish machair from Gaynor (2006). Differences in the dominant species between the two types of machair plain are indicated by *.

Dry machair	Wet machair
<i>Festuca rubra</i>	<i>Trifolium repens</i>
<i>Plantago lanceolata</i>	<i>Agrostis stolonifera</i>
<i>Trifolium repens</i>	<i>Calliergonella cuspidata</i>
<i>Lotus corniculatus</i>	<i>Festuca rubra</i>
<i>Bellis perennis</i>	<i>Bellis perennis</i>
<i>Galium verum</i> *	<i>Plantago lanceolata</i>
<i>Carex arenaria</i>	<i>Carex arenaria</i>
<i>Rhytidadelphus squarrosus</i> *	<i>Potentilla anserina</i>
<i>Leontodon taraxacoides</i> *	<i>Hydrocotyle vulgaris</i>
<i>Poa pratensis (subcaerulea)</i> *	<i>Lotus corniculatus</i>
<i>Homalothecium lutescens</i> *	<i>Prunella vulgaris</i>

Other species typically recorded on Irish machair include common yarrow (*Achillea millefolium*), early hair-grass (*Aira praecox*), common mouse-ear (*Cerastium fontanum*), smooth hawkbeard (*Crepis capillaris*), common stork's-bill (*Erodium cicutarium*), eyebright (*Euphrasia officinalis*), common flax (*Linum catharticum*), red bartsia (*Odontites verna*), yellow rattle (*Rhinanthus minor*), biting stonecrop (*Sedum acre*), wild thyme (*Thymus polytrichus*) and violets (*Viola* spp.) (Ryle *et al.*, 2009). The calcareous nature of the substrate can be reflected by the presence of thyme-leaved sandwort (*Arenaria serpyllifolia*), crested hair-grass (*Koeleria macrantha*), ox-eye daisy (*Leucanthemum vulgare*) and squinancywort (*Asperula cynanchica*).

The machair at Omev Island Machair SAC supports a typical flora dominated by daisy (*Bellis perennis*) and red fescue (*Festuca rubra*), with creeping bent (*Agrostis stolonifera*), white clover (*Trifolium repens*), buck's-horn plantain (*Plantago coronopus*), ribwort plantain (*P. lanceolata*), common ragwort (*Senecio jacobaea*), common bird's-foot trefoil (*Lotus corniculatus*), sand sedge (*Carex arenaria*), glaucous sedge (*C. flacca*), common mouse-ear (*Cerastium fontanum*), lady's bedstraw (*Galium verum*), selfheal (*Prunella vulgaris*) and wild thyme (*Thymus polytrichus*). Other species present are squinancywort (*Asperula cynanchica*), cat's ear (*Hypochaeris radicata*), field wood-rush (*Luzula campestris*), common sorrel (*Rumex acetosa*) and dandelion (*Taraxacum* agg.). There are also areas dominated by yarrow (*Achillea millefolium*), a feature rarely seen in Irish machairs (Ryle *et al.*, 2009).

Petalwort (*Petalophyllum ralfsii*) has also been recorded on the machair at Omev Island Machair SAC (Campbell *et al.*, 2015).

The target for this attribute is to maintain the typical flora for the machair 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 negative indicator species creeping thistle (*Cirsium arvense*) and common ragwort (*Senecio jacobaea*) occurred occasionally throughout the machair habitat at Omey Island Machair SAC and agricultural weeds were noted in some of the fields (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

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.

The target for this attribute therefore is that the cover of scrub and tree species should be under control, or make up less than 5% of the vegetation cover.

3.4.9 Vegetation composition: bryophytes

Bryophytes are an important element of the machair flora. Frequently occurring species include *Campylium stellatum*, *Scorpidium revolvens*, *Ctenidium molluscum* and *Philontis fontana*, most of which are indicative of wet, base-rich conditions.

At Omey Island Machair SAC, the mosses *Homalothecium lutescens*, *Hypnum cupressiforme*, *Syntrichia ruralis* subsp. *ruraliformis* and *Brachythecium albicans* were common on the machair (Ryle *et al.*, 2009).

The Annex II liverwort species petalwort (*Petalophyllum ralfsii*) was recorded at Gooreen on a compacted trackway in a flat wet basin between rock outcrops west of the machair and further south along a compressed trackway across the machair (Campbell *et al.*, 2015).

The target for this attribute is that the cover of bryophytes should and should always be at least an occasional component of the vegetation.

4 References

Angus, S. (1994) The conservation importance of machair systems of the Scottish islands, with particular reference to the Outer Hebrides. In: J.M. Baxter and M.B. Usher (eds.) *The Islands of Scotland: A Living Marine Heritage*, pp. 95–120. HMSO, Edinburgh.

Campbell, C., Hodgetts, N. and Lockhart, N. (2015) Monitoring methods for *Petalophyllum ralfsii* (Wils.) Nees & Gottsche (Petalwort) in the Republic of Ireland. Irish Wildlife Manuals, No. 90. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Cooper, A., McCann, T. and Ballard, E. (2005) The effects of livestock grazing and recreation on Irish machair grassland vegetation. *Plant Ecology*, 181: 255-267.

Crawford, I., Bleasdale, A. and Conaghan, J. (1998) Biomar Survey of Irish machair sites 1996. Irish Wildlife Manuals 3, Dúchas, the Heritage Service, Dublin.

Delaney, A., Devaney, F.M., Martin, J.R. and Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. Irish Wildlife Manuals, No. 75. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

European Commission (2013) Interpretation Manual of European Union Habitats – EUR 28. DG Environment - Nature and Biodiversity, Brussels.

Gaynor, K. (2006) The vegetation of Irish machair. *Biology and Environment: Proceedings of the Royal Irish Academy* 106B No. 3, pp. 311-321.

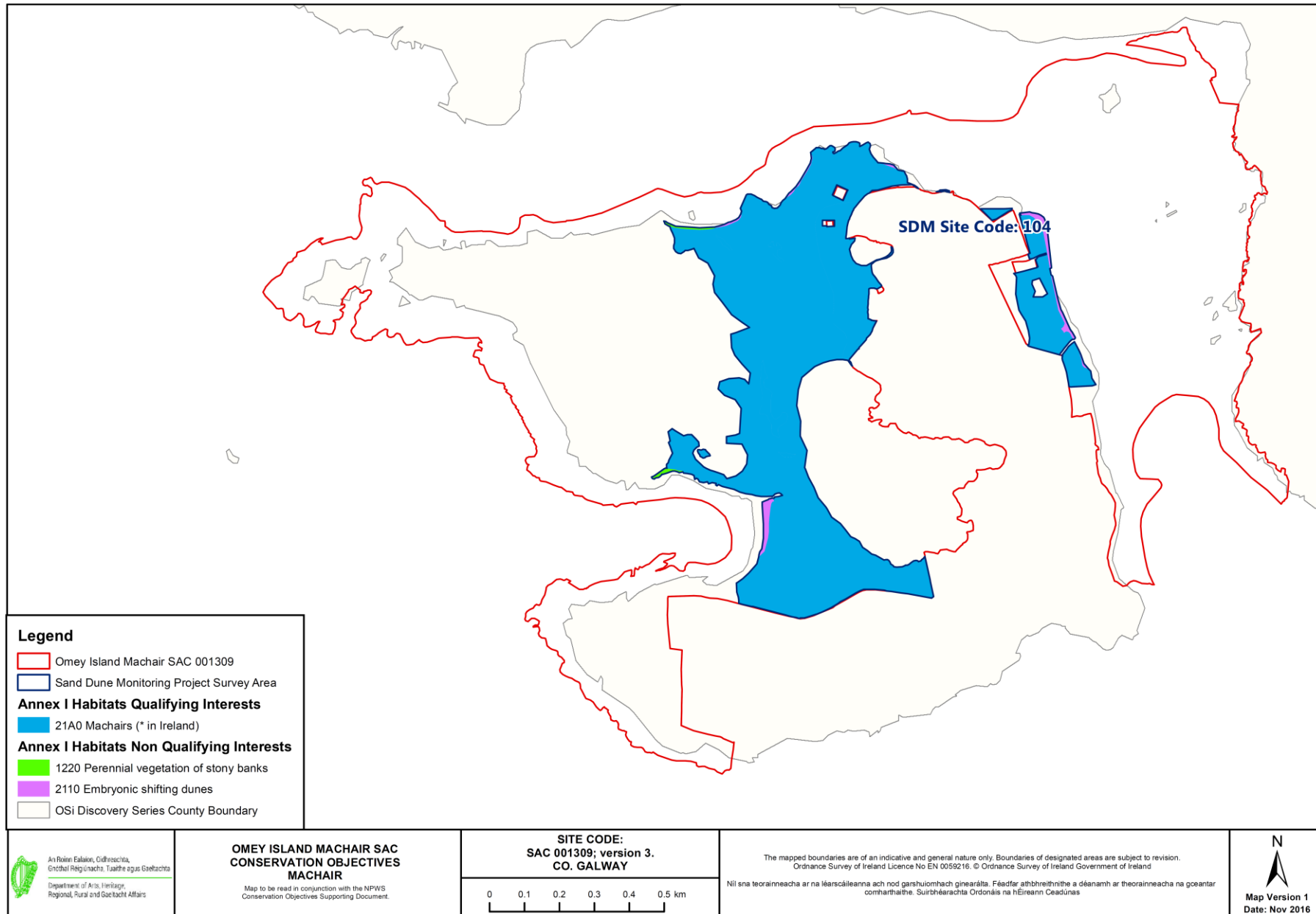
Gaynor, K. (2008) The phytosociology and conservation value of Irish sand dunes. Ph.D. Thesis, National University of Ireland, Dublin.

NPWS (2013) Site Synopsis: Omey Island Machair SAC (001309)
<https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY001309.pdf>

NPWS (2014) Natura 2000: Omey Island Machair SAC (001309)
<https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF001309.pdf>

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

Appendix I – Distribution map of sand dune habitats within Omey Island Machair SAC



Appendix II – Omey Island site report and habitat map from the Sand Dunes Monitoring Project (Delaney *et al.*, 2013)

SITE 104 OMEY ISLAND

The following individual site report should be read in conjunction with the main report (Delaney *et al.*, 2013). Please note that CMP refers to the Coastal Monitoring Project (Ryle *et al.*, 2009) and SDM refers to the Sand Dunes Monitoring Project (Delaney *et al.*, 2013). Unless otherwise stated, the baseline maps refer to the habitat maps produced during the CMP. These baseline maps were revised, to account for discrepancies in the original survey, before comparisons were made with the habitat maps produced during the SDM (see section 2.3 in SDM main report). These revised maps are referred to as the revised baseline maps in the following text.

1 SITE DESCRIPTION

Omey Island is a small site located 10 km north-west of Clifden, Co. Galway. As the name suggests, it is an island situated off the west coast of Galway, and can be accessed at low tide via Omey Strand. The site forms part of the Omey Island Machair SAC (SAC 001309). Three Annex I sand dune habitats (* indicates a priority habitat) were recorded during the CMP: **1220 Perennial vegetation of stony banks**, **2110 Embryonic shifting dunes** and ***21A0 Machairs** (Ryle *et al.*, 2009). Other Annex habitats associated with the sand dunes at Omey Island include **3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.** (Fahy Lough, which lies adjacent to the site). The rare Annex II liverwort species, *Petalophyllum ralfsii* (Petalwort), was previously noted as present on the site (NPWS, 2003) but it was not found during the CMP or the SDM. The Eurasian Golden Plover (*Pluvialis apricaria*) and Chough (*Pyrhacorax pyrrhacorax*), two bird species listed on Annex I of the E.U. Birds Directive, have also been noted on the site, with Chough observed during the SDM. Other notable species noted during the SDM include the Corncrake (*Crex crex*) and the otter (*Lutra lutra*). The main land-uses for the site are agriculture (grazing) and recreation.

2 CONSERVATION ASSESSMENTS

2.1 Overview

Omey Island was surveyed on the 14th and 15th of September 2011. Of the three habitats recorded on the site during the baseline survey, all were recorded again during the SDM. The habitats found at Omey Island in 2011 and the results of the conservation assessments are presented in Table 1. **1220 Perennial vegetation of stony banks** and **2110 Embryonic shifting dunes** were assessed as Favourable while the ***21A0 Machairs** habitat was assessed as Unfavourable-Bad.

Table 1. Conservation assessment results for all Annex I dune habitats surveyed at Omev Island, Co. Galway.

Habitat	Area	Structure & Functions	Future Prospects	Overall result
1220 Perennial vegetation of stony banks	Favourable (Stable)	Favourable (Stable)	Favourable (Stable)	Favourable (Stable)
2110 Embryonic shifting dunes	Favourable (Stable)	Favourable (Stable)	Favourable (Stable)	Favourable (Stable)
*21A0 Machairs	Favourable (Improving)	Unfavourable-Inadequate (Stable)	Unfavourable-Bad (Stable)	Unfavourable-Bad (Improving)

2.1.1 Area

The areas of Annex I sand dune habitats at Omev Island are presented in Table 2. The baseline areas of **2110 Embryonic shifting dunes** and ***21A0 Machairs** were revised after the site was visited. **2110 Embryonic shifting dunes** were extended into a blowout that appeared on the 2005 aerial photographs and an additional ***21A0 Machairs** polygon was included. A field adjacent to the site which appeared to be composed of ***21A0 Machairs** grading into wet grassland was not surveyed and the 5.12 ha was not included within Table 2. The total area of Annex I sand dune habitats at Omev Island was slightly greater in 2011 than it had been during the CMP, and this was due to a small amount of accretion and succession in the north of the site.

Table 2. Areas of Annex I dune habitats originally mapped at Omev Island during the baseline survey (Coastal Monitoring Project), the revised baseline areas and areas mapped during the Sand Dune Monitoring Project in 2011.

Habitat	Baseline survey (ha)	Revised baseline (ha)	Sand Dunes Monitoring Project (ha)
1220 Perennial vegetation of stony banks	0.16	0.15	0.16
2110 Embryonic shifting dunes	0.57	0.62	0.81
*21A0 Machairs	40.33	40.51	40.68
Total	41.06	41.28	41.65

2.1.2 Structure and Functions

Structure and Functions were assessed for all three Annex I sand dune habitats mapped at Omev Island. Table 3 shows the results of the Structure and Functions assessment. All the criteria passed for **1220 Perennial vegetation of stony banks** and **2110 Embryonic shifting dunes**, while two criteria failed for ***21A0 Machairs**.

Table 3. Annex I sand dune habitats at Omev Island for which Structure and Functions were assessed, with the number of monitoring stops, assessment criteria and the number of criteria that failed.

Habitat	No. monitoring stops	Total no. assessment criteria	No. failed criteria
1220 Perennial vegetation of stony banks	4	6	0
2110 Embryonic shifting dunes	4	7	0
*21A0 Machairs	8	10	2

2.1.3 Future Prospects

Impacts and activities recorded at Omei Island are presented in Table 4. Impact codes are assigned according to Ssymanck (2010). **1220 Perennial vegetation of stony banks** and **2110 Embryonic shifting dunes** had only neutral impacts recorded, with walking common to both. ***21A0 Machairs** had twelve impacts recorded with eight having a negative effect on the habitat. Overgrazing is the main threat to the habitat, by both livestock and rabbits, while off-road driving is also a significant threat. Attempts to control the rabbit population on the site by shooting was deemed to have a positive effect on the future prospects of the habitat.

Table 4. Impacts recorded in Annex I sand dune habitats at Omei Island in 2011. Source refers to whether the impact being scored originates inside or outside the Annex I habitat being assessed.

Habitat code	Impact code	Impact description	Intensity	Effect	Percent of habitat	Source
1220	G01.02	Walking	Low	Neutral	100	Inside
1220	J02.12.01	Sea wall	-	Neutral	0	Outside
2110	A04.02.01	Non intensive cattle grazing	Low	Neutral	50	Inside
2110	G01.02	Walking	Low	Neutral	60	Inside
2110	J02.12.01	Sea wall	Medium	Neutral	100	Outside
*21A0	A04.02.01	Non intensive cattle grazing	Low	Negative	75	Inside
*21A0	A04.02.03	Non intensive horse grazing	Low	Negative	5	Inside
*21A0	A05.02	Stock feeding	Low	Negative	5	Inside
*21A0	F03.01	Shooting	Low	Positive	100	Inside
*21A0	G01.02	Walking	Low	Neutral	5	Inside
*21A0	G01.03.02	Off-road driving	High	Negative	5	Inside
*21A0	G01.08	Golf (informal)	Low	Negative	1	Inside
*21A0	G02.08	Camping	Low	Negative	1	Inside
*21A0	G05	Campfires	Low	Negative	1	Inside
*21A0	J02.12.01	Sea wall	-	Neutral	0	Outside
*21A0	K01.01	Erosion	High	Neutral	5	Inside
*21A0	K04.05	Rabbit grazing and burrowing	Medium	Negative	60	Inside

2.2 Annex I habitat assessments

The conservation status of the Annex I habitats at Omei Island is discussed below. The present conservation status in 2011 is compared with the baseline status and if a habitat is not in Favourable status, the main reasons for the Unfavourable assessment are given. Areas recorded in 2011 are compared with the revised baseline areas. It should be noted that natural processes such as erosion, deposition and succession are primary drivers of change on coastal habitats.

2.2.1 1220 Perennial vegetation of stony banks

Two small sections of **1220 Perennial vegetation of stony banks** were mapped during the CMP. One of the polygons which had been mapped during the CMP was no longer present in 2011, but another polygon of equal size had developed in the north of the site.

Area

The area of **1220 Perennial vegetation of stony banks** increased slightly between the baseline survey and the SDM, from 0.15 ha to 0.16 ha. There was no sign that any anthropogenic loss had occurred. Area was assessed as Favourable during the CMP. During the SDM, Area was assessed as Favourable (stable).

Structure and Functions

All of the criteria passed in the Structure and Functions assessment. During the CMP, Structure and Functions were assessed as Favourable on the basis of expert judgement, as no monitoring stops were carried out. Structure and Functions were assessed as Favourable (stable) during the SDM.

Future Prospects

Walking was recorded as a neutral impact on the **1220 Perennial vegetation of stony banks**, but no negative impacts were recorded. During the CMP, no impacts were recorded and Future Prospects were assessed as Favourable. Future Prospects were assessed as Favourable (stable) during the SDM.

Conservation assessment

All three parameters were assessed as Favourable during the SDM, as they were during the CMP. The conservation status of **1220 Perennial vegetation of stony banks** was assessed as Favourable (stable) during the SDM.

2.2.2 *2110 Embryonic shifting dunes*

2110 Embryonic shifting dunes are found to the north, west and east of the island in small linear polygons. There is active accretion of this habitat in the north and east of the site.

Area

The overall area of **2110 Embryonic shifting dunes** has increased since the baseline survey from 0.62 ha to 0.81 ha. There has been some loss of habitat on the western side of the island; however this loss does not seem to be linked to human activity. The habitat has increased in size in the north and east of the island due to the natural process of accretion. Area was assessed as Favourable during the CMP. During the SDM, Area was assessed as Favourable (stable).

Structure and Functions

All of the criteria passed in the Structure and Functions assessment. During the CMP, Structure and Functions were assessed as Favourable on the basis of expert judgement, as no monitoring stops were carried out. Structure and Functions were assessed as Favourable (stable) during the SDM.

Future Prospects

During the SDM walking and cattle grazing had a low neutral effect on **2110 Embryonic shifting dunes**, and the presence of a sea wall had a medium neutral effect. Walking and natural erosion were recorded as impacts on this habitat during the CMP, with walking having a negative effect on a small area of the habitat. Future prospects were assessed as Favourable during the CMP and as Favourable (stable) during the SDM.

Conservation assessment

All three parameters were assessed as Favourable during the SDM, as they were during the CMP. The conservation status of **2110 Embryonic shifting dunes** was assessed as Favourable (stable) during the SDM.

2.2.3 *21A0 Machairs

The ***21A0 Machairs** habitat is the most extensive sand dune habitat of the site. It is split into three separate areas with the largest found west of Fahy Lough, in the centre of the island between two large rocky outcrops.

Area

The ***21A0 Machairs** habitat increased slightly in area since the baseline survey from 40.51 ha to 40.68 ha. This is due to succession. Area was assessed as Unfavourable-Inadequate during the CMP as it was felt that natural erosion of the habitat was exacerbated by overgrazing leading to a loss of habitat. No further loss of habitat was recorded in 2011, and in fact, a large blowout within the ***21A0 Machairs** habitat had reduced in size since the CMP, suggesting recovery of the habitat. Area was assessed as Favourable (improving) during the SDM.

Structure and Functions

Two of the criteria failed the Structure and Functions assessment: damage due to disturbance and a low sward height. Both were the result of overgrazing, particularly by rabbits. Bare sand was recorded as covering 3.9% of the habitat, and was found in seven out of eight monitoring stops. Although the criterion assessing bare sand did not cause the habitat to fail, it is considered to be approaching the maximum of the acceptable proportion (5%). The Structure and Functions were assessed as Unfavourable-Bad for the same reasons during the CMP, with three monitoring stops failing. Because the site failed for the same reasons during the CMP as it did during the SDM, and four of the monitoring stops were affected in 2011, it is not considered that there has been a genuine improvement in the condition of the habitat, and it would probably have been assessed as Unfavourable-Inadequate under the current methodology. Structure and Functions were assessed as Unfavourable-Inadequate (stable) during the SDM.

Future Prospects

Eight negative impacts affected the ***21A0 Machairs** habitat at Omey Island during the SDM, six of which were significant: horse and cattle grazing, stock feeding, off-road driving, camping and rabbit grazing/burrowing. The current damage has impaired the Structure and Functions of the habitat, and the current levels of summer grazing along with rabbit activity are likely to further degrade the habitat through increasing bare soil and decreasing plant diversity. Shooting was recorded as a positive impact, but has a low intensity effect as it is not part of an organised effort to control the rabbit population. During the CMP, Future Prospects were assessed as Unfavourable-Bad due to the threat of overgrazing. Other impacts listed included restructuring agricultural land holdings, horse-riding, motorised vehicles, trampling and invasion by agricultural weeds. Future Prospects were assessed as Unfavourable-Bad (stable) during the SDM.

Conservation assessment

During the CMP Area was assessed as Unfavourable-Inadequate and the other two parameters as Unfavourable-Bad. There has been an improvement in both the Area and Structure and Functions parameters since then, however Future Prospects were assessed as Unfavourable-Bad (stable) during the SDM. The conservation status of ***21A0 Machairs** at Omev Island was assessed as Unfavourable-Bad (improving) during the SDM.

3 DISCUSSION

3.1 Qualifying Interests for SAC

The Natura 2000 standard data form for Omev Island Machair SAC (SAC 001309) records two Annex I habitats as Qualifying Interests, one of which is an Annex I sand dune habitat. This habitat is shown in Table 5. The conservation status for ***21A0 Machairs** in the SAC is listed as C in the Natura 2000 standard data form, in line with the Unfavourable-Bad assessment during the SDM.

Table 5. Relevant Qualifying Interests for Omev Island Machair SAC 001309 (NPWS, 1999)

Habitat	Area (%)	Representativity	Relative surface	Conservation status	Global assessment
*21A0 Machairs	11	B	C	C	B

3.2 Overgrazing

Cattle and horses were observed grazing the ***21A0 Machairs** at Omev in mid-September 2011, and the condition of the habitat would indicate that it had been grazed for several months. The recommended management for ***21A0 Machairs** in Ireland is winter grazing by cattle. This type of management allows plants to flower and set seed, but prevents the habitat from becoming rank (Cooper *et al.*, 2005). The current damage has impaired the Structure and Functions of the habitat and summer grazing along with stock feeding and rabbit burrowing are likely to allow the area of bare ground to become excessive. Overgrazing, particularly when stock are present during the summer as they are at Omev, also reduces species diversity over time.

3.3 Rabbit activity

There is a large rabbit population at Omev. Rabbit populations can increase rapidly given the right conditions and lack of control. The current level of rabbit grazing is contributing to the excessively short sward and threatens to cause an increase in bare soil to above the acceptable parameter (5% of the habitat). The bare ground caused by burrowing can be beneficial to habitat diversity in small amounts, but it also increases the likelihood of storm damage. The current, casual management by shooting is unlikely to be sufficient to control the rabbit population in the long term.

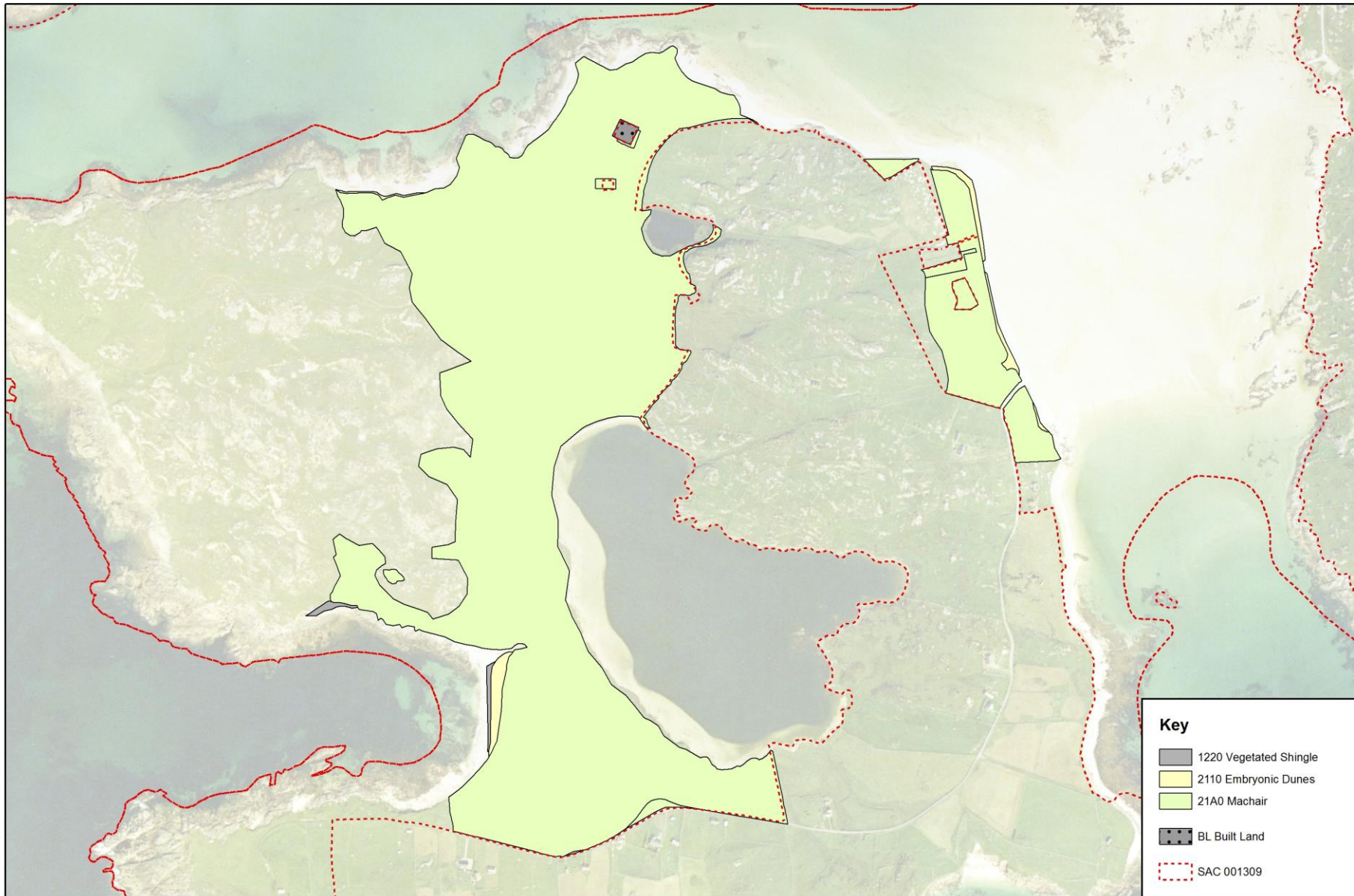
3.4 Other human interference

Because of its relative isolation, fewer visitors drive out to Omev than similar sites in Connemara, and the habitats suffer less pressure due to recreation. However, there are obvious vehicle tracks in the ***21A0 Machairs**, and these could be associated with recreation or agricultural activities. Vehicle damage has been shown to reduce the number and diversity of plant species in coastal areas

(Kindermann and Gormally, 2010), and breaking up the layer of vegetation which binds the sand together contributes to the threat of storm damage.


4 REFERENCES

- Cooper, A., McCann, T. and Ballard, E. (2005) The effects of livestock grazing and recreation on Irish machair grassland vegetation. *Plant Ecology*, **181**, 255-267.
- Delaney, A., Devaney, F.M, Martin, J.R. and Barron, S.J. (2013) Monitoring survey of Annex I sand dune habitats in Ireland. *Irish Wildlife Manuals*, No. 75. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin.
- Kindermann, G. and Gormally, M.J. (2010) Vehicle damage caused by recreational use of coastal dune systems in a Special Area of Conservation (SAC) on the west coast of Ireland. *Journal of Coastal Conservation*, **14**, 173-188.
- NPWS (1999) Natura 2000 Standard Data Form, Site 001039. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. <http://www.npws.ie/media/npwsie/content/images/protectedsites/natura2000/NF001039.pdf>. Accessed March 2013.
- NPWS (2003) SAC site synopsis for SAC 001039 Omev Island Machair. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin. <http://www.npws.ie/media/npwsie/content/images/protectedsites/sitesynopsis/SY001039.pdf>. Accessed March 2013.
- Ryle, T., Murray, A., Connolly, K. and Swann, M. (2009) Coastal Monitoring Project 2004-2006. A report submitted to the National Parks and Wildlife Service, Dublin.
- Ssymank, A. (2010) Reference list threats, pressures and activities (final version). [http://circa.europa.eu/Public/irc/env/monnat/library?l=/expert_reporting/work-package_revision/sub-group_papers/pressures-threats\(vm=detailed&sb=Title](http://circa.europa.eu/Public/irc/env/monnat/library?l=/expert_reporting/work-package_revision/sub-group_papers/pressures-threats(vm=detailed&sb=Title). Accessed March 2011.



Key

- 1220 Vegetated Shingle
- 2110 Embryonic Dunes
- 21A0 Machair
- BL Built Land
- SAC 001309

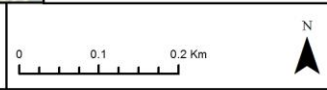
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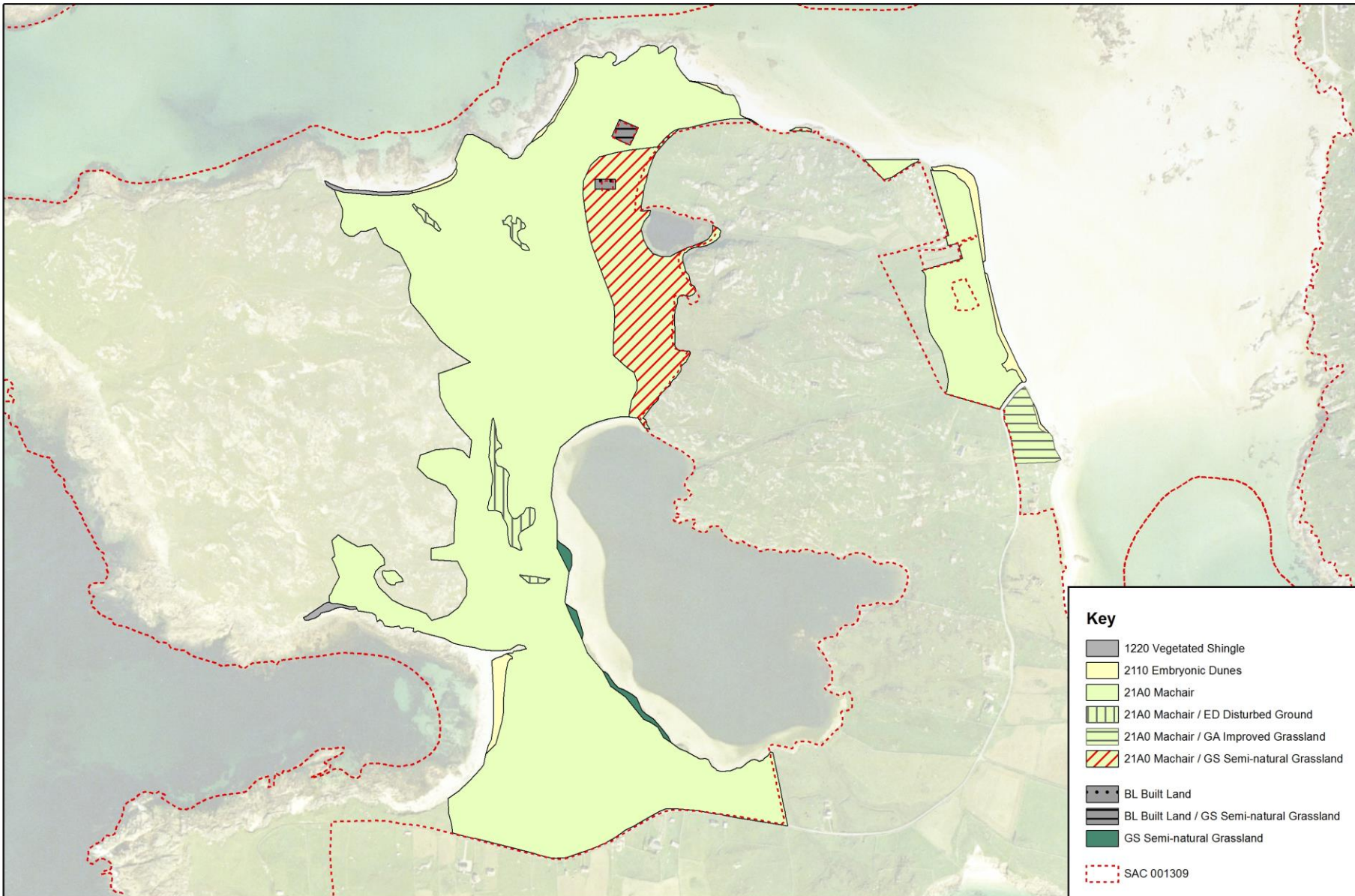
Monitoring survey of Annex I sand dune habitats in Ireland 2011-2012

Omev Island, Co. Galway
- Revised Baseline Habitat Map -

SDM code: 104
Date of map production: 15-04-2014

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Key

	1220 Vegetated Shingle
	2110 Embryonic Dunes
	21A0 Machair
	21A0 Machair / ED Disturbed Ground
	21A0 Machair / GA Improved Grassland
	21A0 Machair / GS Semi-natural Grassland
	BL Built Land
	BL Built Land / GS Semi-natural Grassland
	GS Semi-natural Grassland
	SAC 001309

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Monitoring survey of Annex I sand dune habitats in Ireland 2011-2012

Omev Island, Co. Galway - Updated SDM Map -

SDM code: 104
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