

National Parks and Wildlife Service

Conservation Objectives Series

Carrowmore Dunes SAC 002250



***An Roinn
Ealaíon, Oidhreachta agus Gaeltachta***

***Department of
Arts, Heritage and the Gaeltacht***



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Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

** indicates a priority habitat under the Habitats Directive*

002250	Carrowmore Dunes SAC
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1014	Narrow-mouthed Whorl Snail <i>Vertigo angustior</i>
1170	Reefs
2110	Embryonic shifting dunes
2120	Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes)
2130	Fixed coastal dunes with herbaceous vegetation (grey dunes)*

Please note that this SAC overlaps with Mid-Clare Coast SPA (004182) and adjoins Carrowmore Point to Spanish Point and Islands SAC (001021). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.
Series :	Unpublished report to NPWS
Year :	2011
Title :	Monitoring and condition assessment of populations of <i>Vertigo geyeri</i> , <i>Vertigo angustior</i> and <i>Vertigo moulinsiana</i> in Ireland
Author :	Moorkens, E.A.; Killeen, I.J.
Series :	Irish Wildlife Manual No. 55
Year :	2014
Title :	Carrowmore Dunes SAC (site code: 2250) Conservation objectives supporting document-marine habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2014
Title :	Carrowmore Dunes SAC (site code: 2250) Conservation objectives supporting document V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1997
Title :	The BioMar biotope viewer: a guide to marine habitats, fauna and flora in Britain and Ireland
Author :	Picton, B.E.; Costello, M.J.
Series :	Environmental Science Unit, Trinity College Dublin
Year :	2000-2002
Title :	Annual conservation reports for the development and maintenance of the golf links at Doonbeg, Co. Clare 2000-2002
Author :	Moorkens, E.; Gaynor, K.
Series :	Unpublished reports for Doonbeg Golf Club Ltd
Year :	2003
Title :	Annual conservation report for the development and maintenance of the golf links at Doonbeg, Co. Clare 2003
Author :	Moorkens, K; Browne, A.
Series :	Unpublished report for Doonbeg Golf Club Ltd
Year :	2004-2011
Title :	Annual conservation reports for the development and maintenance of the golf links at Doonbeg, Co. Clare 2004-2011
Author :	Moorkens, E.
Series :	Unpublished reports for Doonbeg Golf Club Ltd
Year :	2008
Title :	The phytosociology and conservation value of Irish sand dunes
Author :	Gaynor, K.
Series :	Unpublished PhD thesis, National University of Ireland, Dublin

Year : 2012
Title : Subtidal reef survey of Carrowmore Point to Spanish Point and Islands SAC, Carrowmore Dunes SAC and Mid-Clare Coast SPA
Author : MERC
Series : Unpublished report to the Marine Institute and NPWS

Year : 2013
Title : Intertidal benthic survey and intertidal reef survey of Carrowmore Point to Spanish Point and Islands SAC, Carrowmore Dunes SAC and Mid-Clare Coast SPA
Author : MERC
Series : Unpublished report to the Marine Institute and NPWS

Spatial data sources

Year :	Interpolated 2014
Title :	1996 BioMar Survey; 2011, 2012 intertidal and subtidal surveys
GIS Operations :	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising
Used For :	1170, marine community types (maps 3 and 4)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present
Used For :	Marine community types base data (map 4)
Year :	2009
Title :	Coastal Monitoring Project 2004-2006. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used
Used For :	2110, 2120, 2130 (map 5)
Year :	2014
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1014 (map 6)

Conservation Objectives for : Carrowmore Dunes SAC [002250]

1170 Reefs

To maintain the favourable conservation condition of Reefs in Carrowmore Dunes SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 3	Habitat area estimated as 211ha from a 1996 BioMar survey (Picton and Costello, 1997) and 2011 and 2012 intertidal and subtidal reef surveys (MERC, 2012, 2013). See marine supporting document for further details
Distribution	Occurrence	The distribution of reefs is stable or increasing, subject to natural processes. See map 3	Based on information from a 1996 BioMar survey (Picton and Costello, 1997) and 2011 and 2012 intertidal and subtidal reef surveys (MERC, 2012, 2013). See marine supporting document for further details
Community structure	Biological composition	Conserve the following community types in a natural condition: Intertidal reef community complex; <i>Laminaria</i> -dominated community complex. See map 4	Reef mapping based on information from a 1996 BioMar survey (Picton and Costello, 1997) and 2011 and 2012 intertidal and subtidal reef surveys (MERC, 2012, 2013). See marine supporting document for further details

2110 Embryonic shifting dunes

To restore the favourable conservation condition of Embryonic shifting dunes in Carrowmore Dunes SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession. For sub-site mapped: White Strand-0.19ha. See map 5	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Habitat is very difficult to measure in view of its dynamic nature. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 5 for known distribution	Based on data from Ryle et al. (2009). Embryonic dunes are present along the seaward side of the dune system at the foot of tall marram dunes. Due to the high exposure and retreating conditions of the west coast, typically the fore dunes are poorly developed. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. Soft erosion protection measure have been installed to protect eroding areas of the golf course since 2001. These measures are absent from areas fronting the high dune sections within the SAC. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data Ryle et al. (2009). Carrowmore dunes support a range of other dune habitats including marram dunes, fixed dunes, dune slacks, annual vegetation of driftlines and perennial vegetation of stony banks. The dunes are also connected to a significant wetland area known as Carrowmore Marsh. See coastal habitats supporting document for further details
Vegetation composition: plant health of foredune grasses	Percentage cover	More than 95% of sand couch (<i>Elytrigia juncea</i>) and/or lyme-grass (<i>Leymus arenarius</i>) should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sand couch (<i>Elytrigia juncea</i>) and/or lyme-grass (<i>Leymus arenarius</i>)	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<i>Hippophae rhamnoides</i>) should be absent or effectively controlled. This species has not been recorded at this site. See coastal habitats supporting document for further details

Conservation Objectives for : Carrowmore Dunes SAC [002250]

2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in Carrowmore Dunes SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For sub-site mapped: White Strand- 2.15ha. See map 5	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al. 2009). Habitat mapped at one sub-site to give a total estimated area of 2.15ha. Habitat is very difficult to measure in view of its dynamic nature. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 5 for known distribution	Shifting dunes along the shoreline with <i>Ammophila arenaria</i> , or marram dunes, occur on the seaward steeper slopes of the dunes above the beach and at the edges of blowouts. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (<i>Ammophila arenaria</i>) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth. Soft coastal protection measures have been installed since 2001 to protect eroding parts of the golf course. These measures are absent from the front of the north and south high dune sections within the SAC. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Gaynor (2008) and Ryle et al. (2009). Carrowmore dunes support a range of other dune habitats including embryonic dunes, fixed dunes, dune slacks, annual vegetation of driftlines and perennial vegetation of stony banks. The dunes are also connected to a significant wetland area known as Carrowmore Marsh. See coastal habitats supporting document for further details
Vegetation composition: plant health of dune grasses	Percentage cover	More than 95% of marram grass (<i>Ammophila arenaria</i>) and/or lyme-grass (<i>Leymus arenarius</i>) should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities dominated by marram grass (<i>Ammophila arenaria</i>) and/or lyme-grass (<i>Leymus arenarius</i>)	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species; species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<i>Hippophae rhamnoides</i>) should be absent or effectively controlled. This species has not been recorded at this site. See coastal habitats supporting document for further details

Conservation Objectives for : Carrowmore Dunes SAC [002250]

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)

To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in Carrowmore Dunes SAC, which is defined by the following list of attributes and targets:

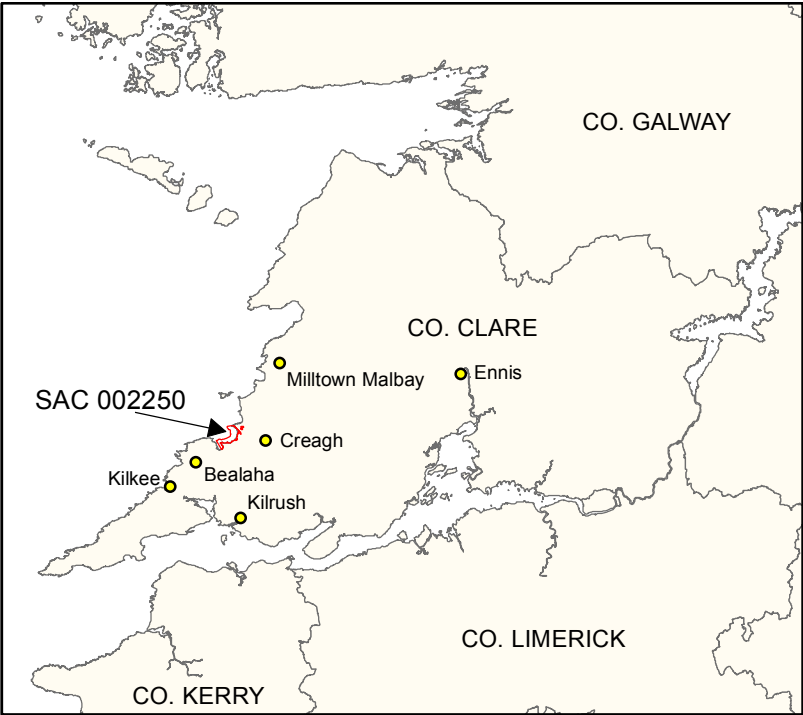
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For sub-site mapped: White Strand- 10.46ha. See map 5	Based on data from Coastal Monitoring Project (CMP) (Ryle et al., 2009). One sub-site was mapped, giving a total estimated area of 10.46ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 5 for known distribution	Based on data from Ryle et al. (2009). Fixed dunes represent the largest dune habitat present within the SAC. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. Soft coastal protection measures have been installed since 2001 to protect eroding parts of the golf course. These measures are absent from the front of the north and south high dune sections within the SAC. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009). Carrowmore dunes support a range of other dune habitats including embryonic dunes, marram dunes, dune slacks, annual vegetation of driftlines and perennial vegetation of stony banks. The dunes are also connected to a significant wetland area known as Carrowmore Marsh. See coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes	Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward	Based on data from Gaynor (2008) and Ryle et al. (2009). The dunes are moderately grazed as part of an agreed management plan. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in Ryle et al. (2009)	Based on data from Gaynor (2008) and Ryle et al. (2009). Mountain pansy (<i>Viola lutea</i>) is considered an indicator of local distinctiveness. See coastal habitats supporting document for further details.
Vegetation composition: negative indicator species (including <i>Hippophae rhamnoides</i>)	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<i>Hippophae rhamnoides</i>) should be absent or effectively controlled. This species has not been recorded at this site. See coastal habitats supporting document for further details
Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control	Based on data from CMP (Ryle et al. 2009). See coastal habitats supporting document for further details

Conservation Objectives for : Carrowmore Dunes SAC [002250]

1014 Narrow-mouthed Whorl Snail *Vertigo angustior*

To maintain the favourable conservation condition of Narrow-mouthed Whorl Snail in Carrowmore Dunes SAC, which is defined by the following list of attributes and targets:

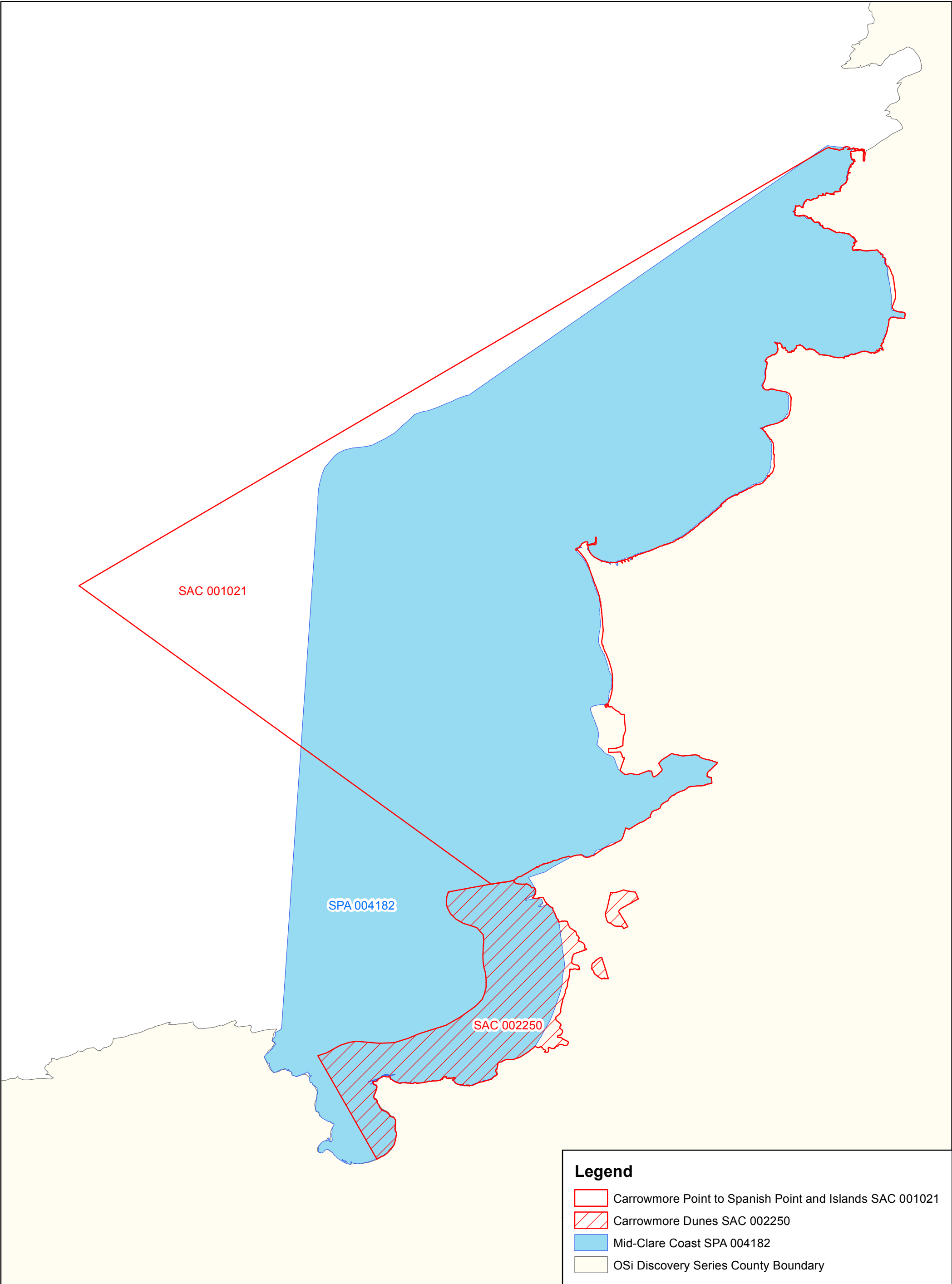
Attribute	Measure	Target	Notes
Distribution: occupied sites	Number	No decline. There are four known terrestrial sub-sites for this species in this SAC, which overlap three 1km squares. See map 6	From Moorkens and Killeen (2011) (site code Va CAM18), Moorkens (2004-2011); Moorkens and Browne (2003); and Moorkens and Gaynor (2000-2002)
Presence on transect	Occurrence	Adult or sub-adult snails are present in at least four of the six maritime grassland zones on the transect where optimal or sub-optimal habitat occurs	Transect established as part of condition assessment monitoring at this site (Moorkens and Killeen, 2011). See habitat extent target below for definition of optimal and sub-optimal habitat
Abundance on transect	Number per sample	At least two samples on the transect should have more than 20 <i>V. angustior</i> individuals	From Moorkens and Killeen (2011)
Transect habitat quality	Metres	At least 75m of habitat of the transect is classed as optimal or sub-optimal, with at least 40m classed as optimal	From Moorkens and Killeen (2011). See habitat extent target below for definition of optimal and sub-optimal habitat
Transect optimal wetness	Metres	Soils, at time of sampling, are damp (optimal wetness) and covered with a layer of humid thatch for at least 40m along the transect	From Moorkens and Killeen (2011)
Habitat extent	Hectares	A minimum of 19ha of the SAC is in optimal/sub-optimal condition, subject to natural processes. Optimal habitat is defined as fixed dune vegetation of species-rich grassland dominated by red fescue (<i>Festuca rubra</i>), with sparse marram grass (<i>Ammophila arenaria</i>), lady's bedstraw (<i>Galium verum</i>) and other low growing herbs, with height of 10-30cm, growing on damp, friable soil covered with a layer of humid, open structured thatch. Sub-optimal habitat is as optimal habitat but either vegetation height is less than 10cm or is between 30 and 50cm; or the soil is dry and sandy; or the thatch is wetter with a denser structure. Also included in this definition are the wetland areas with yellow iris (<i>Iris pseudacorus</i>) and taller sedge species	From Moorkens and Killeen (2011). Note, there are additional areas of optimal and sub-optimal habitat beyond the SAC boundary (Moorkens, 2004-2011; Moorkens and Browne, 2003; Moorkens and Gaynor, 2000-2002). See also the conservation objective for fixed dunes (2130)







Legend

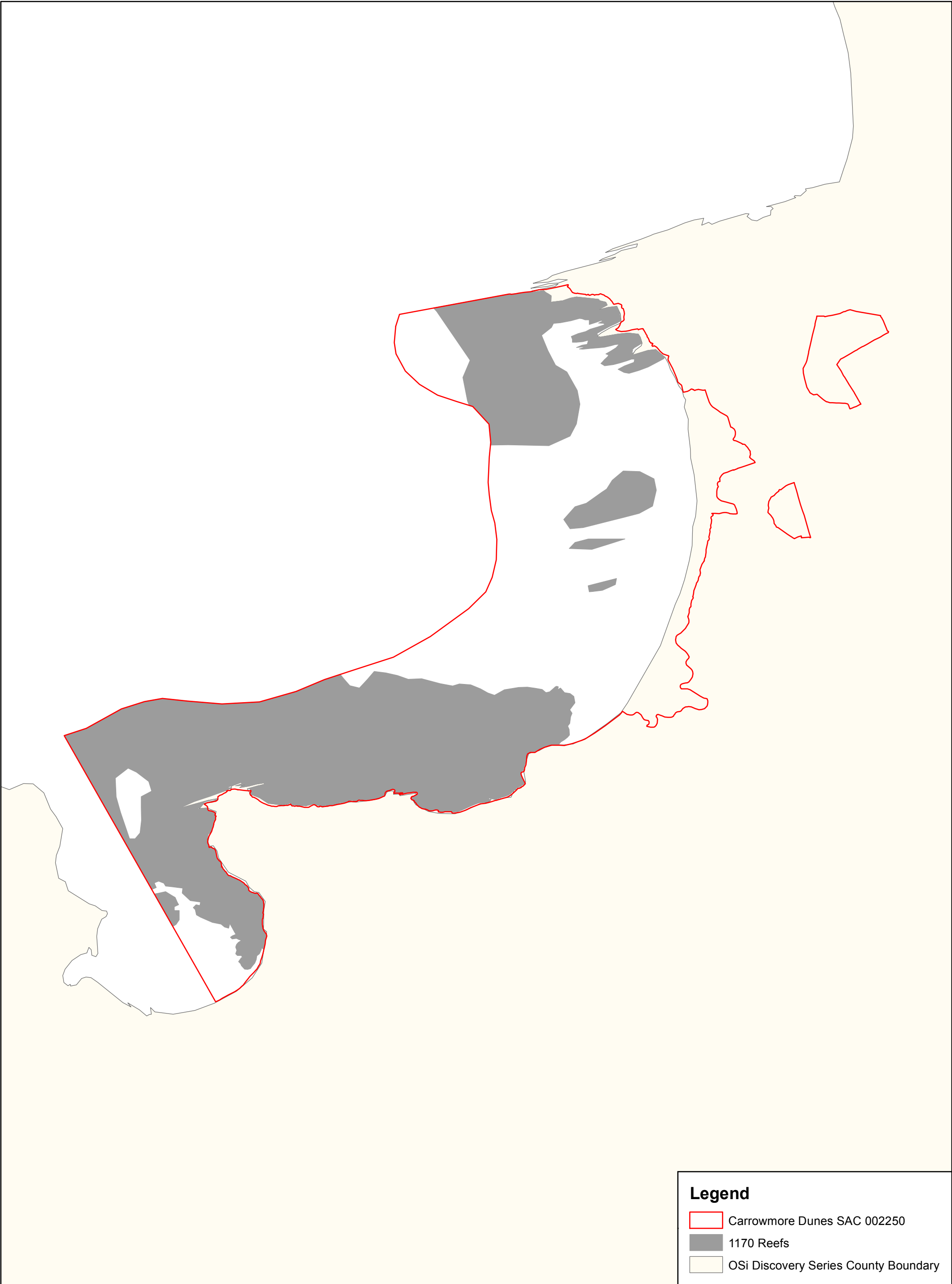
 Carrowmore Dunes SAC 002250








Legend

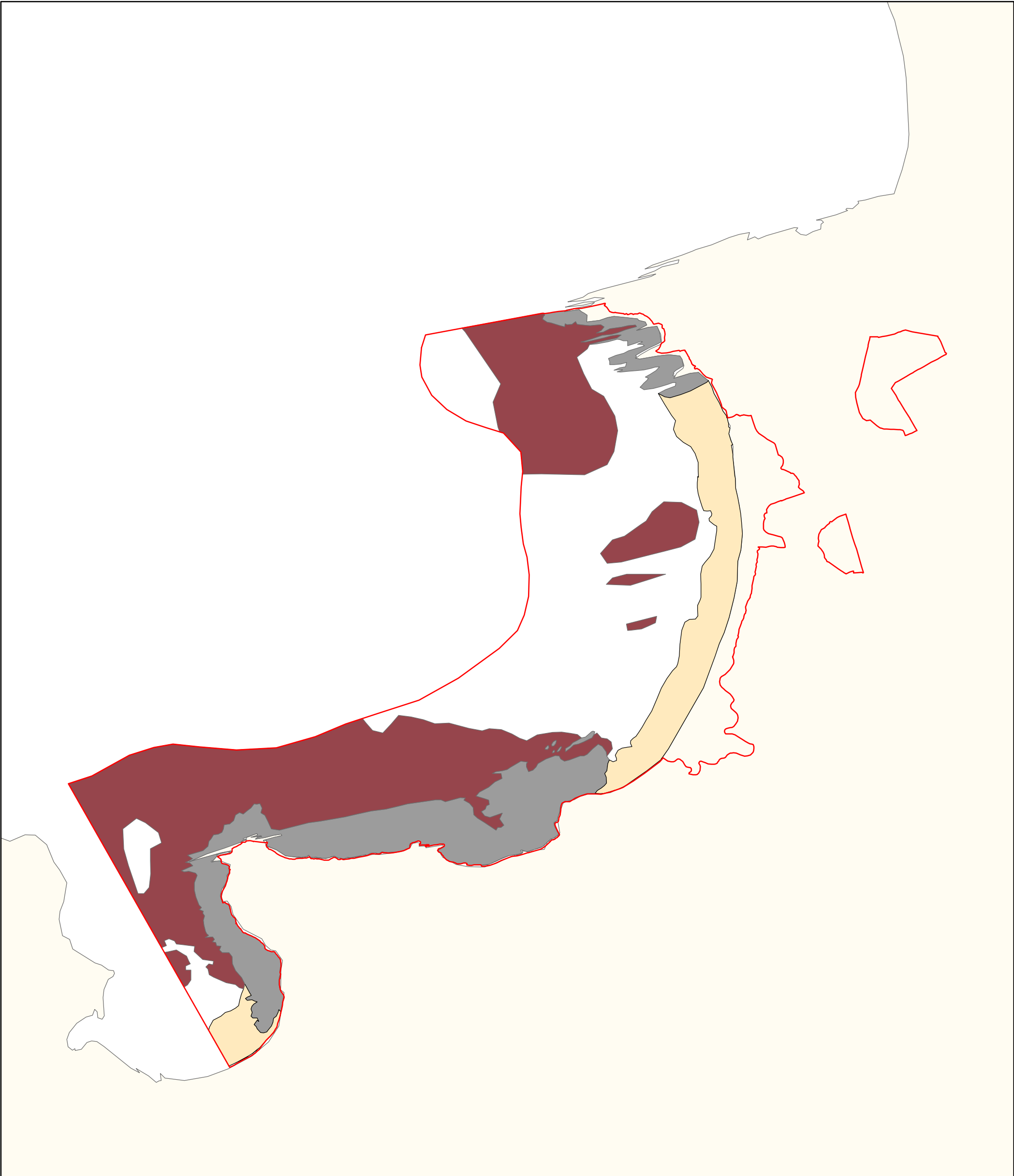
-  Carrowmore Point to Spanish Point and Islands SAC 001021
-  Carrowmore Dunes SAC 002250
-  Mid-Clare Coast SPA 004182
-  OSi Discovery Series County Boundary








Legend

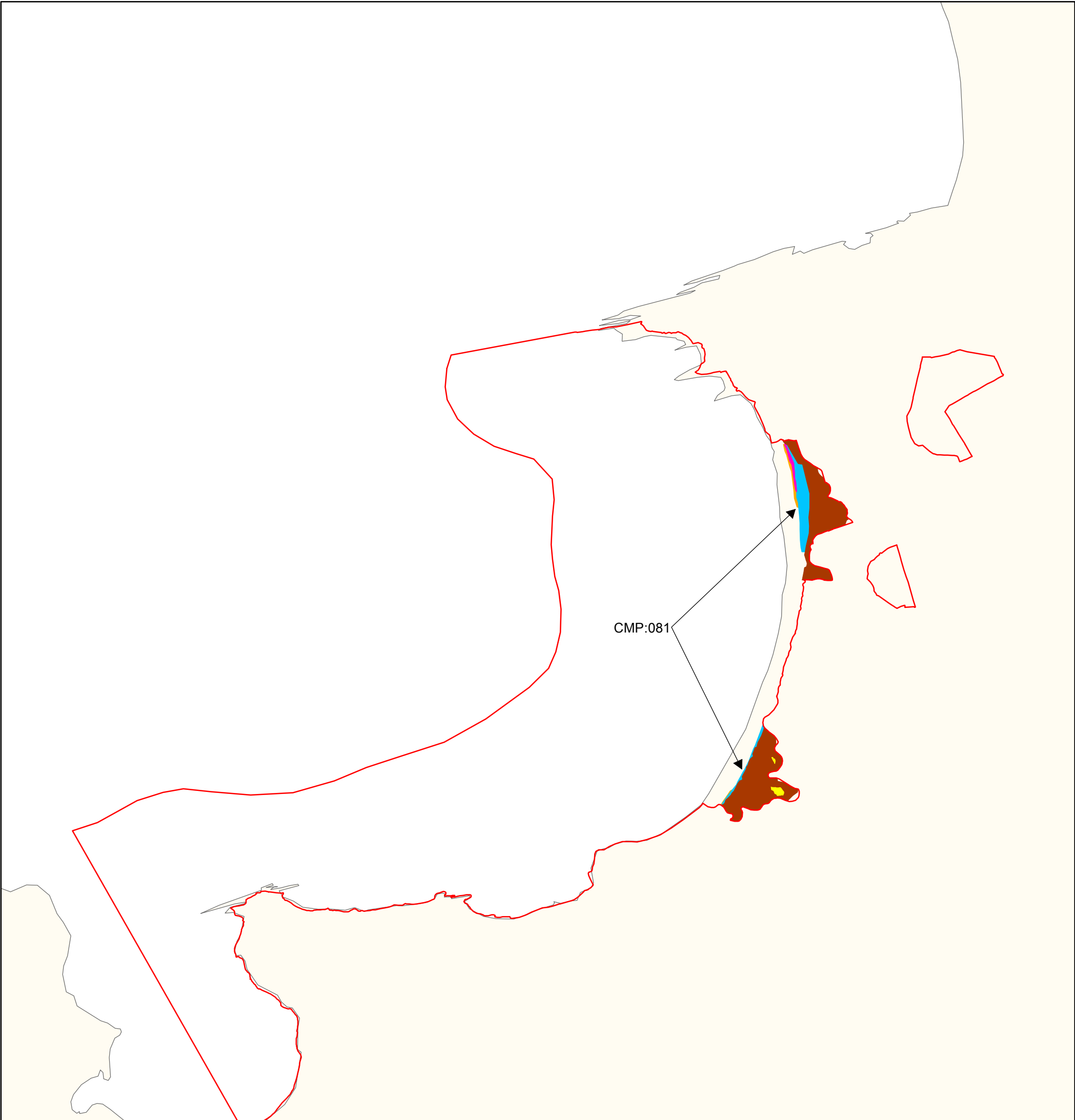
-  Carrowmore Dunes SAC 002250
-  1170 Reefs
-  OSi Discovery Series County Boundary







Legend

-  Carrowmore Dunes SAC 002250
-  OSi Discovery Series County Boundary
- Marine Community Types**
 -  Intertidal reef community complex
 -  *Laminaria*-dominated community complex
 -  Mobile sand community complex






Legend

-  Carrowmore Dunes SAC 002250
-  OSi Discovery Series County Boundary



CMP:081 Coastal Monitoring Project Site Codes

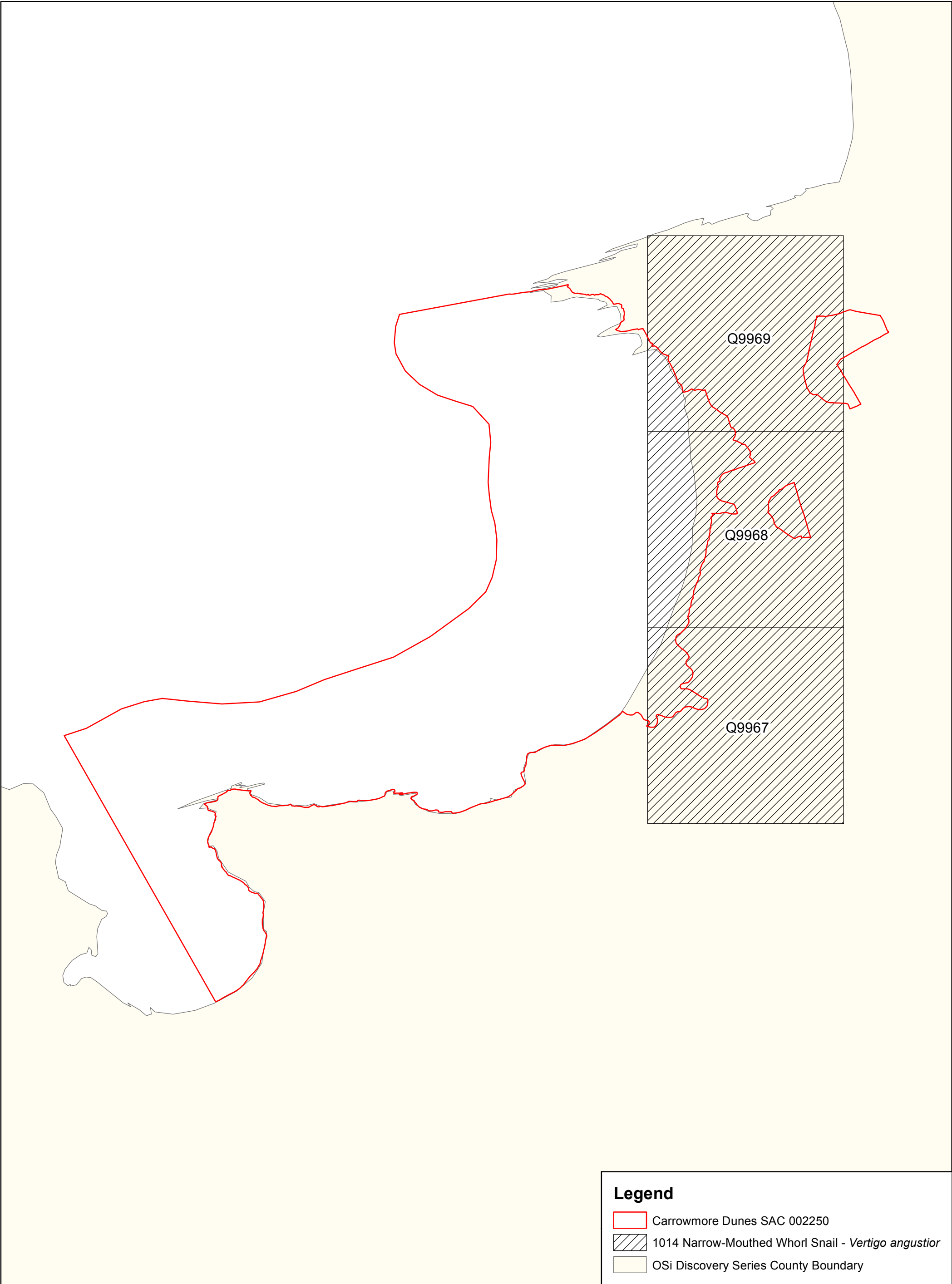
Sand Dune Habitats

Qualifying Interests




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

Non Qualifying Interests

-  1210 Annual vegetation of drift lines
-  2190 Humid dune slacks



Legend

-  Carrowmore Dunes SAC 002250
-  1014 Narrow-Mouthed Whorl Snail - *Vertigo angustior*
-  OSi Discovery Series County Boundary