National Parks and Wildlife Service

Conservation Objectives Series

North Dublin Bay SAC 000206



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	[*] indicates a priority habitat under the Habitats Directive				
000206	North Dublin Bay SAC				
1140	Mudflats and sandflats not covered by seawater at low tide				
1210	Annual vegetation of drift lines				
1310	لُعظِهَةِ {} هُعُجَم الله الله الله الله الله الله الله الل				
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)				
1395	Petalwort Petalophyllum ralfsii				
1410	Mediterranean salt meadows (Juncetalia maritimi)				
2110	Embryonic shifting dunes				
2120	Shifting dunes along the shoreline with Of { { [] @jexer/} æãe(white dunes)				
2130	Fixed coastal dunes with herbaceous vegetation (grey dunes)E				
2190	Humid dune slacks				

Please note that this SAC overlaps with North Bull Island SPA (004006) and adjoins Howth Head SAC (000203) and South Dublin Bay and River Tolka Estuary SPA (004024). 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 :	2007
Title :	Saltmarsh Monitoring Project 2006
Author :	McCorry, M.
Series :	Unpublished report to NPWS
Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.
Series :	Unpublished report to NPWS
Year :	2009
Title :	Saltmarsh monitoring project 2007-2008
Author :	McCorry, M; Ryle, T.
Series :	Unpublished report to NPWS
Year :	2013
Title :	North Dublin Bay SAC (site code 206) Conservation objectives supporting document- coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2013
Title :	North Dublin Bay SAC (site code 206) Conservation objectives supporting document- marine habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2013
Title :	Monitoring survey of Annex I sand dune habitats in Ireland
Author :	Delaney, A.; Devaney, F.M.; Martin, J.M.; Barron, S.J.
Series :	Irish Wildlife Manual No. 75

Other References

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 :	2011
Title :	A survey of mudflats and sandflats in Ireland. An intertidal soft sediment survey of North Dublin Bay
Author :	Aquatic Services Unit
Series :	Unpublished report to the Marine Institute and NPWS
Year :	2012
Title :	Rare and threatened bryophytes of Ireland
Author :	Lockhart, N; Hodgetts, N; Holyoak, D.
Series :	National Museums Northern Ireland

Year :	2013
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author :	Campbell, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin

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Spatial data sources

Year :	Interpolated 2013		
Title :	2010 intertidal survey		
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 :	1140, 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 :	Revision 2010		
Title :	Saltmarsh Monitoring Project 2007-2008. Version 1		
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used		
Used For :	1310, 1330, 1410 (map 5)		
Year :	2013		
Title :	Sand Dune Monitoring Project 2011. 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, 2190 (map 6)		
Year :	2013		
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 :	1395 (map 6)		

1140

Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in North Dublin Bay 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 was estimated using OSi data as 578ha
Community extent	Hectares	Maintain the extent of the <i>Mytilus edulis</i> -dominated community, subject to natural processes. See map 4	Estimated during site walkover in March 2012. See marine supporting document for further information
Community structure: <i>Mytilus</i> <i>edulis</i> density	Individuals/m²	Conserve the high quality of the <i>Mytilus edulis</i> - dominated community, subject to natural processes	Observed during site walkover in March 2012. See marine supporting document for further details
Community distribution	Hectares	Conserve the following community types in a natural condition: Fine sand to sandy mud with <i>Pygospio elegans</i> and <i>Crangon crangon</i> community complex; Fine sand with <i>Spio martinensis</i> community complex. See map 4	Based on an intertidal survey undertaken in 2010 (ASU, 2011). See marine supporting document for further information

1210 Annual vegetation of drift lines

To restore the favourable conservation condition of Annual vegetation of drift lines in North Dublin Bay 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. Total area mapped: South Bull - 0.11ha. See map 6	Based on data from the Sand Dune Monitoring Project (SDM) (Delaney et al., 2013). Habitat is very difficult to measure in view of its dynamic nature, which means that it can appear and disappear within a site from year to year. This habitat was recorded from both North Bull and South Bull sub-sites by the Coastal Monitoring Project (CMP) (Ryle et al., 2009) but was only recorded in South Bull by the SDM. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 6	Based on data from Delaney et al., (2013). Strandline is more extensive at South Bull sub-site than at North Bull. 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. Accumulation of organic matter in tidal litter is essential for trapping sand and initiating dune formation. 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 Delaney et al., (2013). As well as the transitions between sand dune habitats, the transitions from sand dune to saltmarsh communities at Bull Island are of significant value. 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: sea rocket (<i>Cakile maritima</i>), sea sandwort (<i>Honckenya peploides</i>), prickly saltwort (<i>Salsola kali</i>) and oraches (<i>Atriplex</i> spp.)	Based on data from Delaney et al., (2013). 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	Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See coastal habitats supporting document for further details

1310

GU]Wfb]Uand other annuals colonising mud and sand

To restore the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in North Dublin Bay 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: North Bull Island - 29.10ha. See map 5	Based on data from Saltmarsh Monitoring Project (SMP) (McCorry, 2007). Habitat surveyed and mapped at a single sub-site, giving a total estimated area of 29.10ha, including mosaics. NB some further small unsurveyed areas may be present within this site. 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 McCorry (2007). <i>Salicornia</i> is an annual species, so its distribution can vary significantly from year to year. The largest area of <i>Salicornia</i> flats occurs north of the central causeway. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry (2007). Sediment supply is particularly important for this pioneer saltmarsh community, as its distribution depends on accretion rates. It appears that the extent of the <i>Salicornia</i> flats was much lower before the construction of the causeway. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession	Based on data from McCorry (2007). Creeks deliver sediment throughout the saltmarsh system. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Based on data from McCorry (2007). This pioneer saltmarsh community requires regular tidal inundation. 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 McCorry (2007). At Bull Island there are transitional communities between the <i>Salicornia</i> flats, Atlantic salt meadows and Mediterranean salt meadows. These saltmarsh habitats also form transitional communities with a range of sand dune habitats. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from McCorry (2007). Wildfowl and water birds graze and forage on the <i>Salicornia</i> flats at Bull Island. See coastal habitats supporting document for details
Vegetation structure: vegetation cover	Percentage cover at a representative number of monitoring stops	Maintain more than 90% of area outside creeks vegetated	Based on data from McCorry (2007). See coastal habitats supporting document for details
Vegetation composition: typical species and sub- communities	Percentage cover	Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009)	Based on data from McCorry (2007). See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - <i>Spartina</i> <i>anglica</i>	Hectares	No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1%	Based on data from McCorry (2007). <i>Spartina</i> is frequent at Bull Island. While it occurs within a mosaic with <i>Salicornia</i> flats, it generally does not dominate the vegetation cover and only forms small swards. See coastal habitats supporting document for further details

1330

Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

To maintain the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in North Dublin Bay 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: North Bull Island - 81.84ha. See map 5	Based on data from Saltmarsh Monitoring Project (SMP) (McCorry, 2007). Atlantic salt meadow (ASM) surveyed and mapped at a single site, giving an estimated area of 81.84ha, including mosaics. 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 McCorry (2007). The ASM at Bull Island was the largest single section of saltmarsh surveyed by the SMP in 2006. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry (2007). The construction of the causeway had a significant impact on the saltmarsh at Bull Island. Within the ASM there is some erosion at a slow rate at the seaward side of the northern tip. This erosion is offset by accretion along the northside of the causeway. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession	Based on data from McCorry (2007). Within Bull Island, the ASM topography is well developed and there is a very complex creek and salt pan structure. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry (2007). At Bull Island there are transitional communities between the <i>Salicornia</i> flats, Atlantic salt meadows and Mediterranean salt meadows. These saltmarsh habitats also form transitional communities with a range of sand dune habitats. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from McCorry (2007).There is some light grazing by hares (<i>Lepus timidus hibernicus</i>) and wildfowl. See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative number of monitoring stops	Maintain more than 90% area outside creeks vegetated	Based on data from McCorry (2007). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub- communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub- communities with typical species listed in SMP (McCorry and Ryle, 2009)	See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - <i>Spartina</i> <i>anglica</i>	Hectares	No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1%	Based on data from from McCorry (2007). <i>Spartina</i> is widely distributed on ASM though found at low cover values. See coastal habitats supporting document for further details

1410 Medite

Mediterranean salt meadows (Juncetalia maritimi)

To maintain the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in North Dublin Bay 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: North Bull Island - 7.98ha. See map 5	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007). One sub-site that supports Mediterranean Salt Meadow (MSM) was surveyed and mapped, giving an estimated area of 7.98ha, including mosaics. 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 McCorry (2007). The MSM is restricted to the area north of the causeway along the boundary with dune habitats and of St Annes Golf Course; the extent of the habitat here is likely to have been greater in the past. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry (2007). See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession	Based on data from McCorry (2007). The MSM at North Bull Island not as well developed as the ASM. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	MSM is found high up in the saltmarsh but requires occasional tidal inundation. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry (2007). At Bull Island there are transitional communities between the <i>Salicornia</i> flats, Atlantic salt meadows and Mediterranean salt meadows. These saltmarsh habitats also form transitional communities with a range of sand dune habitats. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation in the sward	Based on data from McCorry (2007). There is some light grazing by hares (<i>Lepus timidus hibernicus</i>) and wildfowl. See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated	Based on data from McCorry (2007). 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 characteristic species listed in SMP (McCorry and Ryle, 2009)	See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - <i>Spartina</i> <i>anglica</i>	Hectares	No significant expansion of common cordgrass (<i>Spartina anglica</i>), with an annual spread of less than 1%	Based on data from McCorry (2007). <i>Spartina</i> is widely distributed at this site. See coastal habitats supporting document for further details

2110 Embryonic shifting dunes

To restore the favourable conservation condition of Embryonic shifting dunes in North Dublin Bay 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-sites mapped: North Bull - 2.64ha; South Bull - 3.43ha. See map 6	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Embryo dunes were surveyed and mapped at two sub-sites, giving a total estimated area of 6.07ha. Habitat is very difficult to measure in view of its dynamic nature and is more extensive on North Bull than South Bull. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 6 for known distribution	Based on data from Delaney et al. (2013). Mechanical beach cleaning may be contributing to limited distribution of this habitat, particularly at South Bull. 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. At North Bull, movement of sediment towards the recurved northern tip of the dune has resulted in the formation of a wide area of foredune habitat. 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 Delaney et al. (2013). As well as the transitions between sand dune habitats, the transitions from sand dune to saltmarsh communities at Bull Island are of significant value. 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 Delaney et al. (2013). 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 Delaney et al. (2013). 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 Delaney et al. (2013). 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. See coastal habitats supporting document for further details

2120

Shifting dunes along the shoreline with 5 a a cd\ j`UUFYbUF]U(white dunes)

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in North Dublin Bay 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. North Bull - 2.20ha; South Bull - 0.97ha. See map 6	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). These dunes were surveyed and mapped at two sub-sites, giving a total estimated area of 3.18ha. 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 6 for known distribution	Based on Delaney et al. (2013). At South Bull and North Bull this habitat forms a continuous strip at or near the seaward edge of the dunes. 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 encouraging further accretion. 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 Delaney et al. (2013). As well as the transitions between sand dune habitats, the transitions from sand dune to saltmarsh communities at Bull Island are of significant value. See coastal habitats supporting document for further details
Vegetation composition: plant health of dune grasses	Percentage cover	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 Delaney et al. (2013). 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</i> <i>arenaria</i>) and/or lyme- grass (<i>Leymus arenarius</i>)	Based on data from Delaney et al. (2013). 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 Delaney et al. (2013). 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. See coastal habitats supporting document for further details

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 North Dublin Bay 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- sites mapped: North Bull - 40.29ha; South Bull - 64.56ha. See map 6	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Habitat was surveyed and mapped at two sub-sites to give a total estimated area of 104.85ha. See coastal habitats supporting document for further details	
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution	Based on data from Delaney et al. (2013). 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. 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 Delaney et al. (2013). As well as the transitions between sand dune habitats, the transitions from sand dune to saltmarsh communities at Bull Island are of significant value. 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 Delaney et al. (2013). Pedestrian tracks that are devoid of vegetation occur throughout the island. See coastal habitats supporting document for further details	
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward	Based on data from Delaney et al. (2013). Grazing by livestock is absent from the island. However, the dunes are grazed by rabbits (<i>Oryctolagus cuniculus</i>) and hares (<i>Lepus timidus hibernicus</i>). 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 Delaney et al. (2013)	Based on data from Gaynor (2008) and Delaney et al. (2013). The protected and Red Data Book : species red hemp nettle (<i>Galeopsis angustifolia</i>), meadow saxifrage (<i>Saxifraga granulata</i>), wild clary (<i>Salvia verbenaca</i>) and spring vetch (<i>Vicia</i> <i>lathyroides</i>) represent indicators of local distinctiveness. See coastal habitats supporting document for further details.	
Vegetation composition: negative indicator species (including <i>Hippophae</i> <i>rhamnoides</i>)	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Delaney et al. (2013). 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. It occurs as occasional patches 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 Delaney et al. (2013). There are numerous small trees and shrubs throughout the site but are not currently a significant management issue. See coastal habitats supporting document for further details	

2190 Humid dune slacks

To restore the favourable conservation condition of Humid dune slacks in North Dublin Bay 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-sites mapped: North Bull - 2.96ha; South Bull - 9.15ha. See map 6	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Habitat was surveyed and mapped at two sub-sites to give a total estimated area of 12.11ha. See coastal habitats supporting document for further details	
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 6 for known distribution	Based on data from Delaney et al. (2013). The dune slack on North Bull consists of a long stretch of habitat that lies between successive dune ridges over a distance of approx. 700m. The dune slack topography is similar on South Bull with a number of individual long slacks between dune ridges. 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. See coastal habitats supporting document for further details	
Physical structure: hydrological and flooding regime	Water table levels; groundwater fluctuations (metres)	Maintain natural hydrological regime	Based on data from Delaney et al. (2013). On Bull Island there is some concern that the alder marsh at the North Bull is becoming increasingly brackish in nature. There is also the potential problem of fertiliser run-off, leading to an increase in nutrient levels. Water abstraction could result in a lowering of the water table, negatively affecting the dune slacks. 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 Delaney et al. (2013). As well as the transitions between sand dune habitats, the transitions from sand dune to saltmarsh communities at Bull Island are of significant value. The transitional area between the fixed dunes and dune slacks are particularly important for a range of rare bryophytes (Lockhart et al., 2012). See coastal habitats supporting document for further details	
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 5% of dune slack habitat, with the exception of pioneer slacks which can have up to 20% bare ground	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Walking tracks traverse the dune slack at North Bull and have led to some erosion and poaching of soil. The slacks at the South Bull are close to the main access points to the island and pedestrian tracks have been created, leading to some erosion of vegetation cover. See coastal habitats supporting document for further details	
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Grazing by livestock is absent from the island. However, the dunes are grazed by rabbits (<i>Oryctolagus cuniculus</i>) and hares (<i>Lepus timidus hibernicus</i>). 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 Delaney et al. (2013)	Based on data from Gaynor (2008) and Delaney et al. (2013). The Annex II liverwort, petalwort (<i>Petalophyllum ralfsii</i>) has its only station away from the western seaboard at this site. See coastal habitats supporting document and conservation objective for 1395 for further details. See coastal habitats supporting document for further details	

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Vegetation composition: cover of <i>Salix</i> <i>repens</i>	Percentage cover; centimetres	Maintain less than 40% cover of creeping willow (<i>Salix repens</i>)	Based on data from Delaney et al. (2013). Cover of creeping willow (<i>Salix repens</i>) needs to be controlled (e.g. by an appropriate grazing regime) to prevent the development of a coarse, rank vegetation cover. 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 Delaney et al. (2013). 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. Patches of the shrub, particularly near the golf course boundaries, need to be kept in check on both the North and South Bull. 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 Delaney et al. (2013). There are numerous shrubs and small trees throughout both sub-sites, but not to an extent that would require intensive management. See coastal habitats supporting document for further details

1395 Petalwort *Petalophyllum ralfsii*

To maintain the favourable conservation condition of Petalwort in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution of populations	Number and geographical spread of populations	No decline. See map 6	The known population of <i>Petalophyllum ralfsii</i> at Bull Island occurs along the track that cuts through the Alder marsh, south and east of St. Anne's Golf Club. Data from NPWS surveys and Campbell (2013)
Population size	Number of individuals	No decline. Population at Bull Island estimated at a maximum of 5,824 thalli. Actual population is more likely to be 5% of this, or c. 300 thalli	Counts of thalli are based on the mean of number of thalli in three 1 x 1m plots, averaged for 12 counts from February 2009 to March 2012: = 7.9 thalli per m ² (Campbell, 2013). Maximum estimated population at Bull Island is therefore 7.86 x 741 = 5,824 thalli. As not all the habitat within the area of occupancy is suitable habitat, the actual number of thalli is likely to be much less, perhaps 5% of this figure, i.e. 291 (or c. 300)
Area of suitable habitat	Hectares	No decline. Area of suitable habitat at Bull Island is estimated at c. 0.04ha. See map 6	The area of occupancy is along the track through the Alder marsh, south and east of St. Anne's Golf Club. The width of the track is estimated to be about 1m. The length, measured by GPS co-ordinates, is 741m. The maximum area is thus $741m^2$ (= 0.0741 ha). Not all the track is actually suitable habitat for <i>Petalophyllum ralfii</i> . Some sections are too dry, some too permanently wet, and some sections too overgrown with coarse vegetation. Therefore c. 5% is suitable i.e. c. $37m^2$ (=0.0037ha). See also conservation objectives for humid dune slacks (2190)
Hydrological conditions: soil moisture	Occurrence	Maintain hydrological conditions so that substrate is kept moist and damp throughout the year, but not subject to prolonged inundation by flooding in winter	<i>Petalophyllum ralfsii</i> grows in damp conditions. Attribute and target based on Campbell (2013)
Vegetation structure: height and cover	Centimetres and percentage	Maintain open, low vegetation with a high percentage of bryophytes (small acrocarps and liverwort turf) and bare ground	Petalophyllum ralfsii grows in compacted, sandy ground, maintained at this site by rabbit (<i>Oryctolagus cuniculus</i>) grazing and trampling (by walkers). Campbell (2013) recorded a mean height of vegetation of 3.3cm, with bryophyte cover c. 30% and bare ground c. 15% (based on three 1 x 1m plots between 2009 and 2011)





Howth Head SAC 000202 North Dublin Bay SAC 000206 North Bull Island SPA 004006 South Dublin Bay and River Tolka Estuary SPA 004024 OSi Discovery Series County Boundaries





North Dublin Bay SAC 000206

1140 Mudflats and sandflats not covered by sea water at low tide

OSi Discovery Series County Boundaries



			Legend OSI Discovery Series Marine Community Type Marine Standard In Sandard
An Roinn Ealaíon, Oidhreachta agus Gaeltachta Department of Arts, Heritage and the Gaeltacht	MAP 4: NORTH DUBLIN BAY SAC CONSERVATION OBJECTIVES MARINE COMMUNITY TYPES Map to be read in conjunction with the NPWS Conservation Objectives Document.	SITE CODE: SAC 000206; version 3. CO. DUBLIN 0 0.5 1 I	The mapped boundaries are of an indicative and general nature only. Boundaries of des Survey material by permission of the Government (Permit number EN 0059212). Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (C

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- County Boundaries
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nud with Pygospio elegans and Crangon crangon community complex

martinensis community complex

ignated areas are subject to revision. Reproduced from Ordnance

athbhreithnithe a déanamh ar theorainneacha na gceantar Ceadunas Uimh. EN 0059212)





1310 / 1330 Salicornia and other annuals colonising mud and sand / Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

1330 / 1410 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) / Mediterranean salt meadows (Juncetalia maritimi)





North Dublin Bay SAC 000206

- OSi Discovery Series County Boundaries
- 1395 Petalwort Petalphyllum ralfsii
- SDM: 010 Sand Dune Monitoring Project Site Codes

- 1210 Annual vegetation of drift lines
- 2110 Embryonic shifting dunes
- 2120 Shifting dunes along the shoreline with Ammophila arenaria ('white dunes')
- 2130 *Fixed coastal dunes with herbaceous vegetation ('grey dunes')

