National Parks and Wildlife Service

Conservation Objectives

Castlemaine Harbour SAC 000343
Castlemaine Harbour SPA 004029

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

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***

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QI	Description
1095	Sea lamprey *Petromyzon marinus*
1099	River lamprey *Lampetra fluviatilis*
1106	Atlantic salmon (*Salmo salar*) (only in fresh water)
1130	Estuaries
1140	Mudflats and sandflats not covered by seawater at low tide
1210	Annual vegetation of drift lines
1220	Perennial vegetation of stony banks
1310	*Salicornia* and other annuals colonizing mud and sand
1330	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
1355	Otter *Lutra lutra*
1395	Petalwort *Petalophyllum ralfsii*
1410	Mediterranean salt meadows (*Juncetalia maritimi*)
2110	Embryonic shifting dunes
2120	Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")
2130	* Fixed coastal dunes with herbaceous vegetation ("grey dunes")
2170	Dunes with *Salix repens* ssp. *argentea* (*Salix arenariae*)
2190	Humid dune slacks
91E0	* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

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QI	Description	
A001	Red-throated Diver *Gavia stellata*	wintering
A017	Cormorant *Phalacrocorax carbo*	wintering
A046	Light-bellied Brent Goose *Branta bernicla hrota*	wintering
A050	Wigeon *Anas penelope*	wintering
A053	Mallard *Anas platyrhynchos*	wintering
A054	Pintail *Anas acuta*	wintering
A062	Scaup *Aythya marila*	wintering
A065	Common Scoter *Melanitta nigra*	wintering
A130	Oystercatcher *Haematopus ostralegus*	wintering
A137	Ringed Plover *Charadrius hiaticula*	wintering
A144	Sanderling *Calidris alba*	wintering
A157	Bar-tailed Godwit *Limosa lapponica*	wintering
A162	Redshank *Tringa totanus*	wintering
A164	Greenshank *Tringa nebularia*	wintering
A169	Turnstone *Arenaria interpres*	wintering
A346	Chough *Pyrrhocorax pyrrhocorax*	non-breeding
A999	Wetlands & Waterbirds	

Supporting documents, relevant reports & publications (listed by date)

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

Title: Castlemaine Harbour SAC (000343): Conservation objectives supporting document - woodland habitats [Version 2]

Year: 2011

Author: NPWS

Series: Unpublished Report to NPWS

Title: Castlemaine Harbour SPA (004029): Conservation Objectives Supporting Document [Version 2]

Year: 2011

Author: NPWS

Series: Unpublished Report to NPWS

Title: Castlemaine Harbour SAC (000343): Conservation objectives supporting document - marine habitats [Version 2]

Year: 2011

Author: NPWS

Series: Unpublished Report to NPWS

Title: Castlemaine Harbour SAC (000343): Conservation objectives supporting document - coastal habitats [Version 2]

Year: 2011

Author: NPWS

Series: Unpublished Report to NPWS

Title: Otter tracking study of Roaringwater Bay

Year: 2010

Author: De Jongh, A.; O'Neill, L.

Series: Unpublished Draft Report to NPWS

Title: MI benthic surveys of Natura 2000 sites: Area 1

Year: 2010

Author: ERM

Series: Unpublished Report to NPWS

Title: A provisional inventory of ancient and long-established woodland in Ireland

Year: 2010

Author: Perrin, P.M.; Daly, O.H.

Series: Irish Wildlife Manuals No. 46

Title: Report of the standing scientific committee to the DCENR. The status of Irish salmon stocks in 2010 and precautionary catch advice for 2011

Year: 2010

Author: SSC

Series: Unpublished Report to DCENR

Title: Saltmarsh Monitoring Report 2007-2008

Year: 2009

Author: McCorry, M.; Ryle, T.

Series: Unpublished Report to NPWS

Title: Coastal Monitoring Project 2004-2006

Year: 2009

Author: Ryle, T.; Murray, A.; Connolly, C.; Swann, M.

Series: Unpublished Report to NPWS

Title: A survey of mudflats and sandflats in Ireland. An intertidal soft sediment survey of Castlemaine Harbour

Year: 2008

Author: Aquatic Services Unit

Series: Unpublished Report to NPWS

Title: The phytosociology and conservation value of Irish sand dunes

Year: 2008

Author: Gaynor, K.

Series: Unpublished PhD thesis, National University of Ireland, Dublin

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Title: National Survey of Native Woodlands 2003-2008

Year: 2008

Author: Perrin, P.; Martin, J.; Barron, S.; O'Neill, F.; McNutt, K.; Delaney, A.

Series: Unpublished Report to NPWS

Title: Saltmarsh Monitoring Report 2006

Year: 2007

Author: McCorry, M.

Series: Unpublished Report to NPWS

Title: Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents, Article 17 forms and supporting maps

Year: 2007

Author: NPWS

Series: Unpublished Report to NPWS

Title: A Survey of Juvenile Lamprey Populations in the Corrib and Suir Catchments

Year: 2007

Author: O'Connor, W.

Series: Irish Wildlife Manuals No. 26

Title: Otter Survey of Ireland 2004/2005

Year: 2006

Author: Bailey, M.; Rochford, J.

Series: Irish Wildlife Manuals No. 23

Title: Otters - ecology, behaviour and conservation

Year: 2006

Author: Kruuk, H.

Series: Oxford University Press

Title: Monitoring the river, sea and brook lamprey, *Lampetra fluviatilis*, *L. planeri* and *Petromyzon marinus*

Year: 2003

Author: Harvey, J.; Cowx, I.

Series: Conserving Natura 2000 Rivers Monitoring Series No. 5, English Nature, Peterborough

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Title:	Quantification of the freshwater salmon habitat asset in Ireland using data interpreted in a GIS platform
Year:	2003
Author:	McGinnity, P.; Gargan, P.; Roche, W.; Mills, P.; McGarrigle, M.
Series:	Irish Freshwater Ecology & Management Series: No. 3, Central Fisheries Board
Title:	Reversing the habitat fragmentation of British woodlands
Year:	2002
Author:	Peterken, G.
Series:	WWF-UK, London
Title:	Diet of Otters *Lutra lutra* on Inishmore, Aran Islands, west coast of Ireland
Year:	1999
Author:	Kingston, S.; O'Connell, M.; Fairley, J.S.
Series:	Biol & Environ Proc R Ir Acad B 99B:173–182
Title:	National Shingle Beach Survey of Ireland 1999
Year:	1999
Author:	Moore, D.; Wilson, F.
Series:	Unpublished Report to NPWS
Title:	The spatial organization of otters (*Lutra lutra*) in Shetland
Year:	1991
Author:	Kruuk, H.; Moorhouse, A.
Series:	J. Zool, 224: 41-57
Title:	Otter survey of Ireland
Year:	1982
Author:	Chapman, P.J.; Chapman, L.L.
Series:	Unpublished Report to Vincent Wildlife Trust

Spatial data sources

Year:	2010
Title:	EPA transitional waterbody data
GIS operations:	Clipped to SAC boundary
Used for:	1130 (map 2)
Year:	Interpolated 2011
Title:	Intertidal sediment survey 2008; subtidal sediment survey 2009
GIS operations:	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data
Used for:	Marine community types, 1140 (maps 3 & 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; Saltmarsh and Sand Dune CO datasets erased out
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:	1210, 1220, 2110, 2120, 2130, 2170, 2190 (map 5)
Year:	Revision 2010
Title:	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS operations:	QIs selected; clipped to SAC boundary; overlapping regions with Sand Dune CO data investigated and resolved with expert opinion used
Used for:	1310, 1330, 1410 (map 6)
Year:	Revision 2010
Title:	National Survey of Native Woodlands 2003-2008. Version 1
GIS operations:	QIs selected; clipped to SAC boundary
Used for:	91E0 (map 7)
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; saltmarsh data for site combined to HWM and LWM polygon feature class; resulting polygon feature class unioned with SPA boundary; resulting polygon feature class clipped to SPA boundary; bird use zone attributes assigned to each polygon
Used for:	Bird use zones (map 8)

Year:	2005
Title:	OSi Discovery series vector data
GIS operations:	Creation of an 80m buffer on the marine side of the high water mark (HWM); creation of a 10m buffer on the terrestrial side of the HWM; combination of 80m and 10m HWM buffer datasets; creation of a 10m buffer on the landward side of the river banks data; creation of a 20m buffer applied to river centerline and stream data; combination of 10m river banks and 20m river and stream centerline buffer datasets; combined river and stream buffer dataset clipped to HWM; combination of HWM buffer dataset with river and stream buffer dataset; overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary
Used for:	1355 (no map)

1095 Sea lamprey *Petromyzon marinus*

To maintain the favourable conservation condition of Sea lamprey in Castlemaine Harbour SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Extent of anadromy	% of river accessible	Greater than 75% of main stem length accessible from estuary	Artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Attribute and target based on Inland Fisheries Ireland survey work
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on Harvey and Cowx (2003)
Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density at least 1/m²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on Harvey and Cowx (2003)
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	Lampreys spawn in clean gravels. Artificial barriers can prevent lampreys from accessing suitable spawning habitat. Attribute and target based on spawning bed habitat mapping by IFI
Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Artificial barriers can prevent juvenile lampreys from accessing the full extent of suitable habitat. Target based on O'Connor (2007)

1099 River lamprey *Lampetra fluviatilis*

To maintain the favourable conservation condition of River lamprey in Castlemaine Harbour SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Extent of anadromy	% of river accessible	Greater than 75% of main stem length accessible from estuary	Artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Target based on IFI survey work
Population structure of juveniles	Number of age/size groups	At least three age/size groups of river/brook lamprey present	Attribute and target based on data from Harvey and Cowx (2003). It is impossible to distinguish between brook and river lamprey juveniles in the field, hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density of brook/river lamprey at least 2/m²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m² in optimal conditions and more than 2/m² on a catchment basis
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	Lampreys spawn in clean gravels. Artificial barriers can prevent lampreys from accessing suitable spawning habitat. Attribute and target based on spawning bed habitat mapping by IFI
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Artificial barriers can prevent juvenile lampreys from accessing the full extent of suitable habitat. Target based on O'Connor (2007)

1106 Atlantic salmon (*Salmo salar*) (only in fresh water)

To maintain the favourable conservation condition of Salmon in Castlemaine Harbour SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Extent of anadromy	% of river accessible	100% of channel down to second order accessible from estuary. Currently present in 88 - 100% of sites sampled	Artificial barriers can block salmons' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Target based on McGinnity et al. 2003
Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded	A conservation limit is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee of the National Salmon Commission's annual model output of CL attainment levels. See SSC (2010). Stock estimates are either derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling	Target is threshold value for rivers currently exceeding their conservation limit (CL) (SSC, 2010). For assessments of favourable conservation condition, this measure should be taken in conjunction with other direct means of stock assessment
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (*Lepeophtheirus salmonis*)
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	Salmon spawn in clean gravels. Artificial barriers can prevent salmon from accessing suitable spawning habitat
Water quality	EPA Q values	At least Q4 at all sites sampled by EPA. 85% of relevant sites currently at least Q4 on Laune	Salmon spawn in clean gravels. Artificial barriers can prevent salmon from accessing suitable spawning habitat

1130 Estuaries

To maintain the favourable conservation condition of Estuaries in Castlemaine Harbour 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 no natural processes. See map 2	Habitat area was estimated as 5696ha using OSI data and the defined Transitional Water Body area under the Water Framework Directive. See marine supporting document for further information
Community distribution	Hectares	The following sediment communities should be maintained in a natural condition: Intertidal muddy fine sand community complex; Fine to muddy fine sand with polychaetes community complex; Intertidal sand with *Nephtys cirrosa* community; and Mixed sediment community complex. See map 4	The likely area of sediment communities was derived from a combination of intertidal and subtidal surveys undertaken in 2008 and 2009. See marine supporting document for further information

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 Castlemaine Harbour 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 as 4287ha using OSI data. See marine supporting document for further information
Community extent	Hectares	Maintain the extent of the *Zostera*-dominated community, subject to natural processes. See map 4	The likely area of this community is derived from an intertidal survey undertaken in 2008. See marine supporting document for further information
Community distribution	Hectares	The following sediment communities should be maintained in a natural condition: Intertidal muddy fine sand community complex; and Fine to muddy fine sand with polychaetes community complex. See map 4	The likely area of sediment communities was derived from a combination of intertidal and subtidal surveys undertaken in 2008 and 2009. See marine supporting document for further information

1210 Annual vegetation of drift lines

To maintain the favourable conservation condition of Annual vegetation of driftlines in Castlemaine Harbour 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: Inch - 1.17ha and Rosbehy - 0.73ha. See map 5	Current area unknown. Two sub-sites (Inch and Rosbehy) were mapped during the Coastal Monitoring Project (Ryle et al., 2009), giving a total estimated area of 1.90ha. NB further unsurveyed areas maybe present in the site. 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. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes	Current distribution unknown. Majority of habitat found at Inch and Rosbehy, although there may be additional patches distributed throughout the site. 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. 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 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: *Cakile maritima*, *Honckenya peploides*, *Salsola kali* and *Atriplex* spp.	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	Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details

1220 Perennial vegetation of stony banks

To maintain the favourable conservation condition of Perennial vegetation of stony banks in Castlemaine Harbour 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	Current area unknown. It was recorded from Rosbehy and Cromane during the National Shingle Beach Survey (Moore and Wilson, 1999), but the extent was not mapped. The Coastal Monitoring Project mapped 0.5ha of this habitat at Rosbehy (Ryle et al., 2009). The extent is thought to be considerably greater than this figure, as substantial shingle deposits are known to have formed the spits of Inch, Rosbehy and Cromane, the first two of which are topped by extensive sand dune and saltmarsh systems. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes	Distribution unknown at present, although the habitat has been recorded at Cromane Point (Moore and Wilson, 1999) and Rosbehy (Moore and Wilson, 1999; Ryle et al., 2009). 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	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 Moore and Wilson (1999) and Ryle et al. (2009). 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 the presence of species-poor communities with typical species: *Honckenya peploides*, *Beta vulgaris* ssp. *maritima*, *Crithmum maritimum*, *Tripleurospermum maritimum*, *Glaucium flavum* and *Silene uniflora*	Based on data from Moore and Wilson (1999) and 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 Moore and Wilson (1999) and 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. See coastal habitats supporting document for further details

1310 *Salicornia* and other annuals colonizing mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in Castlemaine Harbour 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: Inch - 1.24ha and Rosbehy - 0.002ha. See map 6	Based on data from Saltmarsh Monitoring Project (McCorry and Ryle, 2009). Habitat recorded at two of the four sub-sites surveyed, giving a total estimated area of 1.24ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 6 for known distribution	Based on data from McCorry and Ryle (2009). *Salicornia* is an annual species, so its distribution can vary significantly from year to year. 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	Sediment supply is particularly important for this pioneer saltmarsh community, as the distribution of this habitat depends on accretion rates. 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 and Ryle (2009). Creeks deliver sediment throughout saltmarsh system. Creeks and pan structures well developed at Inch and Rosbehy. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded, frequency	Maintain natural tidal regime	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 and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimeters	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). 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 and Ryle (2009). See coastal habitats supporting document for further details

1310 *Salicornia* and other annuals colonizing mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in Castlemaine Harbour SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation composition: typical species & sub-communities	Percentage cover	Maintain the presence of species-poor communities with typical species including *Salicornia europaea*, *Puccinellia maritima*, *Aster tripolium*, *Suaeda maritima*	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of *Spartina*. No new sites for this species and an annual spread of less than 1% where it is already known to occur	Based on data from McCorry and Ryle (2009). 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 in Castlemaine Harbour 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: Inch - 9.48ha, Rosbehy - 7.29ha, Whitegate-Fybagh - 2.72ha, Cromane - 13.97ha. See map 6	Based on data from the Saltmarsh Monitoring Project (McCorry and Ryle, 2009). Four sub-sites were mapped (29.21ha) and additional areas of potential saltmarsh (4.79ha) were identified from an examination of aerial photographs, giving a total estimated area of 34.0ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 6 for known distribution	Based on data from McCorry and Ryle (2009). 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	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 and Ryle (2009). The efficiency of sediment circulation throughout a saltmarsh depends on the creek pattern. Creeks and pans are well developed at both Inch and Rosbehy. 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 the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details.
Vegetation structure: vegetation height	Centimeters	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). 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% area outside creeks vegetated	Based on data from McCorry and Ryle (2009). 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 Saltmarsh Monitoring Project (McCorry & Ryle, 2009)	Based on data from McCorry and Ryle (2009). 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 in Castlemaine Harbour SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of *Spartina*. No new sites for this species and an annual spread of less than 1% where it is already known to occur	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details

1355 Otter *Lutra lutra*

To restore the favourable conservation condition of Otter in Castlemaine Harbour SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. FCS target, based on 1980/81 survey findings, is 88% in SACs. Current range estimated at 75% (Bailey and Rochford, 2006; Rapid assessment results from Roaringwater Bay)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 162ha above high water mark (HWM); 193ha along river banks	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 812ha	No field survey. Area mapped based on evicence that otters tend to forage within 80m of the shoreline (HWM) (NPWS, 2007; Kruuk, 2006)
Extent of freshwater (river) habitat	Kilometers	No significant decline. Length mapped and calculated as 104km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk, 2006; Kruuk and Moorhouse, 1991)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006) and wrasse and rockling in coastal waters (Kingston et al., 1999)
Barriers to connectivity	Number	No significant increase	Otters will regularly commute across stretches of open water up to 500m e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed

1395 Petalwort *Petalophyllum ralfsii*

To maintain the favourable conservation condition of *Petalophyllum ralfsii* in Castlemaine Harbour SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution of populations	Number and geographical spread	No decline. Maintain at least current number of populations- 3 at Inch; 1 at Rosbehy. See map 5	3 populations recorded from 3 dune slacks at Inch by Christina Campbell, 2009-2010. 1 population recorded at a dune slack at Rosbehy by David Holyoak, 2006
Population size	Number of individuals	No decline. Current known population at Inch estimated ca.72,000 thalli, counted in 2010. Rosbehy currently unknown	Counts of thalli made on 05.05.2010 (Christina Campbell). Southernmost dune slack: 14.7 thalli/m² (average of 3 quadrats) x 3,146 m² = 46,246 thalli; adjacent dune slack to north: 9 thalli/m² (1 quadrat) x 2,865 m² = 25,785 thalli
Area occupied by habitat	Hectares	No decline. At Inch area of suitable habitat at least 0.6011 ha. Rosbehy currently unknown	Main area of suitable habitat is in 2 dune slacks at Inch Spit, measured by Trimble = 0.6011 ha. *Petalophyllum ralfsii* also present in a 3rd dune slack at Inch Spit, but extent not yet measured. Area of suitable habitat at Rosbehy not yet measured, but known to be very small (ca.0.01 ha)

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

To maintain the favourable conservation condition of Mediterranean salt meadows in Castlemaine Harbour 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: Inch - 29.11ha, Rosbehy - 16.10ha, Cromane - 29.31ha and Whitegate-Fybagh - 2.72ha. See map 6	Based on data from the Saltmarsh Monitoring Project (McCorry and Ryle, 2009). Four sub-sites were mapped (74.73ha) and additional areas of potential saltmarsh (49.59ha) were identified from an examination of aerial photographs, giving a total estimated area of 124.32ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 6 for known distribution	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	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 the Saltmarsh Monitoring Project (McCorry and Ryle, 2009). Creeks and pans are well developed at Inch and Rosbehy. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Mediterranean salt meadow 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 the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). Inch displays some of the best examples of transitional vegetation communities between saltmarsh and sand dunes anywhere in the country. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation in the sward	Based on data from McCorry and Ryle (2009). 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 and Ryle (2009). See coastal habitats supporting document for further details
Vegetation composition: typical species	Percentage cover	Maintain range of sub-communities with typical species listed in Saltmarsh Monitoring Project (McCorry & Ryle, 2009)	See coastal habitats supporting document for further details

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

To maintain the favourable conservation condition of Mediterranean salt meadows in Castlemaine Harbour SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of *Spartina*. No new sites for this species and an annual spread of less than 1% where it is already known to occur	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details

2110 Embryonic shifting dunes

To maintain the favourable conservation condition of Embryonic shifting dunes in Castlemaine Harbour 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: Inch - 14.41ha and Rosbehy - 0.79ha. See map 5	Current area unknown. Two sub-sites (Inch and Rosbehy) were mapped during the Coastal Monitoring Project (Ryle et al., 2009), giving a total estimated area of 15.20ha. NB further unsurveyed areas maybe present in the site. 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 for known distribution	Inch is one of the few actively accreting dune systems on the west coast, with extensive foredunes. 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. 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). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the presence of species-poor communities with typical species: *Elytrigia juncea* and/or *Leymus arenarius*	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: plant health of foredune grasses	Percentage cover	More than 95% of *Elytrigia* and/or *Leymus* 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: 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 (*Hippophae rhamnoides*) should be absent or effectively controlled. See coastal habitats supporting document for further details

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

To maintain the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* in Castlemaine Harbour SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat extent	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Inch - 25.80ha and Rosbehy - 10.42ha. See map 5	Current area unknown. Two sub-sites (Inch and Rosbehy) were mapped during the Coastal Monitoring Project (Ryle et al., 2009), giving a total estimated area of 36.22ha. NB further unsurveyed areas maybe present in the site. 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 for known distribution	Inch is one of the few actively accreting dune systems on the west coast, with extensive mobile 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. *Ammophila* reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth and thus encouraging further accretion. 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 Gaynor (2008) and 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 *Ammophila arenaria* and/or *Leymus arenarius*	Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: plant health of dune grasses	Percentage cover	more than 95% of *Ammophila* and/or *Leymus* 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

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

To maintain the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* in Castlemaine Harbour SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
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 (*Hippophae rhamnoides*) 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 Castlemaine Harbour 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: Inch - 352.24ha and Rosbehy - 99.07ha. See map 5	Based on data from the Coastal Monitoring Project (Ryle et al., 2009). Two sub-sites (Inch and Rosbehy) were mapped, giving a total estimated area of 451.31ha. Figure for Inch based on examination of an aerial photograph from 2000. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 5 for known distribution	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 Ryle et al. (2009). Inch in particular displays some of the best examples of transitional vegetation communities between saltmarsh and sand dunes anywhere in the country. 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). Inch is one of the most geomorphologically dynamic systems in the country. See coastal habitats supporting document for further details
Vegetation structure: sward height	Centimeters	Maintain structural variation within sward	Based on data from Gaynor (2008) and Ryle et al. (2009). 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 Ryle et al. (2009)	Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species (including *Hippophae rhamnoides*)	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 (*Hippophae rhamnoides*) should be absent or effectively controlled. 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 Ryle et al. (2009). See coastal habitats supporting document for further details

2170 Dunes with *Salix repens* ssp. *argentea* (*Salix arenariae*)

To maintain the favourable conservation condition of Dunes with *Salix repens* ssp. *argentea* (*Salix arenariae*) in Castlemaine Harbour 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. Habitat only found and mapped at one sub-site: Inch - 0.34ha. See map 5	Based on data from the Coastal Monitoring Project (Ryle et al., 2009). Figure of 0.34ha for Inch based on examination of an aerial photograph from 2000. Actual area likely to be greater. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 5 for known distribution	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 Ryle et al. (2009). Inch in particular displays some of the best examples of transitional vegetation communities between saltmarsh and sand dunes anywhere in the country. See coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% cover, subject to natural processes	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimeters	Maintain structural variation within sward	Based on data from Gaynor (2008) and Ryle et al. (2009). 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 Ryle et al. (2009)	See coastal habitats supporting document for further details
Vegetation composition: cover and height of *Salix repens*	Percentage cover; centimeters	Maintain more than 10% cover of *Salix*; vegetation height should be in the average range of 5-20cm	Cover of *Salix* is maintained through an appropriate grazing regime, which prevents the development of a coarse, rank vegetation cover. Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species (including *Hippophae rhamnoides*)	Percentage cover at a representative sample of monitoring stops	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 (*Hippophae rhamnoides*) should be absent or effectively controlled. See coastal habitats supporting document for further details

2170 Dunes with *Salix repens* ssp. *argentea* (*Salix arenariae*)

To maintain the favourable conservation condition of Dunes with *Salix repens* ssp. *argentea* (*Salix arenariae*) in Castlemaine Harbour SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details

2190 Humid dune slacks

To maintain the favourable conservation condition of Humid dune slacks in Castlemaine Harbour 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: Inch - 32.37ha and Rosbehy - 1.83ha. See map 5	Based on data from the Coastal Monitoring Project (Ryle et al., 2009). Two sub-sites (Inch and Rosbehy) were mapped, giving a total estimated area of 34.20ha. Figure for Inch based on examination of an aerial photograph from 2000. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 5 for known distribution	Slacks occur on Inch and Rosbehy spits. The dune slacks at Inch are extremely important in an Irish context, with some of the best examples of pioneer slack communities. They provide habitat for Petalwort (*Petalophyllum ralfsii)* and Natterjack toad (*Bufo calamita*). 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	Presence/absence of water abstraction or drainage	Maintain natural hydrological regime	Based on data from Gaynor (2008) and Ryle et al. (2009). 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). Inch in particular displays some of the best examples of transitional vegetation communities between saltmarsh and sand dunes anywhere in the country. 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) and Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimeters	Maintain structural variation within sward	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 sample 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). See coastal habitats supporting document for further details

2190 Humid dune slacks

To maintain the favourable conservation condition of Humid dune slacks in Castlemaine Harbour SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation composition: cover of *Salix repens*	Percentage cover; centimeters	Maintain less than 40% cover of *Salix*	Cover of *Salix* is maintained through an appropriate grazing regime, which prevents the development of a coarse, rank vegetation cover. 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 (*Hippophae rhamnoides*) should be absent or effectively controlled. 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 Ryle et al. (2009). See coastal habitats supporting document for further details

91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* in Castlemaine Harbour 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, at least 17.68ha for sites surveyed: Whitefield (5.21ha), Ardagh wood (1.43ha), Brennan's Glen (0.19ha), Farrantooreen (6.70ha) and Ballymalis (4.15ha). See map 7	Minimum area, based on 5 sites surveyed by Perrin et al. (2008)- site codes 1755, 1759, 1760, 1791 and 1915. NB further unsurveyed areas maybe present within the SAC
Habitat distribution	Occurrence	No decline. Surveyed locations shown on map 7	Distribution based on Perrin et al. (2008). NB further unsurveyed areas maybe present within the site
Woodland size	Hectares	Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The sizes of at least some of the existing woodlands need to be increased in order to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). Topographical constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer	Described in Perrin et al. (2008) and internal NPWS reports: Site 1791- dated March 2001; site 1759 - dated December 2000. See woodland habitats supporting document for further details
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008) and internal NPWS reports: Site 1791- dated March 2001; site 1759 - dated December 2000. See woodland habitats supporting document for further details
Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Alder and oak regenerates poorly. Ash often regenerates in large numbers although few seedlings reach pole size
Hydrological regime: Flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	Periodic flooding is essential to maintain alluvial woodlands along river floodplains but not for woodland around springs/seepage areas
Woodland structure: dead wood	m^3 per hectare; number per hectare	At least 30m^3/ha of fallen timber greater than 10cm diameter; 30 snags/ha (standing dead wood); both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem

91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* in Castlemaine Harbour SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local disctinctiveness	Occurrence	No decline	Includes ancient or long-established (pre-1840s) woodlands, archaeological and geological features as well as red-listed and other rare or localised species. Perrin and Daly (2010) list two woodlands as potential ancient/long established woodlands within this site
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Described in Perrin et al. (2008) and internal NPWS reports: Site 1791- dated March 2001; site 1759 - dated December 2000
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including ash (*Fraxinus excelsior*) alder (*Alnus glutinosa*) and willows (*Salix* spp)	Species reported in Perrin et al. (2008)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control. These species include Japanese knotweed (*Fallopia japonica*), skunk cabbage (*Lysichiton americanus*)	Described in Perrin et al. (2008) and internal NPWS reports: Site 1791- dated March 2001
Presence of rubbish	Occurrence	No rubbish	Abundant dumping reported by Perrin et al. (2008) for site 1791, both from carpark to north and along edge with main road

A001 Red-throated Diver *Gavia stellata*

To maintain the favourable conservation condition of Red-throated Diver in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment using (Generalised Additive Modelling (GAM)) could not be undertaken for this species due to an incomplete dataset. Increased survey effort will allow more robust analysis in the future. See the the SPA conservation objectives supporting document for further details
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A017 Cormorant *Phalacrocorax carbo*

To maintain the favourable conservation condition of Cormorant in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment (Generalised Additive Modelling (GAM)) was undertaken using waterbird count data collected through the Irish Wetland Bird Survey and other surveys. See the the SPA conservation objectives supporting document for further details
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A046 Light-bellied Brent Goose *Branta bernicla hrota*

To maintain the favourable conservation condition of Light-bellied Brent Geese in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment (Generalised Additive Modelling (GAM)) was undertaken using waterbird count data collected through the Irish Wetland Bird Survey and other surveys. See the the SPA conservation objectives supporting document for further details
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A050 Wigeon *Anas penelope*

To maintain the favourable conservation condition of Wigeon in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment (Generalised Additive Modelling (GAM)) was undertaken using waterbird count data collected through the Irish Wetland Bird Survey and other surveys. See the the SPA conservation objectives supporting document for further details
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A053 Mallard *Anas platyrhynchos*

To maintain the favourable conservation condition of Mallard in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment (Generalised Additive Modelling (GAM)) was undertaken using waterbird count data collected through the Irish Wetland Bird Survey and other surveys. See the the SPA conservation objectives supporting document for further details
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A054 Pintail *Anas acuta*

To maintain the favourable conservation condition of Pintail in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment using (Generalised Additive Modelling (GAM)) could not be undertaken for this species due to an incomplete dataset. A measure of population change was calculated using the 'generic threshold' method (see Section 4 of the SPA conservation objectives supporting document for more details)
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A062 Scaup *Aythya marila*

To maintain the favourable conservation condition of Scaup in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment using (Generalised Additive Modelling (GAM)) could not be undertaken for this species due to an incomplete dataset. A measure of population change was calculated using the 'generic threshold' method (see Section 4 of the SPA conservation objectives supporting document for more details)
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A065 Common Scoter *Melanitta nigra*

To maintain the favourable conservation condition of Common Scoter in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment using (Generalised Additive Modelling (GAM)) could not be undertaken for this species due to an incomplete dataset. Increased survey effort will allow more robust analysis in the future. See the the SPA conservation objectives supporting document for further details
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A130 Oystercatcher *Haematopus ostralegus*

To maintain the favourable conservation condition of Oystercatcher in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment (Generalised Additive Modelling (GAM)) was undertaken using waterbird count data collected through the Irish Wetland Bird Survey and other surveys. See the the SPA conservation objectives supporting document for further details
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A137 Ringed Plover *Charadrius hiaticula*

To maintain the favourable conservation condition of Ringed Plover in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment (Generalised Additive Modelling (GAM)) was undertaken using waterbird count data collected through the Irish Wetland Bird Survey and other surveys. See the the SPA conservation objectives supporting document for further details
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A144 Sanderling *Calidris alba*

To maintain the favourable conservation condition of Sanderling in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment (Generalised Additive Modelling (GAM)) was undertaken using waterbird count data collected through the Irish Wetland Bird Survey and other surveys. See the the SPA conservation objectives supporting document for further details
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A157 Bar-tailed Godwit *Limosa lapponica*

To maintain the favourable conservation condition of Bar-tailed Godwit in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment (Generalised Additive Modelling (GAM)) was undertaken using waterbird count data collected through the Irish Wetland Bird Survey and other surveys. See the the SPA conservation objectives supporting document for further details
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A162 Redshank *Tringa totanus*

To maintain the favourable conservation condition of Redshank in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment (Generalised Additive Modelling (GAM)) was undertaken using waterbird count data collected through the Irish Wetland Bird Survey and other surveys. See the the SPA conservation objectives supporting document for further details
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A164 Greenshank *Tringa nebularia*

To maintain the favourable conservation condition of Greenshank in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment (Generalised Additive Modelling (GAM)) was undertaken using waterbird count data collected through the Irish Wetland Bird Survey and other surveys. See the the SPA conservation objectives supporting document for further details
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A169 Turnstone *Arenaria interpres*

To maintain the favourable conservation condition of Turnstone in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trend assessment (Generalised Additive Modelling (GAM)) was undertaken using waterbird count data collected through the Irish Wetland Bird Survey and other surveys. See the the SPA conservation objectives supporting document for further details
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in Section 5 of the SPA conservation objectives supporting document

A346 Chough *Pyrrhocorax pyrrhocorax*

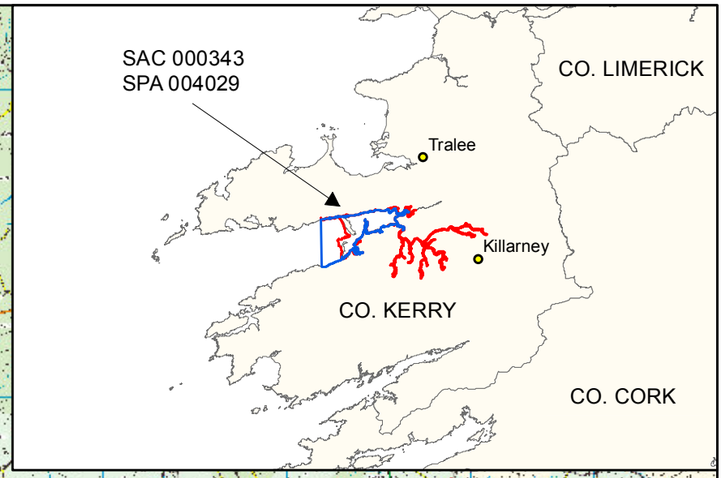
To maintain the favourable conservation condition of Chough in Castlemaine Harbour SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population	Numbers	Long term population stable or increasing	Chough have been recorded at this site in nationally important inumbers
Distribution	Numbers of birds and range of areas used	No significant decrease in the numbers or range of areas used	Chough use the sand dune systems of Inch and Rosbehy (See map 5) for foraging and socailising

A999 Wetlands & Waterbirds

To maintain the favourable conservation condition of the wetland habitat in Castlemaine Harbour SAC as a resource for the regularly-occurring migratory waterbirds that utilise it. This is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the areas of 7472, 3983 and 322 hectares for subtidal, intertidal, and supratidal habitats respectively, other than that occurring from natural patterns of variation. See map 8	Wetland areas defined by SPA boundary to MLWM; MLWM to MHWM; and MHWM to SPA boundary (the last value is minus the sand dunes of Inch and Rosbehy)



DINGLE BAY
Bá an Daingin

Legend

- SAC 000343
- SPA 004029

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MAP 1:
CASTLEMAINE HARBOUR
CONSERVATION OBJECTIVES
SAC & SPA DESIGNATIONS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

COUNTY KERRY

0 1 2 3 4 5 km

N

SITE CODE
SAC 000343
Version 1.11
SPA 004029
Version 1.08
Map Version 2
Date: April 2011

Legend

- SAC 000343
- 1130 Estuaries
- OSi Discovery Series County Boundary

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MAP 2: CASTLEMAINE HARBOUR CONSERVATION OBJECTIVES ESTUARIES

Map to be read in conjunction with the NPWS Conservation Objectives Document.

CO. KERRY

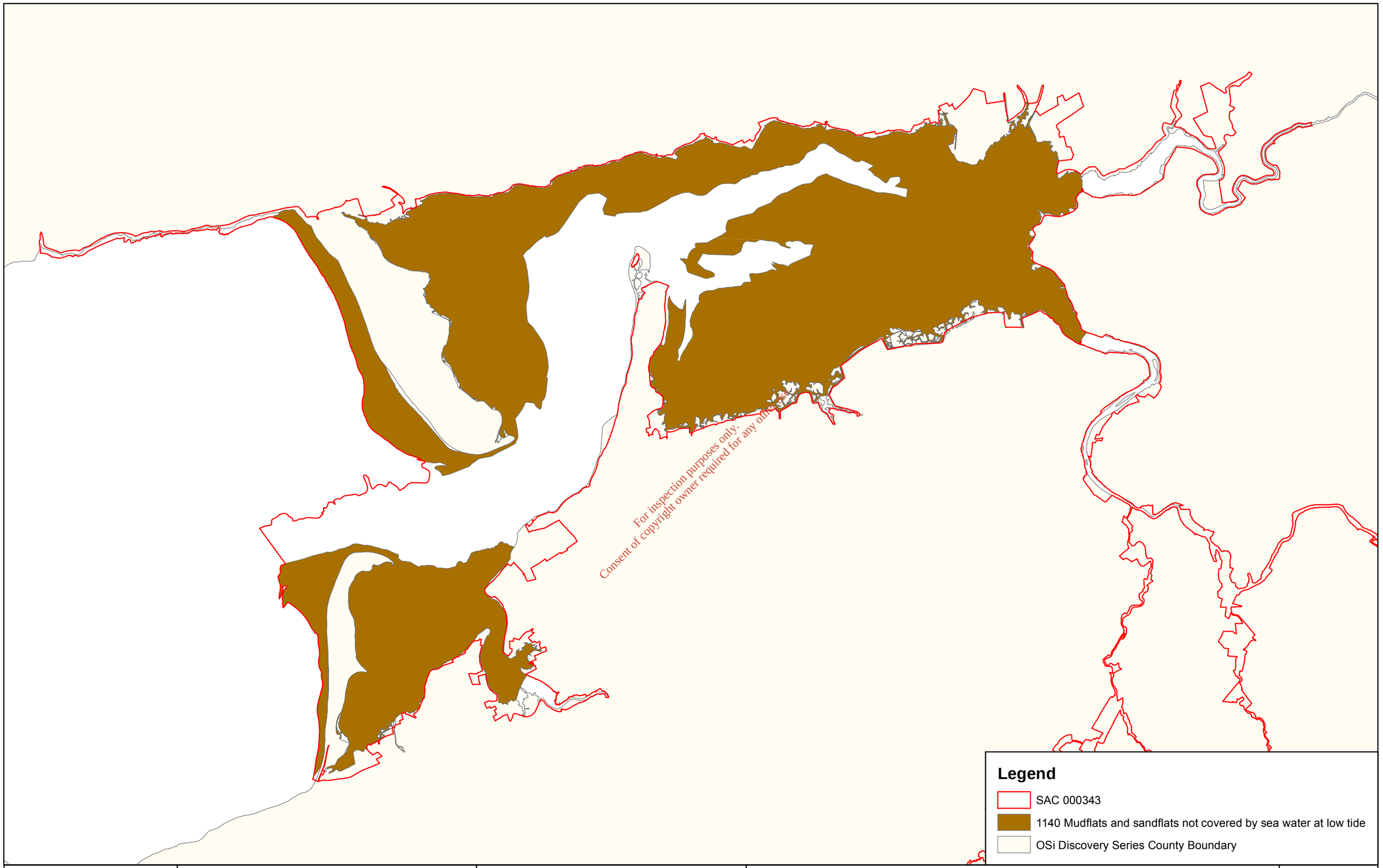
0 1 2 3 km

N

SITE CODE

SAC 000343
Version 1.11

Map Version 2
Date: March 2011



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MAP 3:
CASTLEMAINE HARBOUR
CONSERVATION OBJECTIVES
TIDAL MUDFLATS AND SANDFLATS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

CO. KERRY

0 1 2 3 km

N

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059208).
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

SITE CODE

SAC 000343
Version 1.11

Map Version 2
Date: March 2011

Legend

- SAC 000343
- SPA 004029
- OSi Discovery Series County Boundary

Marine Community Types

- *Zostera* dominated community
- Fine sand with *Donax vittatus* and polychaetes community
- Fine to muddy fine sand with polychaetes community complex
- Intertidal muddy fine sand community complex
- Intertidal sand with *Nephtys cirrosa*
- Mixed sediment community complex
- River

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MAP 4: CASTLEMAINE HARBOUR CONSERVATION OBJECTIVES MARINE COMMUNITY TYPES

Map to be read in conjunction with the NPWS Conservation Objectives Document.

CO. KERRY

0 1 2 3 km

N

SITE CODE
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Version 1.11
SPA 004029
Version 1.08
Map Version 2
Date: April 2011

Legend

- SAC 000343
- OSi Discovery Series County Boundary
- 1395 *Petalophyllum ralfsii* Locations

Coastal Habitats

- 1210 Annual vegetation of drift lines
- 1220 Perennial vegetation of stony banks
- 2110 Embryonic shifting dunes
- 2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')
- 2130 *Fixed coastal dunes with herbaceous vegetation ('grey dunes')
- 2170 Dunes with *Salix repens* ssp. *argentea* (Salicion arenariae)
- 2190 Humid dune slacks

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MAP 5:
CASTLEMAINE HARBOUR CONSERVATION OBJECTIVES COASTAL HABITATS & PETALOPHYLLUM RALFSII LOCATIONS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

CO. KERRY

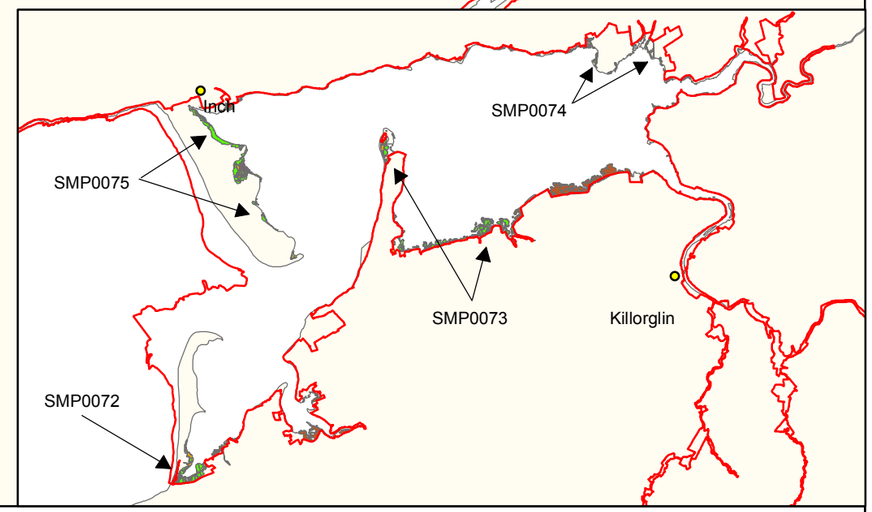
0 0.25 0.5 0.75 1 km

N

SITE CODE

SAC 000343
Version 1.11

Map Version 2
Date: March 2011



Legend

- SAC 000343
- OSi Discovery Series County Boundary

Saltmarsh Habitats

- 1310 *Salicornia* and other annuals colonising mud and sand
- 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
- 1330 / 1410 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) / Mediterranean salt meadows (Juncetalia maritimi)
- 1410 Mediterranean salt meadows (Juncetalia maritimi)
- Potential Annex Habitat

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MAP 6: CASTLEMAINE HARBOUR CONSERVATION OBJECTIVES SALTMARSH HABITATS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

CO. KERRY

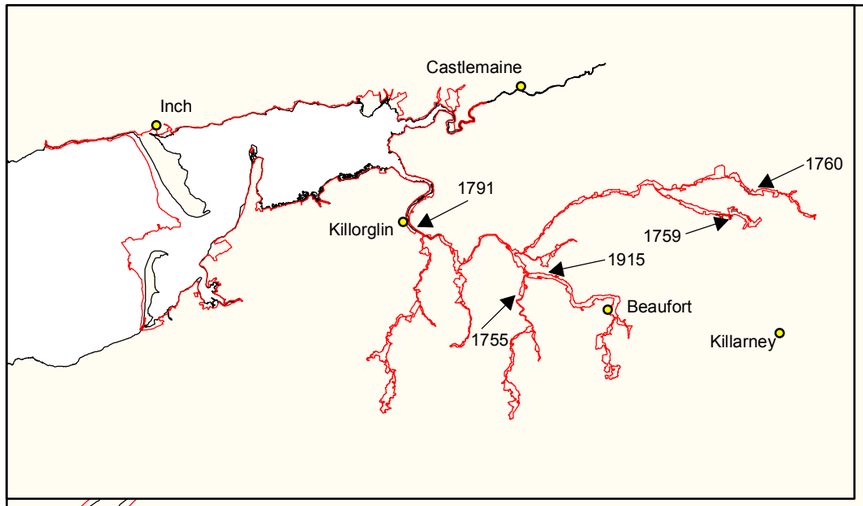
0 1 2 3 km

N

SITE CODE

SAC 000343
Version 1.11

Map Version 2
Date: March 2011



Legend

- SAC 000343
- OSi Discovery Series County Boundary
- 91E0 *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-padion, Alnion incanae, Salicion albae) Qualifying Interest
- 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- WD2 Mixed broadleaved / conifer woodland
- WN2 Oak-ash-hazel woodland

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MAP 7:
CASTLEMAINE HARBOUR CONSERVATION OBJECTIVES ALLUVIAL FORESTS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

CO. KERRY

0 0.5 1 1.5 2 km

N

SITE CODE

SAC 000343
Version 1.11

Map Version 2
Date: April 2011

Legend

- SPA 004029
- OSi Discovery Series County Boundary

Bird Use Zones

- Subtidal
- Intermittal
- Supratidal

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MAP 8: CASTLEMAINE HARBOUR CONSERVATION OBJECTIVES BIRD USE ZONES

Map to be read in conjunction with the NPWS Conservation Objectives Document.

COUNTY KERRY

0 1 2 3 km

N

SITE CODE

SPA 004029
Version 1.08

Map Version 2
Date: March 2011

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Department of
Arts, Heritage and the Gaeltacht

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Citation:
NPWS (2011) Conservation Objectives: Castlemaine Harbour SAC 000343 and Castlemaine Harbour SPA 004029. Version 2.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editors: Rebecca Jeffrey & Naomi Kingston

ISSN 2009-4086