

National Parks and Wildlife Service

Conservation Objectives Series

Mullet/Blacksod Bay Complex SAC 000470



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta

Department of
Arts, Heritage and the Gaeltacht



**National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,**

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie

E-mail: nature.conservation@ahg.gov.ie

Citation:

**NPWS (201) Conservation Objectives: Mullet/Blacksod Bay Complex SAC
000470. Version 1. National Parks and Wildlife Service, Department of Arts,
Heritage and the Gaeltacht.**

Series Editor: Rebecca Jeffrey

ISSN 2009-4086

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

000470	Mullet/Blacksod Bay Complex SAC
1140	Mudflats and sandflats not covered by seawater at low tide
1160	Large shallow inlets and bays
1170	Reefs
1310	Upland and other annuals colonising mud and sand
1355	Otter <i>Lutra lutra</i>
1395	Petalwort <i>Petalophyllum ralfsii</i>
2120	Shifting dunes along the shoreline with Cladonia (white dunes)
2130	Fixed coastal dunes with herbaceous vegetation (grey dunes)E
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
21A0	Machairs (* in Ireland)
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation
7230	Alkaline fens

Please note that this SAC overlaps with Blacksod Bay/Broadhaven SPA (004037), Termoncarragh Lake and Annagh Machair SPA (004093) and Mullet Peninsula SPA (004227). It adjoins West Connaught Coast SAC (002998). 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 :	1996
Title :	Biomar survey of Irish machair sites
Author :	Crawford, I.; Bleasdale, A.; Conaghan, J.
Series :	Irish Wildlife Manual No. 3
Year :	2007
Title :	Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents. Article 17 forms and supporting maps
Author :	NPWS
Series :	Unpublished report to NPWS
Year :	2008
Title :	Survey of sensitive subtidal benthic marine communities in Mullet/Blacksod Bay Complex SAC, Rutland Island and Sound SAC, Mulroy Bay SAC
Author :	MERC
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 :	National otter survey of Ireland 2010/12
Author :	Reid, N.; Hayden, B.; Lundy, M.G.; Pietravalle, S.; McDonald, R.A.; Montgomery, W.I.
Series :	Irish Wildlife Manual No. 76
Year :	2013
Title :	A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel
Author :	Roden, C.; Murphy, P.
Series :	Irish Wildlife Manual No. 70
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
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments
Author :	NPWS
Series :	Conservation assessments

Year : 2014
Title : Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author : Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series : Irish Wildlife Manual No. 79

Year : 2014
Title : Mullet/Blacksod Bay Complex SAC (site code: 470) Conservation objectives supporting document- coastal habitats V1
Author : NPWS
Series : Conservation objectives supporting document

Year : 2014
Title : Mullet/Blacksod Bay Complex SAC (site code: 470) Conservation objectives supporting document- marine habitats V1
Author : NPWS
Series : Conservation objectives supporting document

Other References

Year : 1982
Title : Otter survey of Ireland
Author : Chapman, P.J.; Chapman, L.L.
Series : Unpublished report to Vincent Wildlife Trust

Year : 1982
Title : Eutrophication of waters. Monitoring assessment and control
Author : OECD
Series : OECD, Paris

Year : 1991
Title : The spatial organization of otters (*Lutra lutra*) in Shetland
Author : Kruuk, H.; Moorhouse, A.
Series : J. Zool, 224: 41-57

Year : 1997
Title : The BioMar biotope viewer: a guide to marine habitats, fauna and flora in Britain and Ireland
Author : Picton, B.E.; Costello, M.J.
Series : Environmental Science Unit, Trinity College Dublin

Year : 1999
Title : Diet of otters (*Lutra lutra*) on Inishmore, Aran Islands, west coast of Ireland
Author : Kingston, S.; O'Connell, M.; Fairley, J.S.
Series : Biol & Environ Proc R Ir Acad B 99B:173-182

Year : 2000
Title : Colour in Irish lakes
Author : Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series : Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie. 27: 2620-2623

Year : 2006
Title : Otters - ecology, behaviour and conservation
Author : Kruuk, H.
Series : Oxford University Press

Year :	2006
Title :	The vegetation of Irish machair
Author :	Gaynor, K.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, vol 106B, No. 3: 311-321
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
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 :	2010
Title :	Otter tracking study of Roaringwater Bay
Author :	De Jongh, A.; O'Neill, L.
Series :	Unpublished draft report to NPWS
Year :	2010
Title :	Subtidal benthic investigations in Mullet/Blacksod Bay Complex cSAC (cSAC code: IE000470) and Blacksod Bay/Broadhaven SPA (site code: IE004037)
Author :	Aquafact
Series :	Unpublished report to the Marine Institute and NPWS
Year :	2010
Title :	Reef investigations in Blacksod Bay cSAC (site code: IE000470) Co. Mayo
Author :	Aquafact
Series :	Unpublished report to the Marine Institute and NPWS
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
Year :	2013
Title :	Benthic survey services framework. Blacksod Bay intertidal surveys 2009 & 2010
Author :	RPS
Series :	Unpublished report to the Marine Institute and NPWS
Year :	in prep.
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, A.
Series :	Unpublished report to NPWS
Year :	in prep.
Title :	Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes
Author :	Roden, C.; Murphy, P.
Series :	Unpublished report to NPWS

Spatial data sources

Year :	Interpolated 2014
Title :	1994 BioMar Survey; 2008 sensitive species survey; 2009, 2010 intertidal and subtidal surveys
GIS Operations :	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used to resolve any issues arising
Used For :	1140, 1170, marine community types (maps 3, 5 and 6)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. EPA WFD transitional waterbody data erased from extent. Expert opinion used as necessary to resolve any issues arising
Used For :	1160 (map 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 6)
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 (map 7)
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 :	2120, 2130, 2150, 21A0 (map 8)
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 :	2120, 2130, 2150, 21A0 (map 8)
Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3150 (map 9)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	Creation of an 80m buffer on marine side of high water mark (HWM); creation of a 10m buffer on terrestrial side of HWM; combination of 80m and 10m HWM buffer datasets; creation of a 10m buffer on terrestrial side of river banks data; creation of 20m buffer applied to canal centreline data. Datasets combined with the derived EPA WFD Waterbodies data. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising. Creation of 250m buffer on marine side of HWM to highlight potential commuting points
Used For :	1355 (map 10)
Year :	2014
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1395 (map 11)

Conservation Objectives for : Mullet/Blacksod Bay Complex SAC [000470]

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 Mullet/Blacksod Bay Complex 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 1,428ha
Community distribution	Hectares	Conserve the following community types in a natural condition: Mobile sand with <i>Bathyporeia guilliamsoniana</i> community; Sand with <i>Angulus tenuis</i> and <i>Pygospio elegans</i> community complex. See map 6	Based on intertidal surveys undertaken in 2009 and 2010 (RPS, 2013). See marine supporting document for further information

Conservation Objectives for : Mullet/Blacksod Bay Complex SAC [000470]

1160 Large shallow inlets and bays

To maintain the favourable conservation condition of Large shallow inlets and bays in Mullet/Blacksod Bay Complex 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 4	Habitat area was estimated as 11,169ha using OSI data and the Transitional Water Body area as defined under the Water Framework Directive
Community extent	Hectares	Maintain the extent of the <i>Zostera</i> - and maërl-dominated communities and <i>Serpula vermicularis</i> -dominated community complex, subject to natural processes. See map 6	Based on dive surveys undertaken in 2008 (MERC, 2008). See marine supporting document for further details
Community structure: shoot density	Shoots per m ²	Conserve the high quality of <i>Zostera</i> -dominated community, subject to natural processes	Based on diver observation and underwater viewer (MERC, 2008). See marine supporting document for further details
Community structure	Biological composition	Conserve the high quality of the Maërl dominated community, subject to natural processes	Based on diver observation (MERC, 2008). See marine supporting document for further details
Community structure	Biological composition	Conserve the high quality of the <i>Serpula vermicularis</i> -dominated community complex, subject to natural processes	Based on diver observation (MERC, 2008). See marine supporting document for further details
Community distribution	Hectares	Conserve the following community types in a natural condition: Sand with <i>Angulus tenuis</i> and <i>Pygospio elegans</i> community complex; Sand with <i>Gastrosaccus spinifer</i> community complex; Fine sand with <i>Angulus fabula</i> community complex; Intertidal reef community complex; Sheltered subtidal reef community complex and <i>Laminaria</i> -dominated community complex. See map 6	Based on a BioMar survey in 1994 (Picton and Costello, 1997), a sensitive species survey in 2008 (MERC, 2008) and intertidal and subtidal surveys in 2009 and 2010 (Aquafact, 2010; RPS, 2013). See marine supporting document for further details

Conservation Objectives for : Mullet/Blacksod Bay Complex SAC [000470]

1170 Reefs

To maintain the favourable conservation condition of Reefs in Mullet/Blacksod Bay Complex 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 5	Habitat area estimated as 1,531ha from a 1994 BioMar survey (Picton and Costello, 1996), 2009 intertidal and subtidal reef surveys (Aquafact, 2010) and a walkover survey in 2013
Distribution	Occurrence	The distribution of reefs remains stable, subject to natural processes. See map 5 for mapped distribution	Based on information from a 1994 BioMar survey (Picton and Costello, 1996), 2009 intertidal and subtidal reef surveys (Aquafact, 2010) and a walkover survey in 2013
Community extent	Hectares	Maintain the extent of the <i>Serpula vermicularis</i> -dominated community complex, subject to natural processes. See map 6	Based on dive surveys undertaken in 2008 (MERC, 2008). See marine supporting document for further details
Community structure	Biological composition	Conserve the high quality of the <i>Serpula vermicularis</i> -dominated community complex, subject to natural processes	Based on diver observation (MERC, 2008). See marine supporting document for further details
Community structure	Biological composition	Conserve the following community types in a natural condition: Intertidal reef community complex; Sheltered subtidal reef community; <i>Laminaria</i> -dominated community complex. See map 6	Reef mapping based on information from a 1994 BioMar survey (Picton and Costello, 1996), 2009 intertidal and subtidal reef surveys (Aquafact, 2010) and a walkover survey in 2013. See marine supporting document for further details

Conservation Objectives for : Mullet/Blacksod Bay Complex SAC [000470]

1310 Salicornia and other annuals colonising mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonising mud and sand in Mullet/Blacksod Bay Complex 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: Elly Harbour - 0.02ha. See map 7	Based on data from Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). Habitat recorded at one of the four sub-sites surveyed and mapped, giving a total estimated area of 0.02ha. NB further unsurveyed areas maybe present within the 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 7 for known distribution	Based on data from McCorry and Ryle (2009). <i>Salicornia</i> 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, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry and Ryle (2009). 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. At Elly Harbour there are signs of modification of the former saltmarsh structure such as drainage channels and old peat-cutting banks. 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). At Elly Harbour this habitat occurs in mosaic with other saltmarsh habitats. There are also notable successions to brackish and wet grassland vegetation communities around Leam Lough which increases the diversity of the site. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for 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 details
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the presence of species-poor communities with typical species including common glasswort (<i>Salicornia europaea</i>), common saltmarsh grass (<i>Puccinellia maritima</i>), sea aster (<i>Aster tripolium</i>) and annual sea-blite (<i>Suaeda maritima</i>)	Based on data from McCorry and Ryle (2009). Turf fucoids were recorded at all sub-sites. Saltmarsh flat-sedge (<i>Blasmus rufus</i>) was recorded at Doolough and Bunnahowen sub-sites and is also a species of local distinctiveness. See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	There is no record of common cordgrass (<i>Spartina anglica</i>) in the SAC and its establishment should be prevented	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details

Conservation Objectives for : Mullet/Blacksod Bay Complex SAC [000470]

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

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in Mullet/Blacksod Bay Complex 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. Doo Lough - 3.56ha, Cross Lough - 2.61ha, Aghleam - 3.85ha, Dooyork -0.14ha , Srah South - 2.23ha, Srah North - 1.63ha, Leam Lough -2.36ha, Termoncarragh Lough - 2.58ha. See map 8	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Habitat was mapped at eight sub-sites, giving a total estimated area of 18.95ha. 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 8 for known distribution	Based on data from Ryle et al. (2009) and Delaney et al. (2013). This habitat was recorded at all eight subsites. The shifting dunes at Aghleam are undergoing natural erosion. At Cross Lough the establishment of an equestrian centre has reduced the extent of this habitat. 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	Based on data from Ryle et al. (2009) and Delaney et al. (2013). 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. At Srah North, coastal protection measures in the form of fencing (access control and sand-trapping), marram planting and dune reconstruction using gabions and geotextile fabrics have been put in place. Sand and shingle extraction is known to occur at a number of locations throughout the Mullet sand dune sites. 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), Ryle et al. (2009) and Delaney et al. (2013). 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 Ryle et al. (2009) and 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 arenaria</i>) and/or lyme-grass (<i>Leymus arenarius</i>)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). The flora of mobile dunes in this SAC also includes sea bindweed (<i>Calystegia soldanella</i>), which has a scattered distribution along the north-west coast. 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) and 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. Creeping thistle (<i>Cirsium arvense</i>) was recorded in mobile dune at Cross Lough. See coastal habitats supporting document for further details

Conservation Objectives for : Mullet/Blacksod Bay Complex SAC [000470]

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 Mullet/Blacksod Bay Complex 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: Doo Lough - 46.35ha, Cross Lough - 184.74ha, Aghleam - 292.43ha, Dooyork - 3.73ha, Srah South - 9.10ha, Srah North - 5.99ha, Leam Lough - 170.63ha, Termoncarragh Lough - 224.11ha. See map 8	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). This habitat was recorded from all eight sub-sites, giving a total estimated area of 937.07ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 8 for known distribution	Based on data from Ryle et al. (2009) and Delaney et al. (2013). At Doo Lough there is some erosion of this habitat at the seaward edge and poaching by livestock has caused erosion at the fixed dune edge. At Aghleam the extent of the fixed dunes has been reduced due to overgrazing. At Cross Lough the establishment of an equestrian centre on the fixed dunes has led to a modification and reduction in extent of this habitat. 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	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. At Srah North, coastal protection measures in the form of fencing (access control and sand-trapping), marram planting and dune reconstruction using gabions and geotextile fabrics have been put in place. Sand and shingle extraction is known to occur a number of locations throughout the Mullet sand dune sites. 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) and Delaney et al. (2013). 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) Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward	Based on data from Ryle et al. (2009) and Delaney et al. (2013). All of the sub-sites are grazed to varying extents. At Doo Lough, sustainable grazing regimes have led to the creation and maintenance of a large area of species-rich turf. The positive impact of grazing is also seen in parts of Aghleam, Leam Lough and Cross Lough. Parts of Doo Lough are overgrazed as are Srah North, Aghleam, Leam Lough, Cross Lough and Termoncarragh. At some areas of Srah South, undergrazing is an issue. 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 Delaney et al. (2013)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details.
Vegetation composition: negative indicator species (including <i>Hippophae rhamnoides</i>)	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009) and 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. Common ragwort (<i>Senecio jacobaea</i>), creeping thistle (<i>Cirsium arvense</i>), perennial rye grass (<i>Lolium perenne</i>) and common nettle (<i>Urtica dioica</i>) were regularly recorded in the fixed dune habitat. New Zealand flax (<i>Phormium tenax</i>) was recorded at Leam Lough. 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) and Delaney et al. (2013). Within Mullet/Blacksod Complex SAC, the levels of grazing are such that prevents scrub from becoming dominant. See coastal habitats supporting document for further details

Conservation Objectives for : Mullet/Blacksod Bay Complex SAC [000470]

2150 Atlantic decalcified fixed dunes (*Calluno-Ulicetea*)

To maintain the favourable conservation condition of Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) in Mullet/Blacksod Bay Complex 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: Aghleam - 4.08ha, Termoncarragh Lough - 6.20ha. See map 8	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Habitat was mapped at two sub-sites, giving a total estimated area of 10.29ha. However, there is some doubt over the validity of the record of this habitat at Termoncarragh, based on a subsequent site visit by NPWS staff. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 8 for known distribution	Based on data from Ryle et al. (2009) and 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	Based on data from Ryle et al. (2009) and Delaney et al. (2013). 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) and Delaney et al. (2013). 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), Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation composition: sward height	Centimeters	Maintain structural variation within sward	Based on data from Gaynor (2008), Ryle et al. (2009) and 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 range of sub-communities with typical species listed in Delaney et al. (2013)	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Rarer species in this habitat include Autumn lady's tresses (<i>Spiranthes spiralis</i>), lesser butterfly orchid (<i>Platanthera bifolia</i>) and field gentian (<i>Gentianella campestris</i>). 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) and 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
Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details

Conservation Objectives for : Mullet/Blacksod Bay Complex SAC [000470]

21A0 Machairs (* in Ireland)

To restore the favourable conservation condition of Machairs in Mullet/Blacksod Bay Complex 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: Doo Lough - 59.52ha, Cross Lough - 60.73ha, Aghleam - 138.59ha, Dooyork - 31.55ha, Srah South - 15.50ha, Srah North - 21.44ha, Leam Lough - 45.55ha, Termoncarragh Lough - 222.76ha. See map 8	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Eight sub-sites were mapped, giving a total estimated area of 595.64ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 8 for known distribution	The largest machair site is at Termoncarragh Lough. 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	Based on data from Ryle et al. (2009) and Delaney et al. (2013). 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 works	Maintain natural hydrological regime	Based on data from Ryle et al. (2009), Delaney et al. (2013), Crawford et al. (1996) and Gaynor (2006). 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) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 20% of machair habitat, subject to natural processes	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation structure: sward height	Centimeters	Maintain structural variation within sward	Based on data from Ryle et al. (2009) and 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 range of sub-communities with typical species listed in Delaney et al. (2013)	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Notable species include the Annex II liverwort species petalwort (<i>Petalophyllum ralfsii</i>). See conservation objective for petalwort (1395) and 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) and 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. See coastal habitats supporting document for further details
Vegetation composition: bryophytes	Percentage cover	Should always be at least an occasional component of the vegetation	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details

Conservation Objectives for : Mullet/Blacksod Bay Complex SAC [000470]

3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation

To maintain the favourable conservation condition of Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation in Mullet/Blacksod Bay Complex 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. See map 9	The selection of this SAC for habitat 3150 was based on data for Cross Lough. Little is known about the characteristics or ecology of this lake habitat type in Ireland. A working hypothesis of Irish lake habitats defines it as pondweed (<i>Potamogeton</i> spp.) dominated with circumneutral or higher pH, found in low-lying, large, naturally more productive catchments. It is likely that the coastal form inter-grades with or is related to lake habitats 3130 and 3140. Few, if any, Irish lakes are naturally "eutrophic" as defined using total phosphorus, chlorophyll <i>a</i> and water transparency (OECD, 1982). Lakes with habitat 3150 are considered to be associated with mesotrophic conditions as defined by OECD (1982). Two measures of extent should be used: 1. the area of the lake itself and 2. the extent of the vegetation communities/zones that typify the habitat. For further information see NPWS (2013) and the lake habitats supporting document (O Connor, in prep.)
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 9	As noted above, the habitat is considered to occur in Cross Lough. Cross Lough appears to be influenced by the sea, through spray, wind-borne materials and/or subsurface flows, and has a high chloride content. It is likely that this maritime influence increases the lake's productivity
Vegetation composition: typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant species, see Article 17 habitat assessment for 3150 (NPWS, 2013) and the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.). The phytoplankton of Cross Lough is noted as being dominated by cyanobacteria. Pondweeds (<i>Potamogeton praelongus</i> , <i>P. filiformis</i> and <i>P. pectinatus</i>), <i>Littorella uniflora</i> and <i>Myriophyllum spicatum</i> have been recorded in Cross Lough
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	Very little is known about the characteristic zonation of lake habitat 3150. Like the coastal forms of the hard water lake habitat (3140), coastal 3150 lakes may have compressed zonation (see Roden and Murphy, in prep.)
Vegetation distribution: maximum depth	Metres	Maintain maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. An indicative target of >6m has been developed for hard water lakes (3140) (see Roden and Murphy, 2013; in prep.). Indicative targets will be developed for the other lake habitats with time. Coastal lakes with 3150 may have naturally shallow maximum vegetation depth, as for the coastal form of the hard water habitat. Colonisation tends to be shallower in the machair form of hard water lakes, owing to cloudier water and shallower lake depth (Roden and Murphy, in prep.). For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)

Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that habitat 3150 is found on fine (silt and mud), neutral to alkaline, and more nutrient-rich substrates. Substratum particle size is likely to vary with depth and along the shoreline within a single lake. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Water quality: transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A target has been set for hard water lakes (3140); however, targets have yet to be established for the remaining lake habitats. Habitat 3150 is associated with clear water; however, coastal examples such as Cross Lough may have naturally lower transparency owing to the influence of the sea producing greater phytoplankton biomass. The OECD fixed boundary system set transparency targets for mesotrophic lakes of 3-6m annual mean Secchi disk depth, and 1.5-3m annual minimum Secchi disk depth. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Water quality: nutrients	µg/l phosphorus; mg/l nitrogen	Maintain the concentration of nutrients in the water column at sufficiently low levels to support the habitat and its typical species	As a relatively-productive habitat, mesotrophic and Water Framework Directive 'good' status targets apply. Where a lake has nutrient concentrations that are lower than these targets, there should be no decline within class, i.e. no upward trend in nutrient concentrations. For the lake habitat 3150, annual average TP concentration should be ≤ 20µg/l TP, average annual total ammonia concentration should be ≤ 0.065mg/l N and annual 95th percentile for total ammonia should be ≤ 0.140mg/l N. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.). See also the European Communities Environmental Objectives (Surface Waters) Regulations 2009

Water quality: phytoplankton biomass	µg/l Chlorophyll <i>a</i>	Maintain appropriate water quality to support the habitat, including good chlorophyll <i>a</i> status	Mesotrophic and Water Framework Directive 'good' status targets apply to habitat 3150. Where a lake has a chlorophyll <i>a</i> concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll <i>a</i> concentration must be <10µg/l. The annual average chlorophyll <i>a</i> concentration should be 2.5-8.0µg/l and the annual peak chlorophyll <i>a</i> concentration should be 8.0-25.0µg/l (OECD, 1982). For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.). See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including good phytoplankton composition status	The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, habitat 3150 is considered to require WFD good status. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/ absent attached algal biomass (<5% cover) and good phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in habitat 3150 should, ideally therefore, be trace/absent (<5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, habitat 3150 is considered to require good phytobenthos status. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain good macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for the lake habitat. The EPA monitors macrophyte status for Water Framework Directive purposes using the 'Free Index'. The target for habitat 3150 is good status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥ 0.68, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Acidification status	pH units; mg/l-1	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	The specific requirements of habitat 3150, in terms of water and sediment pH, alkalinity and cation concentration, have not been fully determined. Acidification is not considered a threat to habitat 3150, however eutrophication can lead to at least temporary increases in pH to toxic levels (>9/9.5 pH units). Maximum pH should be <9.0 pH units, in line with the surface water standards. See The European Communities Environmental Objectives (Surface Waters) Regulations 2009. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)

Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decreases light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free, et al., 2000) and 33mg/l PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be <50mg/l PtCo. For further information see the lake habitats supporting document (O Connor, in prep.)
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Fringing habitat : area	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3150	3150 lakes typically have well-developed reedswamp, fen and/or marsh communities around much of their shoreline. Wet woodland would have surrounded much of their shoreline in the past and has survived or re-colonised patches of many 3150 lake shores. These fringing habitats intergrade with and support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species richness than the lake habitats themselves. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)

Conservation Objectives for : Mullet/Blacksod Bay Complex SAC [000470]

7230 Alkaline fens

To maintain the favourable conservation condition of Alkaline fens in Mullet/Blacksod Bay Complex 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	The full extent of this habitat within the SAC is currently unknown. The main area described is to the southwest of Termoncarragh Lake; however, other areas are known to occur. This habitat is found in mosaic with, and transitional to, other habitat types including saltmarsh and sand dunes (Crawford et al., 1996; McCorry and Ryle, 2009; Ryle et al., 2009; Delaney et al., 2013; NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	Full distribution of this habitat in this SAC is currently unknown- see note above
Hydrological regime	Metres	Appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat
Peat formation	Flood duration	Active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time (Jim Ryan, pers. comm.)
Water quality: nutrients	Water chemistry measures	Appropriate water quality to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus with the latter tending to be the limiting nutrient
Vegetation composition: typical species	Percentage	Maintain vegetation cover of typical species including brown mosses and vascular plants	Species recorded at Termoncarragh include jointed rush (<i>Juncus articulatus</i>), glaucous sedge (<i>Carex flacca</i>), few-flowered spike-rush (<i>Eleocharis quinqueflora</i>), common spike-rush (<i>E. palustris</i>), common butterwort (<i>Pinguicula vulgaris</i>) and lesser clubmoss (<i>Selaginella selaginoides</i>). Marsh helloborine (<i>Epipactis palustris</i>) has also been recorded here. Saline influences are demonstrated by the presence of species such as sea-milkwort (<i>Glaux maritima</i>) and sea arrowgrass (<i>Triglochin maritimum</i>) (NPWS internal files)
Vegetation composition: trees and shrubs	Percentage cover in local vicinity	Cover of scattered native trees and shrubs less than 10%	Scrub and trees will tend to invade if fen conditions become drier. Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)
Physical structure: disturbed bare ground	Percentage cover at a representative number of monitoring stops and in local vicinity	Cover of disturbed bare ground less than 10%. Where tufa is present, disturbed bare ground less than 1%	While grazing may be appropriate in this habitat, excessive area of disturbed bare ground may develop due to unsuitable grazing regimes. Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)
Physical structure: drainage	Percentage cover in local vicinity	Area showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%	Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)

Conservation Objectives for : Mullet/Blacksod Bay Complex SAC [000470]

1355 Otter *Lutra lutra*

To maintain the favourable conservation condition of Otter in Mullet/Blacksod Bay Complex 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 93.6% (Reid et al., 2013)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 168.7ha	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 929.6ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (NPWS, 2007; Kruuk, 2006)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 31.0km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 87.7ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (NPWS, 2007)
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; Reid et al., 2013) and wrasse and rockling in coastal waters (Kingston et al., 1999)
Barriers to connectivity	Number	No significant increase. For guidance, see map 10	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

Conservation Objectives for : Mullet/Blacksod Bay Complex SAC [000470]

1395 Petalwort *Petalophyllum ralfsii*


To maintain the favourable conservation condition of Petalwort in Mullet/Blacksod Bay Complex 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 11 for the two recorded locations	There are currently two known sub-populations in the SAC: (8a) Doolough machair and (8b) Dooyork machair. The population at Dooyork machair has not been seen since 1998. Data from unpublished NPWS surveys
Population size	Number of individuals	No decline. Current known population at Doolough machair estimated c.33 thalli; at Dooyork machair estimated to be c.3 thalli. Total c.36 thalli	Counts of thalli: for Doolough machair- from mean number of thalli recorded by Lockhart in 1999 (20 thalli); Holyoak in 1999 (77 thalli) and Lockhart in 2006 (3 thalli) = 33.33 thalli; for Dooyork machair- from mean number of thalli recorded by Lockhart in 1998 (6 thalli) and Lockhart in 1999 (0 thalli) = 3 thalli. Total number of thalli = 36.33 (c.36 thalli)
Area of suitable habitat	Hectares	No decline. Area of suitable habitat at Doolough machair and Dooyork machair currently unknown, but thought to be very small. Total estimated to be c.0.0005ha	The extent of suitable habitat at Doolough machair and at Dooyork machair has not been accurately measured using GPS, but is known to be very small (c.0.5m ² and 4m ² respectively)
Hydrological conditions: soil moisture	Occurrence of damp soil conditions	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 sand. Based on Campbell (2013)
Vegetation: open structure	Height and percentage cover of vegetation	Maintain and enhance open, low vegetation, with a high percentage cover of bryophytes (small acrocarps and liverwort turf) and bare ground	<i>Petalophyllum ralfsii</i> grows in compacted, sandy ground, maintained by rabbit (<i>Oryctolagus cuniculus</i>) and cattle grazing. Recorded at Doolough machair on tightly cropped turf on sides of low sandhills at the highest part of the plain, above a flushed calcareous slope to the south-east (by Holyoak in 1999; Lockhart in 2006); recorded at Dooyork machair by Lockhart in 1998 on damp flats between low sandhills, which is unusual for <i>P. ralfsii</i> ; not refound during a visit by Lockhart in 1999



Legend

 Mullet/Blacksod Bay Complex SAC 000470

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

**MAP 1:
 MULLET/BLACKSOD BAY
 COMPLEX SAC
 CONSERVATION OBJECTIVES
 SAC DESIGNATION**

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

SITE CODE:
 SAC 000470; version 3.01. CO. MAYO

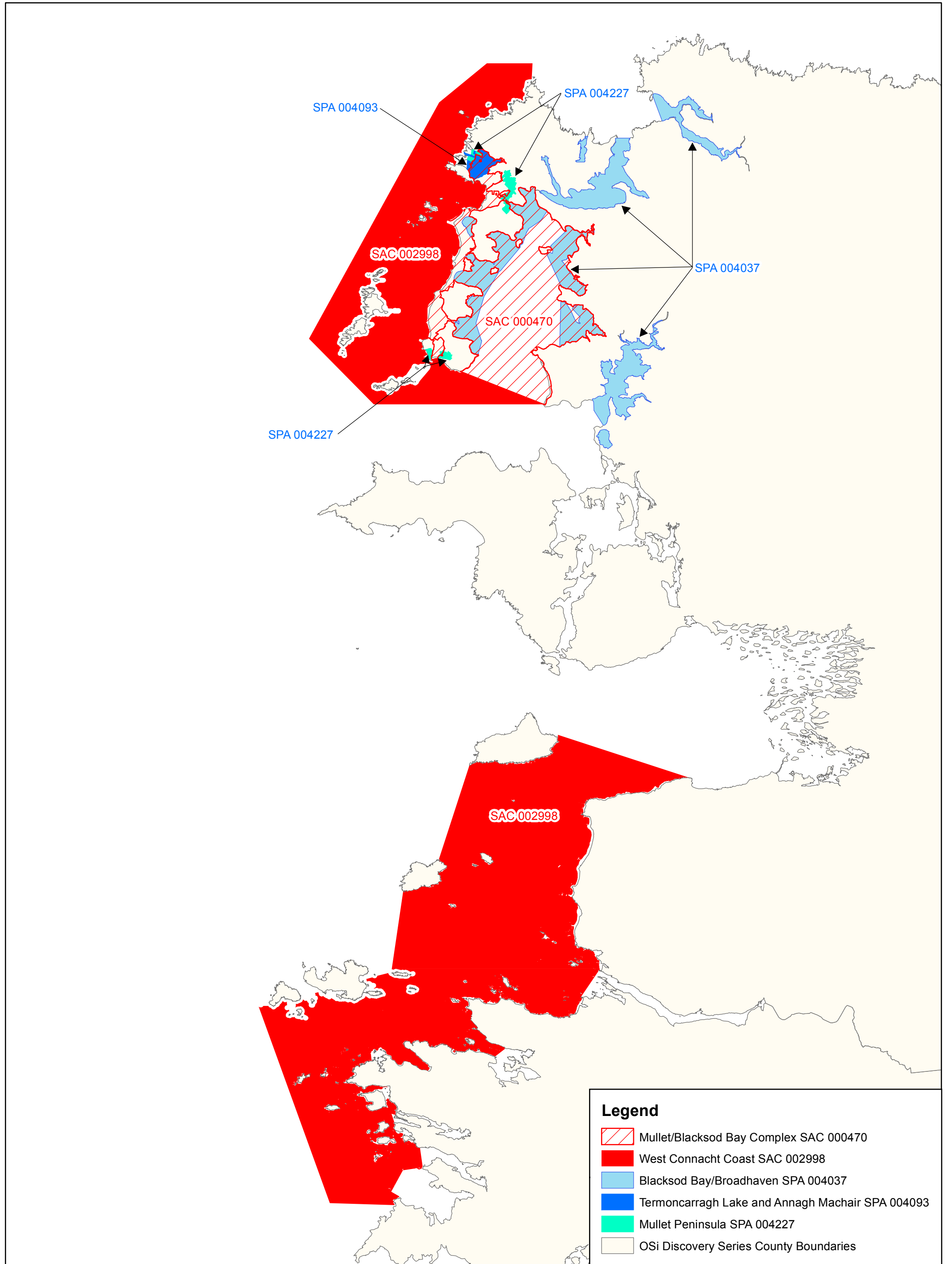


The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Ordnance Survey of Ireland Licence No EN 0059214. © Ordnance Survey of Ireland Government of Ireland







Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithníthe a déanamh ar theorainneacha na gceantar comharthaíthe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann



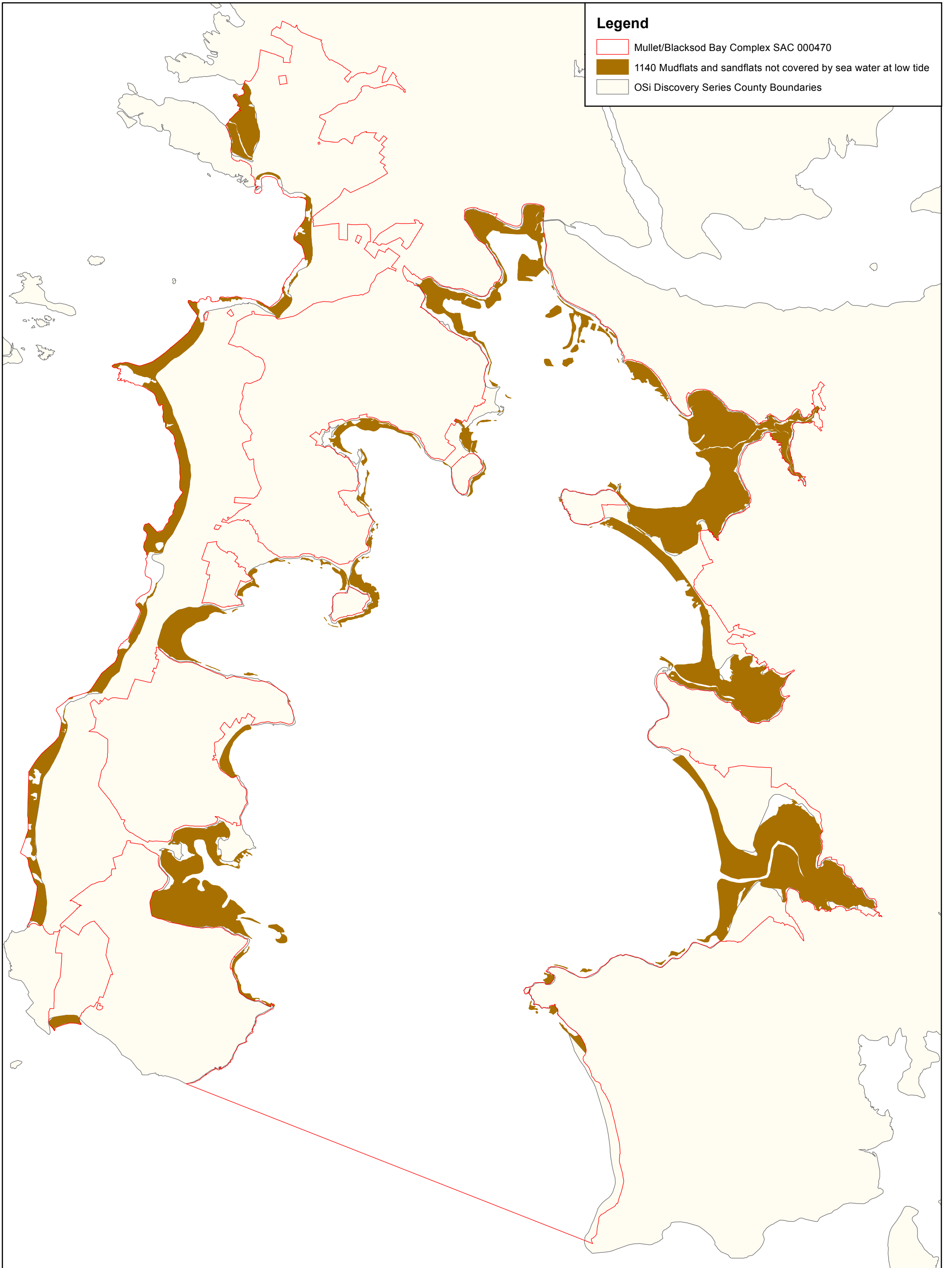
Map Version 1
 Date: Dec 2014



Legend

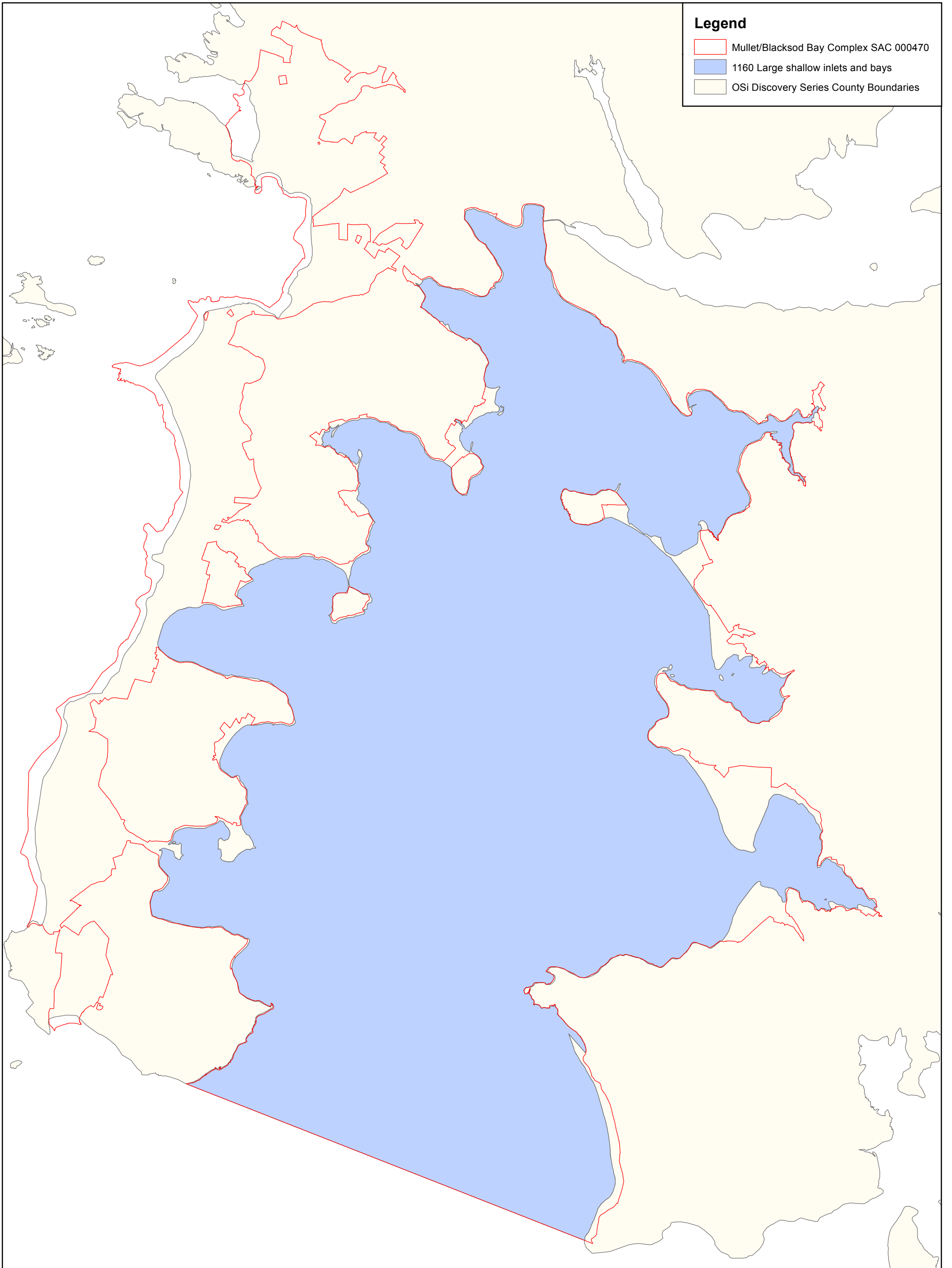
-  Mullet/Blacksod Bay Complex SAC 000470
-  West Connacht Coast SAC 002998
-  Blacksod Bay/Broadhaven SPA 004037
-  Termoncarragh Lake and Annagh Machair SPA 004093
-  Mullet Peninsula SPA 004227
-  OSi Discovery Series County Boundaries





Legend

- Mullet/Blacksod Bay Complex SAC 000470
- 1140 Mudflats and sandflats not covered by sea water at low tide
- OSi Discovery Series County Boundaries



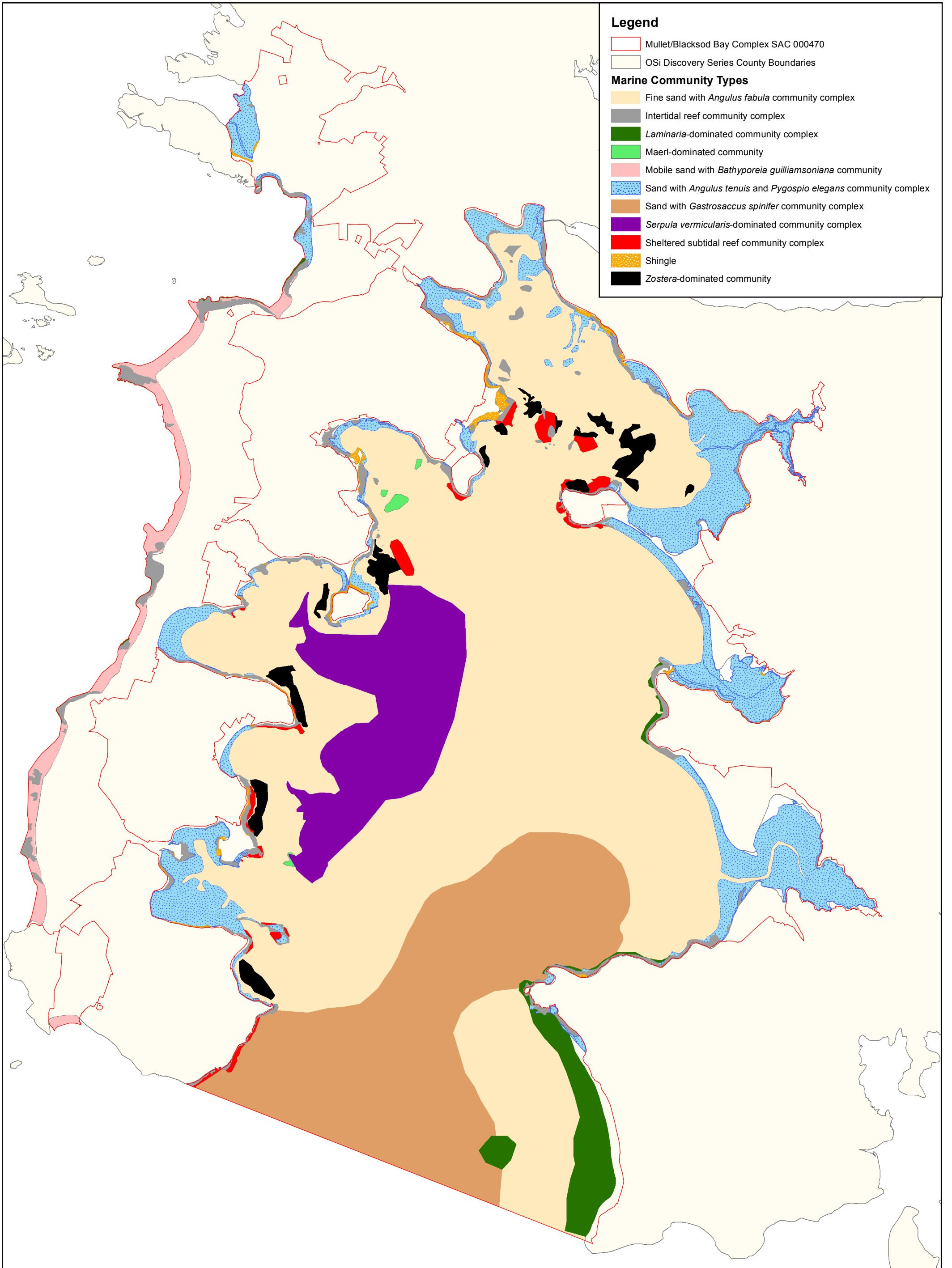
Legend

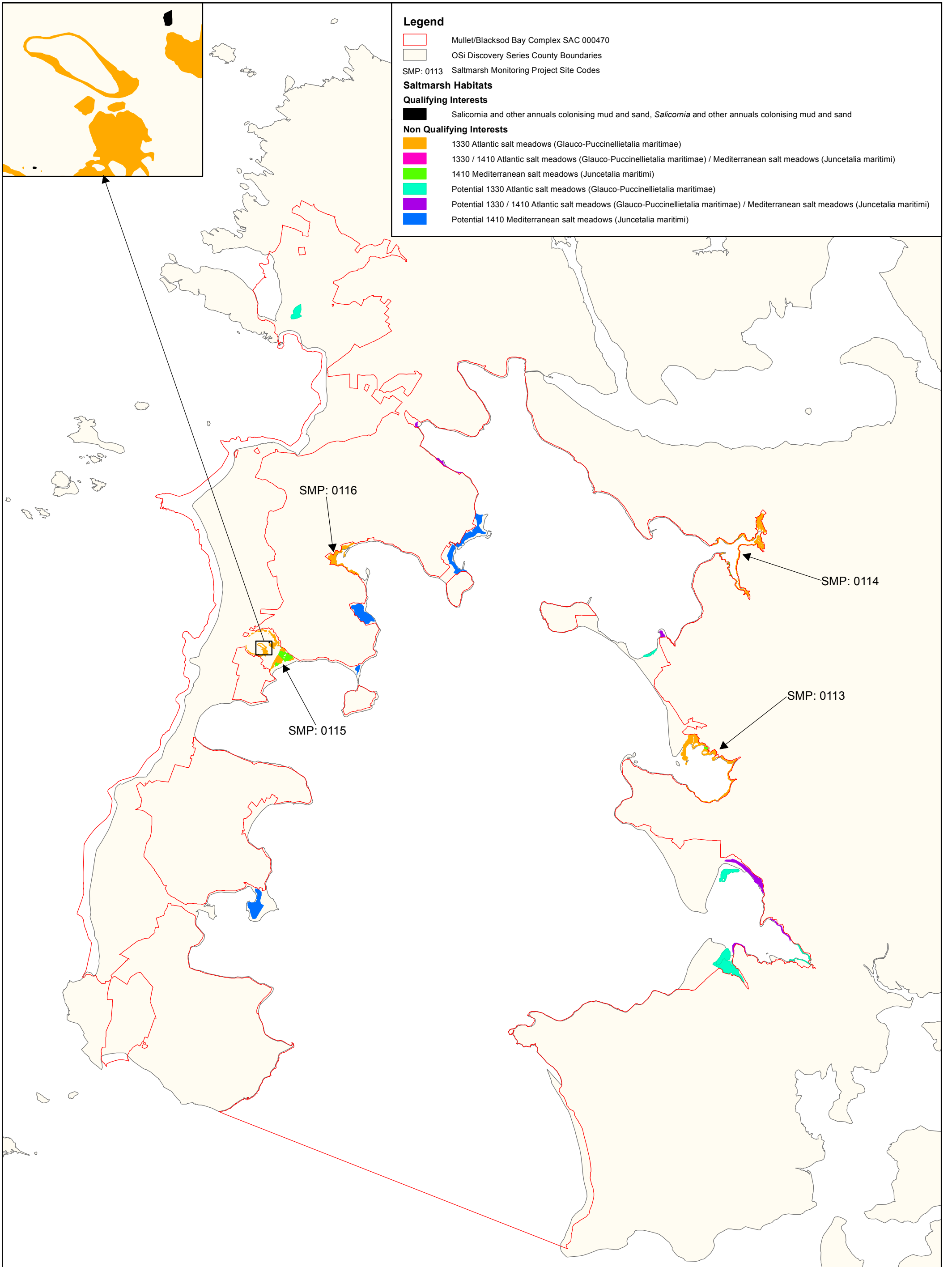
- Mullet/Blacksod Bay Complex SAC 000470
- 1160 Large shallow inlets and bays
- OSi Discovery Series County Boundaries

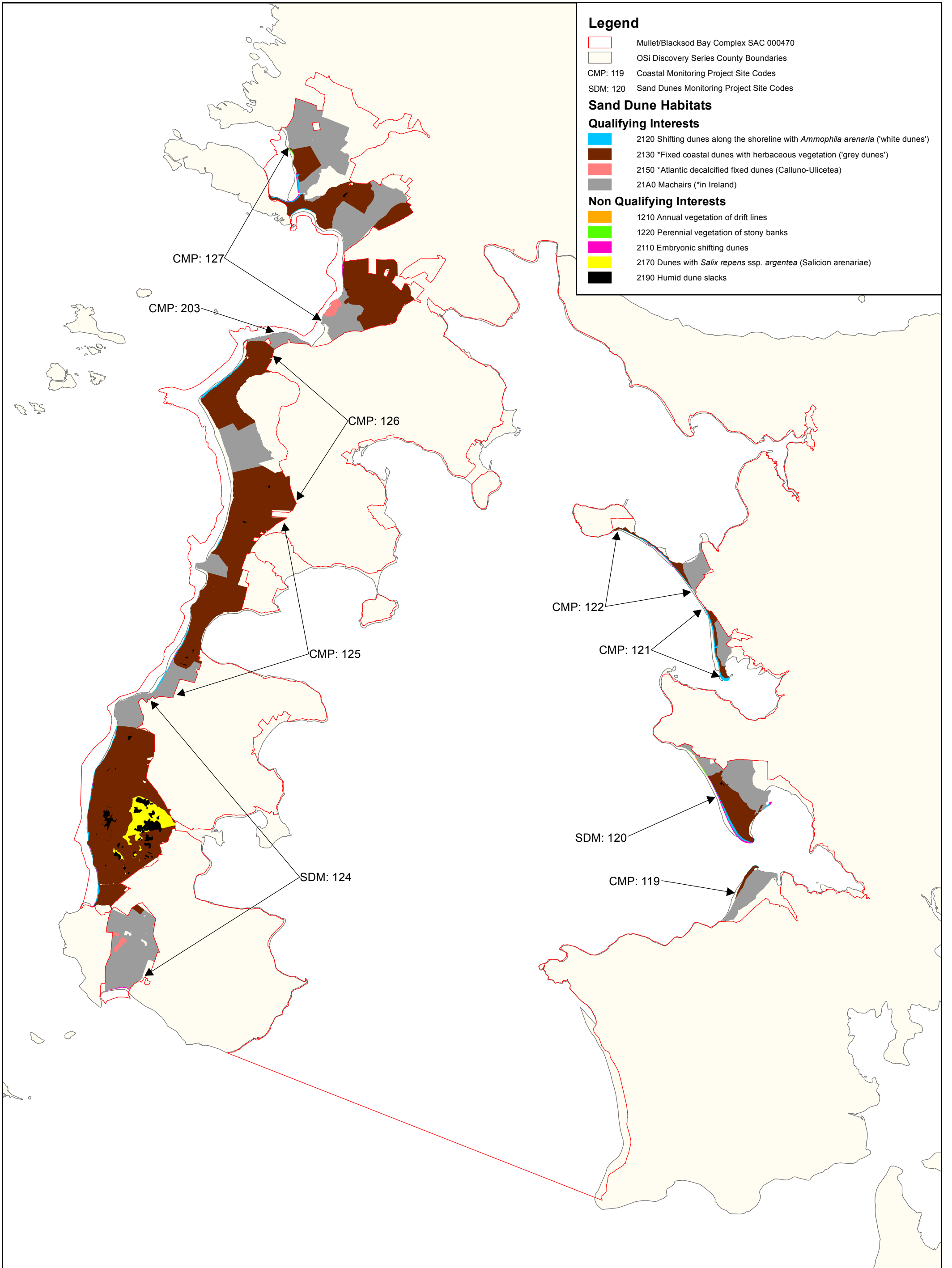


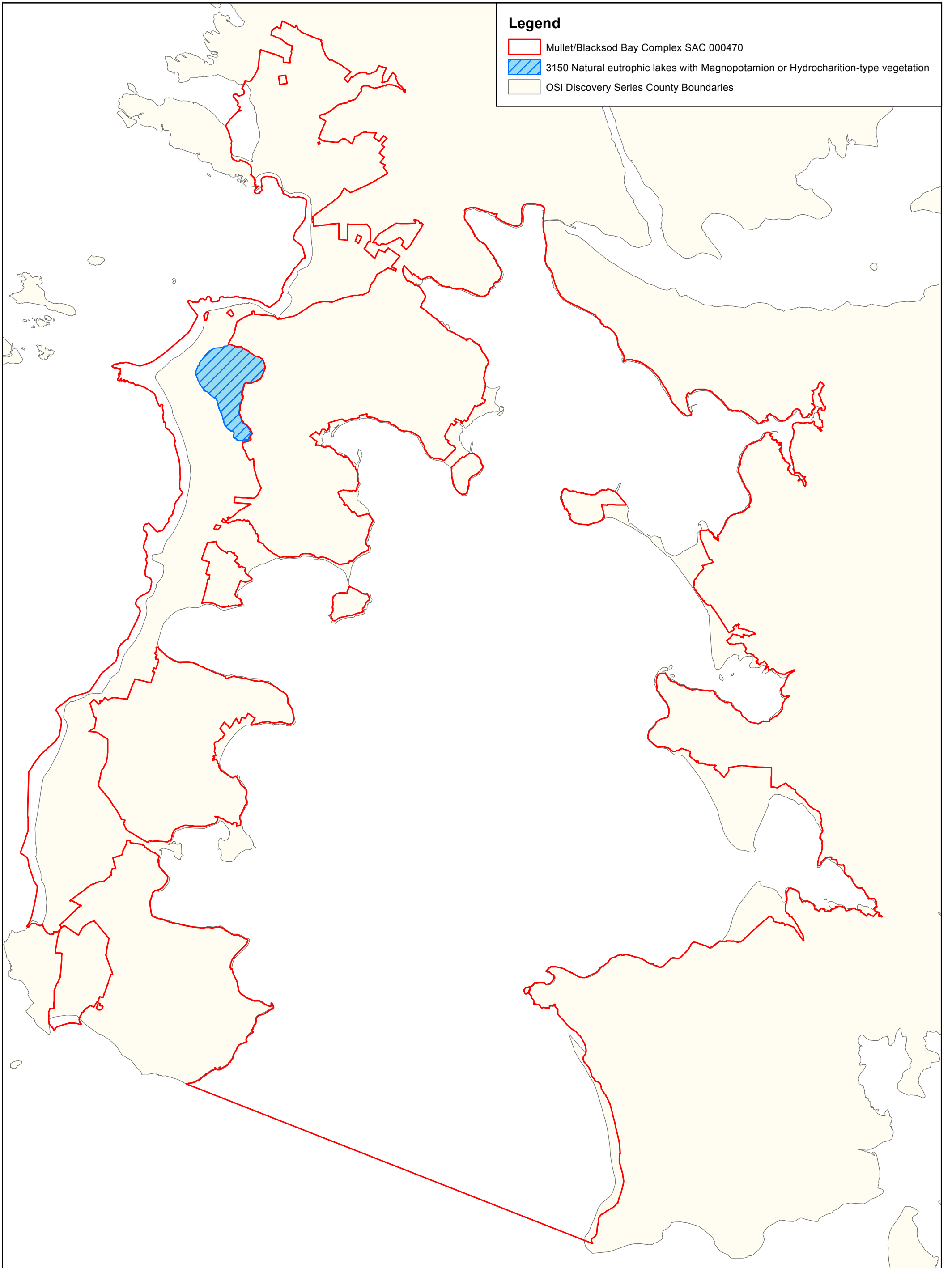
Legend

- Mullet/Blacksod Bay Complex SAC 000470
- 1170 Reefs
- OSi Discovery Series County Boundaries



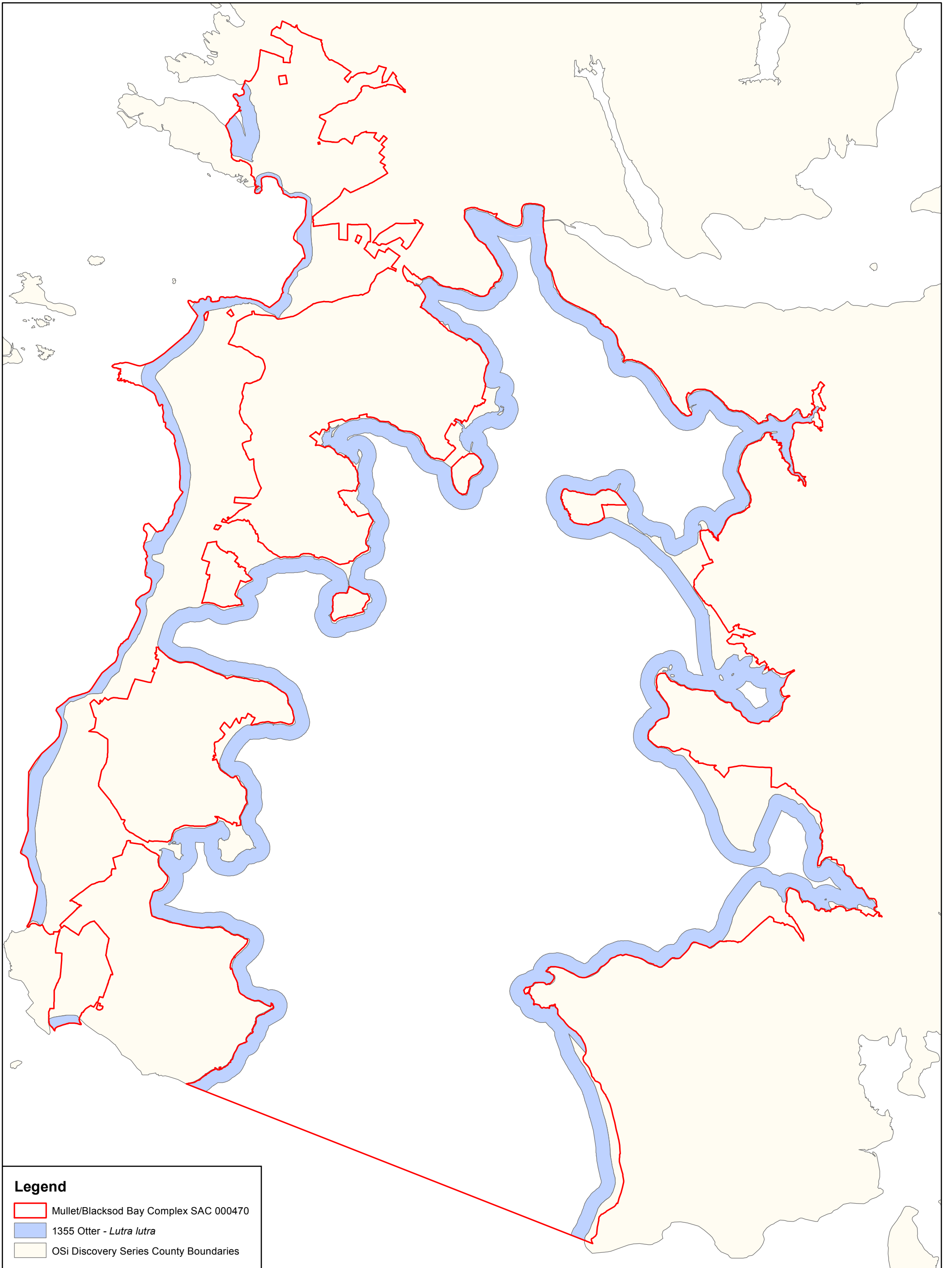






Legend

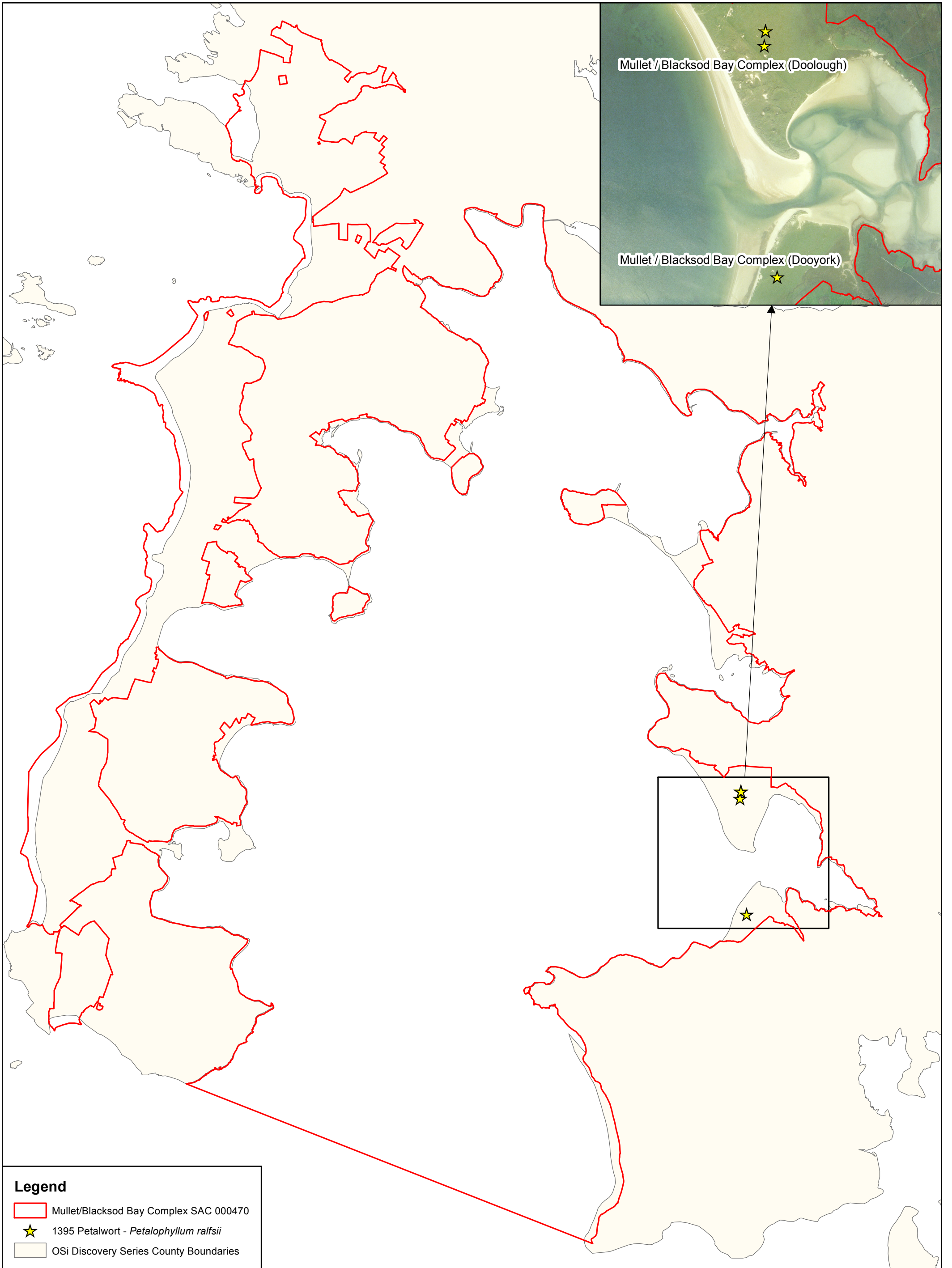
- Mullet/Blacksod Bay Complex SAC 000470
- 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation
- OSi Discovery Series County Boundaries



Legend

- Mullet/Blacksod Bay Complex SAC 000470
- 1355 Otter - *Lutra lutra*
- OSi Discovery Series County Boundaries





Legend

- Mullet/Blacksod Bay Complex SAC 000470
- ★ 1395 Petalwort - *Petalophyllum ralfsii*
- OSi Discovery Series County Boundaries