July 2018

Appropriate Assessment Stage 1

Screening Report

Port of Waterford Master Plan

Port of Waterford Company

Co. Waterford

MALONE O'REGAN ENVIRONMENTAL

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1 INTRODUCTION

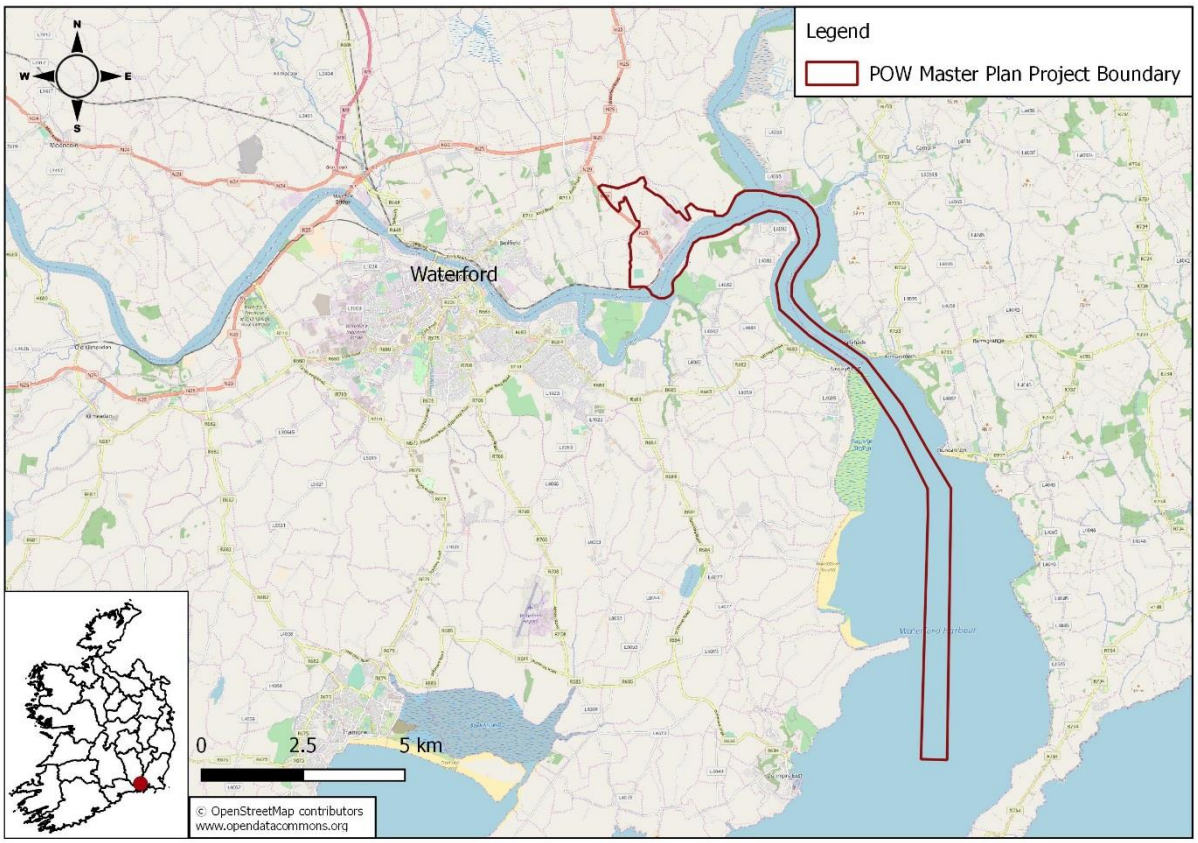
1.2 Background

The Port of Waterford (POW) is currently developing a 25 year Master Plan that will provide guidance and strategic context for future developments at the Port.

Malone O'Regan Environmental (MOR) were commissioned by POW, to undertake an Appropriate Assessment Screening Report to assess the potential impacts, if any, of the proposed POW Master Plan and associated work on nearby sites with European conservation designations (i.e. Natura 2000 sites).

The location and boundary of the Master Plan, encompassing all proposed Master Plan projects are shown in Figure 1.

Figure 1: Site Location



The purpose of this assessment was to determine the appropriateness, or otherwise, of the proposed works in the context of the conservation objectives of Natura 2000 sites.

1.3 Regulatory Context

This Appropriate Assessment Screening Report was prepared in compliance with the following legislation:

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and on Wild Flora and Fauna better known as "The Habitats Directive" which provides the framework for legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/EEC as amended 2009/149/EC) (better known as "The Birds Directive").

Article 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect Natura 2000 sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment (now termed Natura Impact Statement):

> *"Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implication for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. First, the project should aim to avoid any negative impacts on European sites by identifying possible impacts early in the planning stage, and designing the project in order to avoid such impacts. Second, mitigation measures should be applied, if necessary, during the AA process to the point where no adverse impacts on the site(s) remain. If the project is still likely to result in adverse effects, and no further practicable mitigation is possible, it is rejected. If no alternative solutions are identified and the project is required for imperative reasons of overriding public interest (IROPI test) under Article 6 (4) of the Habitats Directive, then compensation measures are required for any remaining adverse effects.

1.4 Stages of the Appropriate Assessment

This Appropriate Assessment Screening Report has been undertaken in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (EC 2001) and the European Commission Guidance 'Managing Natura 2000 Sites'. The Guidance for Planning Authorities issued by the Department of Environment, Heritage and Local Government (DOEHLG, December 2009) was also adhered to.

There are four distinct stages to undertaking an AA as outlined in the current EU and DOEHLG guidance:

1. Appropriate Assessment Screening;
2. Appropriate Assessment;
3. Assessment of Alternatives in cases where significant impact cannot be prevented; and,
4. Where no alternatives exist, an assessment of compensatory issues in the case of projects or plans which can be considered to be necessary for imperative reasons of overriding public interest (IROPI).

This Report comprises a Stage 1 Screening Report, which seeks to determine whether the subject site will, on its own or in combination with other plans/projects have a significant effect on Natura 2000 sites within a defined radius of the subject site.

2 SCREENING FOR APPROPRIATE ASSESSMENT

Screening determines whether Appropriate Assessment is necessary by examining:

1. Whether a plan or project can be excluded from AA requirements because it is directly connected with or necessary to the management of a Natura 2000 site; and,
2. Whether the project will have a potentially significant effect on a Natura 2000 site, either alone or in combination with other projects or plans, in view of the site's conservation objectives.

Screening involves the following:

i) Description of a plan or project;

ii) Identification of relevant Natura 2000 sites, and compilation of information on their qualifying interests and conservation objectives;

iii) Assessment of likely effects – direct, indirect and cumulative – undertaken on the basis of available information as a desk study or field survey or primary research as necessary; and,

iv) Screening Statement with conclusions.

2.2 Desk Based Studies

A desk-based review of information sources was completed, which included the following sources of information:

- The National Parks and Wildlife Service (NPWS) website was consulted to obtain the most up to date detail on conservation objectives for the Natura 2000 sites relevant to this assessment (National Parks and Wildlife Service, 2018);
- The National Biodiversity Data Centre (NBDC) website was consulted with regard to species distributions (National Biodiveristy Data Centre, 2018); and,
- The EPA Envision website was consulted to obtain details about watercourses in the vicinity of the Site (http://gis.epa.ie/Envision/) (EPA, 2018).

3 DESCRIPTION OF THE PROJECT

3.2 Overview of the Port of Waterford

POW is designated as a Port of National Significance (Tier 2) within the terms of the National Port's Policy (Department of Transport, 2013) and is a comprehensive port on the Ten-T Network. POW is Ireland's closest multi-model Port to mainland Europe and enjoys excellent transport links with Ireland's major cities.

POW has been a hub for shipping to and from the southeast of Ireland for over 1100 years. POW, originally known as Waterford Harbour Commissioners, was established more than 200 years ago in 1816.

POW operates with a focus on bulk, general cargoes and container handling through its licenced stevedores. The main centre of operations is Belview Port on the River Suir ca. 5km downstream of Waterford City.

Belview Port currently handles over 1 million tonnes of bulk products (predominately agri-related) together with another 100k+ tonnes of break bulk (predominately timber, steel and project cargoes). In addition, POW handles 40k TEU[1] container/ Lo-Lo[2] traffic annually with a view to expanding the Lo-Lo service offering at the Port in the coming years.

POW is also a member of Cruise Ireland and welcomes many cruise ships to Ireland's South East region each year.

3.3 Site Context and Description

The proposed POW Master Plan boundary is situated along a stretch of the River Suir and the River Barrow, which drain into Waterford Harbour. These waterbodies intersect three counties – Co. Waterford, Co. Kilkenny and Co. Wexford.

The Master Plan boundary extends ca. 3.5km east of Waterford City, Co. Waterford. Part of this area is located within the industrial landscape of the Belview Port and part within the River Suir, River Barrow, and the Waterford Estuary and Harbour. The POW Master Plan and associated projects are bordered by multiple Water Framework Directive (WFD) Catchments including: Suir, Nore, Barrow, Colligan-Mahon, and Ballyteigue Bannow. The placement of dredged material at sea is part of ongoing works at the port and under annual review by the POW and does not form part of Appropriate Assessment.

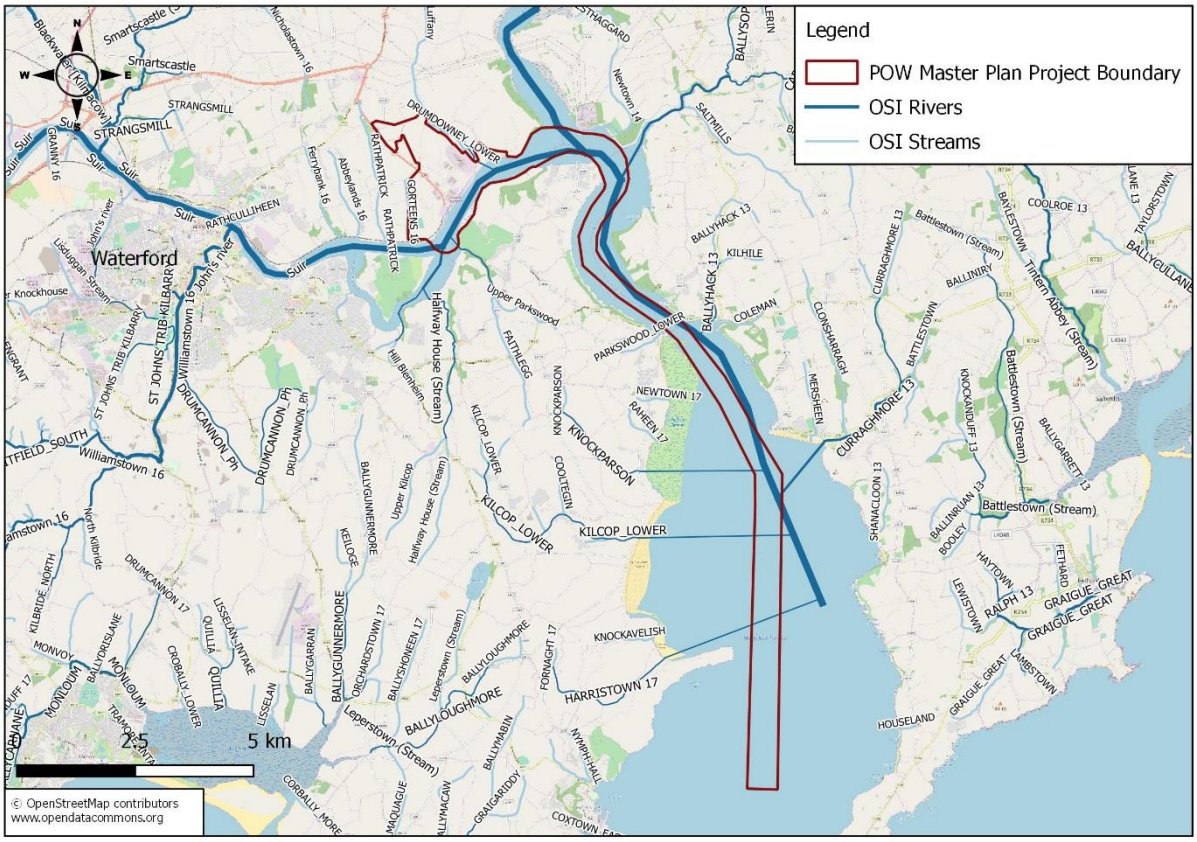
The River Suir, the River Barrow and Waterford Harbour are the primary hydrological feature of note across the POW Master Plan. The River Barrow is ca. 1.8km east of Belview Port. The River Suir, which is a designated Special Area of Conservation (SAC) flows in a north easterly direction, where it joins the River Barrow which is also an SAC. The River Barrow flows in a south easterly direction, eventually discharging into Waterford Harbour.

There are many rivers and streams that are tributaries of the River Suir, and drain into this river within the proposed POW Master Plan Boundary including; Ferrybank 16, Abbeylands 16, Rathpatrick rathpatrick, Gorteens 16, Drumdowney lower, Halfway house, and Upper parks wood (EPA, 2018). Some of these waterbodies have been identified and protected as WFD River Water Bodies that intersect with the River Suir SAC and River Barrow and River Nore SAC Conservation Objective Habitats and Species under the EU Habitats Directive and for the EU Water Framework Directive. These waterbodies include; Ballyhack 13, Parkswood lower, Newtown 17, Raheen 17, Kilcop lower, Knockavelish, and Harristown 17.

The location of the key surface water features in the vicinity of the POW Master Plan are illustrated in Figure 2.

[1] Twenty foot equivalent units, describing port throughput capacity.
[2] LO-LO (LIFT ON/LIFT OFF) A type of vessel that allows cargo to be loaded or unloaded by either ship or shore cranes.

Figure 2: Watercourses in the Vicinity of the Site



3.4 Master Plan

The POW Master Plan will provide a physical framework for the sustainable development of the Port, describing the strategic intentions necessary to improve overall Port performance and illustrating a clear vision of future Port operations.

Development of this 25-year Master Plan is considered critical to increase the commercial success and sustainability of the Port. The Master Plan will set out the main infrastructural developments envisaged to facilitate trade in the Region for the next 25 years.

The key objectives of the Master Plan will be as follows:

1. To reduce dredging requirements at the Port
2. To increase navigational safety and access to the Port
3. To provide additional capacity at the Port
4. To facilitate the development of new shore side berthing provisions and facilities

A range of both shore and marine based projects will be included in the Master Plan to achieve these objectives. The area that will be covered by the Master Plan is shown Figure 3 and Appendix A.

Figure 3: Overall POW Masterplan and Site Boundary

3.4.1 Proposed Development

The proposed development is located within the Port of Waterford, and will comprise of the multiple projects as listed and described in Table 1. The location of the proposed developments are illustrated in Figure 3 and Appendix A.

Table 1: Proposed Developments

Project No.	Development	Description
1	Cheekpoint Lower Bar River Training	The Cheekpoint Lower Bar area is regularly maintained by dredging, resulting in the need for disposal of high volume of dredged materials and high ongoing maintenance costs. The key project within the Master Plan is construction of a river training wall at a strategic location, which would remove the need for ongoing dredging, as shown by the hydrodynamic model completed for the estuary.
2	Quay Wall Continuity	There is currently a break of 230m in the continuity of the quay wall between Belview Quay and O'Brien's Quay. This area is prone to sedimentation and impinges on safe navigational depths in the adjacent downstream berth. To minimise this feature and provide additional berthing and storage, the construction of a quay wall in this area is proposed.
3	Belview Quay Extension	Construction of a 400m extension of the main Belview Quay to provide two new berths is proposed. This project would require 6 hectares of land reclamation and capital dredging.
4	Turning Basin Development	Currently, trade vessels utilise one of two turning circles; either between Belview Quay and O'Brien's Quay or within the area just beyond the downstream end of Belview Quay (between Flour Mill and Snowhill at Cheekpoint Upper Bar). Both areas have constraints on length which would prevent larger vessels accessing the Port. Therefore, it is proposed to develop (i.e. enlarge) one of these turning basins to safely accommodate trade vessels which are foreseen to possibly visit the port in the next 25 years.
5	Carter Patch Channel Widening	Carter Patch represents an area of the navigational channel (from Passage East to Sheagh Light) that poses a navigational safety hazard to trade vessels with a particular length. The curve of the navigational channel requires vessels to 'crab' when manoeuvring the channel. This results in a limiting length of vessel through the area. This project would involve widening this area to approximately 150m to remove this restriction and increase navigational safety and access.
6	Approach Channel Deepening	To accommodate larger, tidally restricted vessels it is required to deepen the approach channel, from the mouth of the estuary to the quays, from 6.5mBCD to a more appropriate level, potentially to a depth of 8mBCD.

Project No.	Development	Description
7	Shore Side Developments	The Local Area Plan for Ferrybank/Belview designates a significant area of land around Belview for port related facilities and uses. Currently envisaged projects include: • Road access – alterations to N29 in vicinity of the Port to allow access to roadside lands; • Services – water supply, effluent treatment, broadband; • Serviced Land – development of serviced sites; • POW is seeking a wider zoning designation on Marine Point to allow development of office buildings; • Development of additional warehousing required for forecasted increased Port throughput; and, • Potential other shore side infrastructural developments required to support the above shore side projects.
8	O'Brien Quay Extension	O'Brien's Quay can currently accommodate 100m long ships. Extension to accommodate 190m long ships is proposed. Extension on either side of the existing quay is considered. Turning circle will be required in the vicinity of this Quay to allow longer ships to turn, which would require deepening and maintenance dredging.
9	Berth Deepening at the Container Terminal	Deepening of a berth from 8m to 10m at the existing container terminal at Belview Quay is proposed to accommodate larger vessels berthing at this terminal.

4 IDENTIFICATION OF NATURA 2000 SITES

In accordance with the European Commission Methodological Guidance (European Commission, 2002) a list of European sites that can be potentially affected by the proposed development has been compiled. Guidance for Planning Authorities prepared by the Department of Environment Heritage and Local Government (DoEHLG, 2009) states that defining the likely zone of impact for the screening and the approach used will depend on the nature, size, location and the likely effects of the project. The key variables determining whether or not a particular Natura 2000 site is likely to be negatively affected by a project are: the physical distance from the project to the site; the sensitivities of the ecological receptors; and, the potential for in-combination effects. Adopting the precautionary principle, all SAC and SPA sites within a 15km radius of the proposed development Site have been considered.

Nine Natura 2000 designated sites were identified within 15km of the Site (Table 1, Figure 4).

Table 2: Natura 2000 Designated Sites within 15km of the Site

Site Name	Site Code	Distance (km)*	Direction
Special Area of Conservation			
Lower River Suir SAC	002137	/	/
River Barrow and River Nore SAC	002162	/	/
Hook Head SAC	000764	1.8km	SE
Bannow Bay SAC	000697	5.5km	E
Tramore Dunes and Backstrand SAC	000671	8.2km	W
Ballyteigue Burrow SAC	000696	14.5km	E
Special Protection Area			
Tramore Backstrand SPA	004027	8.2km	W
Bannow Bay SPA	004033	5.5km	E
Keeragh Islands SPA	004118	13km	E

***The distance to the Natura 2000 Sites is measured from the nearest point on the red line boundary to the nearest point on the Natura Site.**

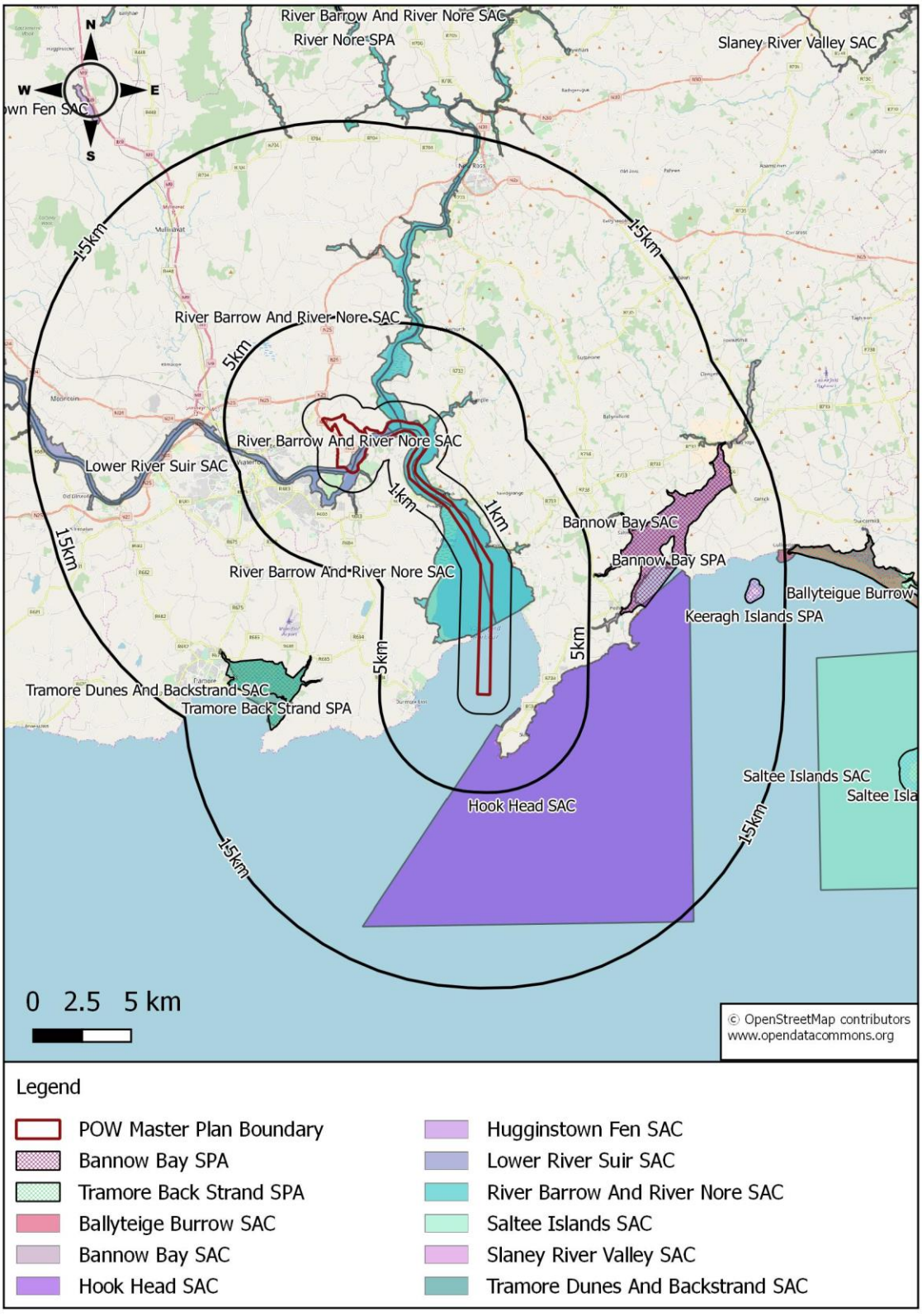
The proposed POW Master Plan is not located within or directly adjacent to Hook Head SAC, Bannow Bay SAC, Bannow Bay SPA, Tramore Dunes and Backstrand SAC, and Tramore Back Strand SPA, Ballyteigue Burrow SAC and / or Keeragh Islands SPA, however, the boundaries of these 7 Natura Sites are located within 15km of the Site (Refer to Figure 4).

Given the significant distance of ca. 14.5km and ca. 13km separating Ballyteigue Burrow SAC and Keeragh Islands SPA from the proposed Masterplan Boundary, comprised of extensive agricultural land, local and regional road infrastructure and Hook Head Peninsula, it is considered highly unlikely that the proposed development would have any direct or indirect effects on Ballyteigue Burrow SAC or Keeragh Islands SPA or their designated features of interest. As a result, these Natura Sites has been screened out and will not be considered further as part of this assessment.

However, the proposed project area is situated within the boundaries of Lower River Suir SAC and River Barrow and River Nore SAC and within <8.2km of Hook Head SAC, Bannow Bay SAC, Bannow Bay SPA, Tramore Dunes and Backstrand SAC, and Tramore Back Strand SPA (Refer to Figure 3). Given the proximity of the proposed development area to these Natura 2000 sites, further consideration will be given to assess potential impacts resulting

from the proposed development. Further details are provided in Section 4.1 through 4.8 below.

Figure 4: Natura 2000 Sites



4.1 Lower River Suir SAC (Site Code: 002137)

The Lower River Suir SAC, is an extensive site, which covers the freshwater stretches of the River Suir from south of Thurles, Co. Tipperary, to the Barrow-Suir confluence east of Cheekpoint, Co. Waterford.

The SAC is comprised of a number of Annex I habitats, including the priority habitats alluvial forest and Yew woodland (Tables 3 and 4 below). Other habitats within the Site include wet and dry grassland, marsh, reed swamp, improved grassland, tidal river, deciduous woodland and mudflats.

The SAC is of conservation interest for the presence of a number of Annex II species including Freshwater Pearl Mussel, Otter, White-clawed Crayfish, Salmon, Twaide Shad and three species of Lampreys- Sea, Brook and River Lamprey. The site is one of only three known spawning grounds in the country for Twaite Shad. The site is also of ornithological importance for the number of Annex I bird species, E.U. Birds Directive including Golden Plover, Whooper Swan and Kingfisher.

Intensive agriculture is the primary land use along the banks of the river. The widespread use of fertiliser and slurry pose the greatest threats to the conservation status of the SAC due to the related impairment in water quality. Furthermore, there are multiple industrial developments, which border the SAC, and discharge into the river. Fishing is the primary tourism attraction along the stretches of the Suir, including both commercial and leisure fishing with numerous Angler Associations (NPWS, 2013). See full details in Appendix B.

Table 3: Qualifying Annex I Habitats for the Lower Suir SAC

Qualifying Habitats **(* denotes Priority Habitat)**	**Code**	**Site Specific Conservation Objective**
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	1330	Restore favourable conservation condition
Mediterranean salt meadows (*Juncetalia maritimi*)	1410	Restore favourable conservation condition
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	3260	Maintain favourable conservation condition
Old sessile oak woods with Ilex and Blechnum in British Isles	91A0	Restore favourable conservation condition
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)	91E0	Restore favourable conservation condition
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	6430	Maintain favourable conservation condition

Table 4: Qualifying Annex II Species for the Lower Suir SAC

Species	Species Name	Code
Mammals listed on Annex II of the Habitats Directive	Otter (*Lutra lutra*)	1355
Fish listed on Annex II of the Habitats Directive	Atlantic salmon (*Salmo salar*)	1106
	Sea lamprey (*Petromyzon marinus*)	1095
	Brook lamprey (*Lampetra planeri*)	1096
	River lamprey (*Lampetra fluviatilis*)	1099
	Twaite shad (*Alosa fallax*)	1103
	Allis shad (*Alosa alosa*)	1102
Molluscs listed on Annex II of the Habitats Directive	Freshwater pearl mussel (*Margaritifera margaritifera*)	1029
Crustaceans listed on Annex II of the Habitats Directive	White-clawed crayfish (*Austropotamobis pallipes)*	1092

4.2 River Barrow and River Nore SAC (Site Code 002162)

The River Barrow and River Nore SAC consists of the freshwater stretches of the Barrow and Nore River catchments extending from the Slieve Bloom Mountains to the estuary and tidal elements in Creadun Head, Waterford.

Species rich habitats (Annex I of the EU Habitats Directive) including estuaries, alluvial forests, petrifying springs, and intertidal mudflats and sandflats can be found within this SAC.

This SAC is of considerable conservation significance for multiple reasons:

- Ornithological importance: This SAC supports Kingfisher, a nationally important bird population listed in Annex I of the EU Birds Directive. One SPA (River Nore), designated under the EU Birds Directive, is also located within the SAC; and,
- This SAC supports multiple species listed on Annex II of the EU Habitats Directive, including Otter, River Lamprey and Salmon.

Land use within the SAC is primarily agricultural, principally grazing and silage production. Fishing is also a main tourist attraction along stretches of the main rivers and their tributaries. Other recreational activities such as boating, golfing and walking also occur within the SAC. The main threats to the SAC and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and sewage plants, along with over-grazing, invasion of non-native species and land reclamation (NPWS, 2011). See full details in Appendix C.

Table 5: Qualifying Annex I Habitats for the River Barrow and River Nore SAC

Qualifying Habitats (*denotes Priority Habitat)	Code	Site Specific Conservation Objective
Estuaries	1130	Maintain favourable conservation condition
Mudflats and Sandflats not covered by seawater at low tide	1140	Maintain favourable conservation condition
Salicornia and other annuals colonizing mud and sand	1310	Maintain favourable conservation condition
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae)*	1330	Restore favourable conservation condition
Mediterranean salt meadows (*Juncetlaia maritimi)*	1410	Restore favourable conservation condition
Water courses of plain to montane levels with *the Ranunculion fluitantis* and *Callitricho - Batrachion* vegetation	3260	Maintain favourable conservation condition
European dry heaths	4030	Maintain favourable conservation condition
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	6430	Maintain favourable conservation condition
Petrifying springs with tufa formation (Cratoneurion)*	7220	Maintain favourable conservation condition
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	91A0	Restore favourable conservation condition
Alluvial forests with *Alnus glutinosa and Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicioncalbae*)*	91E0	Restore favourable conservation condition

Table 6: Qualifying Annex II Species for the River Barrow and River Nore SAC

Qualifying Species	Species Name	Code
Mammals listed on Annex II of the Habitats Directive	Otter *(Lutra lutra)*	1355
Molluscs listed on Annex II of the Habitats Directive	Freshwater pearl mussel (*Margaritifera margaritifera*)	1029
	Nore Freshwater pearl mussel (*Margaritifera durrovensis*)	1990
	Desmoulin's whorl snail (Vertigo moulinsiana)	1016
Crustaceans listed on Annex II of the Habitats Directive	White-clawed crayfish (*Austropotamobis pallipes)*	1092
	Salmon (*Salmo salar)*	1106

Qualifying Species	Species Name	Code
Fish listed on Annex II of the Habitats Directive	Sea Lamprey (*Petromyzon marinus*)	1095
	Brook Lamprey (*Lampetra planeri*)	1096
	River Lamprey (Lampetra fluviatilis)	1099
	Twaite *Shad (Alosa fallax)*	1103
Flora listed on Annex II of the Habitats Directive	Killarney Fern (*Trichomanes speciosum)*	1421

4.3 Hook Head SAC (Site Code: 000764)

The Hook Head SAC, is comprised of marine subtidal reefs to the south and east of the Hook Head Peninsula, and also sea cliffs from Hook Head to Baginbun and Ingard Point. The peninsula forms the eastern side of Waterford Harbour, while to the east it adjoins the estuary mouth of Bannow Bay.

This SAC is of conservation importance for its subtidal reef and shallow bay communities, and their diversity of species, as well as for the vegetated sea cliffs, as listed under the E.U. Habitats Directive (See Table 7). Furthermore, the rocky coastline is also important for a number of breeding birds, two of which are listed on Annex I of the E.U. Birds Directive. The cliffs at this site are of ornithological interest for breeding Chough, Raven and Peregrine, and there is a small seabird colony, mainly of Guillemots, near Baginbun. The headland is a noted landfall point for migrants.

The waters off Hook Head are rich in marine life and are a popular diver site for SCUBA enthusiasts. Rock pools on the shore support a diverse flora and fauna (NPWS, 2014). See full details in Appendix D.

Table 7: Qualifying Annex I Habitats for the Hook Head SAC

Qualifying Habitats **(* denotes Priority Habitat)**	**Code**	**Site Specific Conservation Objective**
Large shallow inlets and bays	1160	Maintain favourable conservation condition
Reefs	1170	Maintain favourable conservation condition
Vegetated sea cliffs of the Atlantic and Baltic coasts	1230	Maintain favourable conservation condition

4.4 Bannow Bay SAC (Site Code 000697)

Bannow Bay SAC is a relatively large estuarine site, approximately 14 km long, on the south coast of Co. Wexford. Small rivers and streams to the north and south-west flow into the bay and their sub-estuaries from part of the site.

This SAC is of considerable conservation significance for multiple reasons:

- This SAC is of considerable conservation significance for the large number of E.U. Habitats Directive Annex I habitats that it contains, including the priority habitat fixed grey dune (See Table 8); and,
- Ornithological importance: This SAC supports important breeding populations of Little Tern and Kingfisher - two species listed on Annex I of the E.U. Birds Directive (Little

Tern and Kingfisher). One SPA (Bannow Bay), designated under the EU Birds Directive, is also located within the SAC because of its significant bird interest. It supports important numbers of wintering wildfowl, including an internationally important population of Light-bellied Brent Goose. Parts of this area have also been designated a Wildfowl Sanctuary.

Land use within the SAC consists mainly of shellfish farming; approximately 20 ha of the intertidal area is under cultivation. In some areas damage is caused to the shingle vegetation and to the substrate by tractors accessing the aquaculture farms. Any further increase in aquaculture poses a threat. Other land uses include shooting, bird-watching, conservation management, grazing in some of the dune areas, horse-riding on the beach and Big Burrow sand dunes, swimming, sailboarding, jet-skiing, line fishing and bait digging (NPWS, 2014). See full details in Appendix E.

Table 8: Qualifying Annex I Habitats for the Bannow Bay SAC

Qualifying Habitats (*denotes Priority Habitat)	Code	Site Specific Conservation Objective
Estuaries	1130	Maintain favourable conservation condition
Mudflats and Sandflats not covered by seawater at low tide	1140	Maintain favourable conservation condition
Annual vegetation of drift lines	1210	Maintain favourable conservation condition
Perennial vegetation of stony banks	1220	Maintain favourable conservation condition
Salicornia and other annuals colonizing mud and sand	1310	Restore favourable conservation condition
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae)*	1330	Restore favourable conservation condition
Mediterranean salt meadows (*Juncetlaia maritimi)*	1410	Restore favourable conservation condition
Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	1420	Restore favourable conservation condition
Embryonic shifting dunes	2110	Restore favourable conservation condition
Shifting dunes along the shoreline with Ammophila arenaria (white dunes)	2120	Restore favourable conservation condition
Fixed coastal dunes with herbaceous vegetation (grey dunes)	2130	Restore favourable conservation condition

4.5 Bannow Bay SPA (Site Code 004033)

Bannow Bay SAC is a relatively large estuarine site, approximately 14 km long, on the south coast of Co. Wexford. Small rivers and streams to the north and south-west flow into the bay and their sub-estuaries from part of the site.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species as listed in Table 9 below. Bannow Bay SPA

is an excellent example of an enclosed estuarine system. It supports internationally important populations of Light-bellied Brent Goose and Black-tailed Godwit as well as nationally important populations of a further eleven species. Bannow Bay is a Ramsar Convention site and part of Bannow Bay SPA is a Wildfowl Sanctuary (NPWS, 2014). See full details in Appendix F.

Table 9: Qualifying Annex I Species of Birds for Bannow Bay SPA

Species Names	Scientific Name	Code
Light-bellied Brent Goose	*Branta bernicla hrota*	A046
Shelduck	*Tadorna tadorna*	A048
Pintail	*Anas acuta*	A054
Oystercatcher	*Haematopus ostralegus*	A130
Golden Plover	*Pluvialis apricaria*	A140
Grey Plover	*Pluvialis squatarola*	A141
Lapwing (	*Vanellus vanellus*	A142
Knot	*Calidris canutus*	A143
Dunlin	*Calidris alpina*	A149
Black-tailed Godwit	*Limosa limosa*	A156
Bar-tailed Godwit	*Limosa lapponica*	A157
Curlew	*Numenius arquata*	A160
Redshank	*Tringa totanus*	A162
Wetland and Waterbirds		A999

4.6 Tramore Dunes and Backstrand SAC (Site Code 000671)

This Tramore Dunes and Backstrand SAC coastal site lies at the head of Tramore Bay, east of Tramore town in Co. Waterford.

Tramore Dunes and Back Strand is a site of major ecological importance for the range of good quality coastal habitats which occur, as listed in Table 10, including fixed dunes, which are listed as a priority habitat on Annex I of the E.U. Habitats Directive. The dunes at this site are well developed and contain several important habitats including the priority habitat fixed dunes.

This SAC has a remarkably rich flora, featuring a number of rare and protected species, and the intertidal area is important for wintering waterfowl. The Back Strand is also an area of great importance for waterfowl on the south coast and is a designated SPA.

The main threat to the stability of the dune habitats is from recreational pressures, with heavy usage of the site due to its proximity to Tramore, a popular holiday town. Driftline and shingle vegetation is also under pressure from heavy usage of the beach area. The intertidal and saltmarsh habitats are not under significant threat, though possible seepage from the nearby landfill site is a potential threat (NPWS, 2013).

Table 10: Qualifying Annex I Habitats for the Tramore Dunes and Backstrand SAC

Qualifying Habitats (*denotes Priority Habitat)	Code	Site Specific Conservation Objective
Mudflats and Sandflats not covered by seawater at low tide	1140	Maintain favourable conservation condition
Annual vegetation of drift lines	1210	Maintain favourable conservation condition
Perennial vegetation of stony banks	1220	Maintain favourable conservation condition
Salicornia and other annuals colonizing mud and sand	1310	Restore favourable conservation condition
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae)*	1330	Restore favourable conservation condition
Mediterranean salt meadows (*Juncetlaia maritimi)*	1410	Restore favourable conservation condition
Embryonic shifting dunes	2110	Restore favourable conservation condition
Shifting dunes along the shoreline with Ammophila arenaria (white dunes)	2120	Restore favourable conservation condition
Fixed coastal dunes with herbaceous vegetation (grey dunes)	2130	Restore favourable conservation condition

4.7 Tramore Back Strand SPA (Site Code 004027)

This Tramore Back Strand SAC coastal site lies at the head of Tramore Bay, east of Tramore town in Co. Waterford.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the species listed in Table 11.

Tramore Back Strand SPA is of high ornithological importance for wintering waterfowl, as it is an important site for wintering waterfowl, providing both feeding and roosting areas, with one species occurring in internationally important numbers and a further seven species having populations of national importance. The regular occurrence of Little Egret, Golden Plover and Bar-tailed Godwit is of particular note as these three species are listed on Annex I of the E.U. Birds Directive.

The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds. Tramore Back Strand is also a Ramsar Convention site (NPWS, 2014).

Table 11: Qualifying Annex I Species of Birds for Tramore Back Strand SPA

Species Name	Scientific Name	Code
Light-bellied Brent Goose	*Branta bernicla hrota*	A046
Golden Plover	*Pluvialis apricaria*	A140
Grey Plover	*Pluvialis squatarola*	A141

Species Name	Scientific Name	Code
Lapwing	*Vanellus vanellus*	A142
Dunlin	*Calidris alpina*	A149
Black-tailed Godwit	*Limosa limosa*	A156
Bar-tailed Godwit	*Limosa lapponica*	A157
Curlew	*Numenius arquata*	A160
Wetland and Waterbirds		A999

4.8 Conservation Objectives of Natura 2000 Sites

4.8.1 Conservation Objectives for SAC Sites

European and national legislation places a collective obligation on Ireland and its citizens to maintain at favourable conservation status areas designated as candidate Special Areas of Conservation. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

According to the EU Habitats Directive, favourable conservation status of a habitat is achieved when:

- *Its natural range, and area it covers within that range, is 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 as defined below.*

The favourable conservation status of a species is achieved when:

- *Population data on the species concerned indicate that it is maintaining itself;*
- *The natural range of the species is neither being reduced or 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.*

Conservation objectives for all identified Natura 2000 SAC Sites are as follows (See Appendix B-H for full details):

> *'To maintain or restore the favourable conservation condition of the Annex I habitat(s) and the Annex II species for which the SAC has been selected.'*

4.8.2 Conservation Objectives for SPA Sites

The conservation objectives for Bannow Bay SPA and Tramore Back Strand SPA are the same as those for the SACs, as specified above (See Appendix G & H for full details).

5 IDENTIFICATION & ASSESSMENT OF POTENTIAL IMPACT

Potential impacts, if any, on the Lower River Suir SAC, River Barrow and River Nore SAC, Hook Head SAC, Bannow Bay SAC, Bannow Bay SPA, Tramore Dunes and Backstrand SAC, and Tramore Back Strand SPA were considered further in this section. Only those features of the project that have the potential to impact on the conservation objectives of the identified Natura 2000 sites were considered.

The key output of this stage of the assessment is the identification of the types of threats to the integrity of the European sites as a result of implementing the proposed projects as part of the overall Masterplan. This is a high level assessment and does not take into account specific threats in relation to these projects given the level of details currently available. The specific threats resulting from these projects will need to be identified and reviewed during specific assessments for each of these projects at the planning stage.

A number of factors were examined at this stage and dismissed due to the very low risk associated with them. Table 12 presents further details and rationale of the screening assessment undertaken for each of the qualifying interests of the Lower River Suir SAC and River Barrow and River Nore SAC.

These factors were screened in or out, based on whether or not it was concluded that they are likely to be affected by the proposed development if no mitigation measures were applied and if progression to Stage 2 is required. The rationale for these conclusions is based on results from the aforementioned desk study and literature search.

Table 12: Screening Assessment for Identified Natura 2000 sites

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
Project 1: **Cheekpoint Lower Bar River Training Wall**				
Lower River Suir SAC*	See Tables 3 and 4 Above	**The main threats to the Lower River Suir SAC habitats include:** • Impacts to the hydrodynamic regime and/or geomorphology of the estuary; • Direct habitat loss and / or disturbance to habitats as a result of construction of the Cheekpoint Lower Bar River Training Wall; • Impacts during construction such as siltation and pollution; • Accidental introduction of invasive species; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan. **Main threats to species include:** • Impacts to movement / migration; • Impacts associated with pollution during the construction works; • Disturbance / displaced and habitat loss; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan.	Impacts to the hydrodynamic regime and/or geomorphology of the estuary are likely to change the balance and flux of sediments within the estuary and lead to modifications to the habitats for which the SAC is designated. Given the presence of designated habitats within the area where the proposed Cheekpoint Lower Bar River Training Wall is to be constructed, both direct and indirect impacts on designated habitats will need to be considered further. The proposed training wall will require construction works to take place within the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further consideration will therefore be required with regards to these species. Further consideration with regard to impacts on Annexed habitats and species will be required in association with these works and further progression within the AA process will be required.	**Screened In**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
River Barrow and River Nore SAC	See Tables 5 and 6 Above	As Above	As above.	**Screened In**
Hook Head SAC	See Table 7 Above	No likely impacts	It is not envisaged that the proposed development of the training wall would result in any potential impacts on the Hook Head SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the Hook Head SAC.	**Screened out**
Bannow Bay SAC	See Table 8 Above	No likely impacts	It is not envisaged that the proposed development of the Cheekpoint Lower Bar River Training Wall would result in any potential impacts on the Bannow Bay SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the SAC.	**Screened out**
Bannow Bay SPA	See Table 9 Above	**Potential threats to species include:** • Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts during both the construction stage and during the operational phase of the development.	**Screened in**
Tramore Dunes and Backstrand SAC	See Table 10 Above	No likely impacts	It is not envisaged that the proposed development of the Cheekpoint Lower Bar River Training Wall would result in any potential impacts on the Tramore Dunes and Backstrand SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the SAC.	**Screened out**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
Tramore Back Strand SPA	See Table 11 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts during both the construction stage and during the operational phase of the development.	**Screened in**
Project 2 & 3: **Quay Wall Continuity and Belview Quay Extension**				
Lower River Suir SAC	See Tables 3 and 4 Above	**The main threats to the Lower River Suir SAC habitats include:** • Impacts to the hydrodynamic regime and/or geomorphology of the estuary; • Direct habitat loss and / or disturbance to habitats as a result of construction of the proposed Quay Wall Continuity and Belview Quay Extension; • Impacts during construction such as siltation and pollution; • Accidental introduction of invasive species; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan. **Main threats to species include:** • Impacts to movement / migration; • Impacts associated with pollution during the construction works;	Impacts to the hydrodynamic regime and/or geomorphology of the estuary are likely to change the balance and flux of sediments within the estuary and lead to modifications to the habitats for which the SAC is designated. Given the presence of designated habitats within the area where the proposed Quay Wall Continuity and Belview Quay Extension is to be constructed, both direct and indirect impacts on designated habitats will need to be considered further. The proposed Quay Wall Continuity and Belview Quay Extension will require construction works to take place within the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further consideration will therefore be require with regards to these species. In addition, consideration will need to be taken with regards to increased vessel movements / routes in and out of the port and potential increase in vessels sizes. Further consideration with regard to impacts on Annexed habitats and species will be required in association with	**Screened In**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
		• Disturbance / displacement and habitat loss; • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan; and, • Impacts associated with increased shipping activities and vessel movements, i.e. increased disturbance, noise, erosion, impacts on water quality (such as mobilisation of sediments, ballast water).	these works and further progression within the AA process will be required.	
River Barrow and River Nore SAC	See Tables 5 and 6 Above	**The main threats to the River Barrow and Nore SAC habitats include:** • Impacts to the hydrodynamic regime and/or geomorphology of the estuary; • In-Direct impacts to habitats as a result of construction of the proposed Quay Wall Continuity and Belview Quay Extension; • Impacts during construction such as siltation and pollution; • Accidental introduction of invasive species; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan. **Main threats to species include:** • Impacts to movement / migration;	Impacts to the hydrodynamic regime and/or geomorphology of the estuary are likely to change the balance and flux of sediments within the estuary and lead to modifications to the habitats for which the SAC is designated. Given the presence of designated habitats within close proximity to the proposed Quay Wall Continuity and Belview Quay Extension and the hydrological links, impacts on designated habitats will need to be considered further. The proposed Quay Wall Continuity and Belview Quay Extension will require construction works to take place within close proximity to the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further consideration will therefore be required with regards to these species. In addition, consideration will need to be taken with regards to increased vessel movements / routes in and out of the port and potential increase in vessels sizes.	**Screened In**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
		• Impacts associated with pollution during the construction works; • Disturbance / displacement and habitat loss; • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan; and, • Impacts associated with increased shipping activities and vessel movements, i.e. increased disturbance, noise, erosion, impacts on water quality (such as mobilisation of sediments, ballast water).	Further consideration with regard to impacts on Annexed habitats and species will be required in association with these works and further progression within the AA process will be required.	
Hook Head SAC	See Table 7 Above	**The main threats to the Hood Head SAC habitats include:** • Potential impacts on habitats as a result of deposition of dredged material; • Impacts associated with increased shipping activities and vessel movements, i.e. increased disturbance, erosion, impacts on water quality (such as mobilisation of sediments, ballast water).	Further consideration of deposition site(s) will be required to ensure that impacts can be avoided. Should site be located within or near the SAC, there is potential for the deposited material to have an impact on habitats for which the SAC is designated. In addition, consideration will need to be taken with regards to increased vessel movements / routes in and out of the port and potential increase in vessels sizes.	**Screened in**
Bannow Bay SAC	See Table 8 Above	No likely impacts	It is not envisaged that the proposed developments would result in any potential impacts on the Bannow Bay SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the SAC.	**Screened out**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
Bannow Bay SPA	See Table 9 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts during both the construction stage and during the operational phase of the development.	**Screened in**
Tramore Dunes and Backstrand SAC	See Table 10 Above	No likely impacts.	It is not envisaged that the proposed developments would result in any potential impacts on the Tramore Dunes and Backstrand SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the SAC.	**Screened out**
Tramore Back Strand SPA	See Table 11 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts during both the construction stage and during the operational phase of the development.	**Screened in**
Project 4: **Turning Basin Development**				
Lower River Suir SAC	See Tables 3 and 4 Above	**The main threats to the Lower River Suir SAC habitats include:** • Impacts to the hydrodynamic regime and/or geomorphology of the estuary; • Direct habitat loss and / or disturbance to habitats as a result of Turning Basin Relocation Development and associated dredging works;	Impacts to the hydrodynamic regime and/or geomorphology of the estuary are likely to change the balance and flux of sediments within the estuary and lead to modifications to the habitats for which the SAC is designated. Given the presence of designated habitats adjacent to where the proposed Turning Basin Relocation Development and associated dredging works will take place, both direct and indirect impacts on designated habitats will need to be considered further. It should however be noted that this section of the estuary is	**Screened In**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
		• Impacts during dredging such as siltation and pollution; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan. **Main threats to species include:** • Impacts to movement / migration; • Impacts associated with pollution during the dredging; • Disturbance / displacement and habitat loss; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan.	subject to regular dredging as part of ongoing maintenance. The proposed Turning Basin Relocation Development will require works to take place within the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further consideration will therefore be required with regards to these species. However as noted above, the area is currently dredged. Further consideration with regard to impacts on Annexed habitats and species will be required in association with these works and further progression within the AA process will be required.	
River Barrow and River Nore SAC	See Tables 5 and 6 Above	**The main threats to the River Barrow and River Nore SAC habitats include:** • Impacts to the hydrodynamic regime and/or geomorphology of the estuary; • Impacts during dredging such as siltation and pollution; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan. **Main threats to species include:** • Impacts to movement / migration;	Impacts to the hydrodynamic regime and/or geomorphology of the estuary are likely to change the balance and flux of sediments within the estuary and lead to modifications to the habitats for which the SAC is designated. Given the presence of designated habitats within close proximity to the proposed dredging site and the hydrological links, impacts on designated habitats will need to be considered further. It should however be noted that sections of the estuary are subject to regular on going dredging as part of ongoing maintenance. The proposed dredging will require works to take place within close proximity to the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further	**Screened in**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
		• Impacts associated with pollution during the dredging; • Disturbance / displacement and habitat loss; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan.	consideration will therefore be required with regards to these species. However as noted above, the estuary is currently dredged. Further consideration with regard to impacts on Annexed habitats and species will be required in association with these works and further progression within the AA process will be required.	
Hook Head SAC	See Table 7 Above	**The main threats to the Hood Head SAC habitats include:** • Potential impacts on habitats as a result of deposition of dredged material; • Impacts associated with increased shipping activities and vessel movements, i.e. increased disturbance, erosion, impacts on water quality (such as mobilisation of sediments, ballast water).	Further consideration of deposition site(s) will be required to ensure that impacts can be avoided. Should site be located within or near the SAC, there is potential for the deposited material to have an impact on habitats for which the SAC is designated. In addition, consideration will need to be taken with regards to increased vessel movements / routes in and out of the port and potential increase in vessels sizes.	**Screened in**
Bannow Bay SAC	See Table 8 Above	No likely impacts	It is not envisaged that the proposed Turning Basin Relocation Development would result in any potential impacts on the Bannow Bay SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the SAC.	**Screened out**
Bannow Bay SPA	See Table 9 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts on these species during the dredging works. However it should be noted that the river is dredged on a regular basis as part of the maintenance works and there	**Screened in**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
			is potential that, following receipt of further information with regards to the works, these works could be screened out.	
Tramore Dunes and Backstrand SAC	See Table 10 Above	No likely impacts	It is not envisaged that the proposed Turning Basin Relocation Development would result in any potential impacts on the Tramore Dunes and Backstrand SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed dredging area and the SAC.	**Screened out**
Tramore Back Strand SPA	See Table 11 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts on these species during the dredging works. However it should be noted that the river is dredged on a regular basis as part of the maintenance works and there is potential that, following receipt of further information with regards to the works, these works could be screened out.	**Screened in**
Project 5: Carter Patch Channel Widening				

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
Lower River Suir SAC	See Tables 3 and 4 Above	**The main threats to the Lower River Suir SAC habitats include:** • Impacts to the hydrodynamic regime and/or geomorphology of the estuary; • Impacts during dredging such as siltation and pollution; • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan. **Main threats to species include:** • Impacts to movement / migration; • Impacts associated with pollution during the dredging; • Disturbance / displacement and habitat loss; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan.	Impacts to the hydrodynamic regime and/or geomorphology of the estuary are likely to change the balance and flux of sediments within the estuary and lead to modifications to the habitats for which the SAC is designated. Given the presence of designated habitats within close proximity to the Carter Patch Channel Widening and proposed dredge site and the hydrological links, impacts on designated habitats will need to be considered further. It should however be noted that sections of the estuary are subject to regular on going dredging as part of ongoing maintenance. The proposed Carter Patch Channel Widening and associated dredging will require works to take place within close proximity to the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further consideration will therefore be required with regards to these species. However as noted above, the estuary is currently dredged. Further consideration with regard to impacts on Annexed habitats and species will be required in association with these works and further progression within the AA process will be required.	**Screened In**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
River Barrow and River Nore SAC	See Tables 5 and 6 Above	**The main threats to the River Barrow and River Nore SAC habitats include:** • Impacts to the hydrodynamic regime and/or geomorphology of the estuary; • Impacts during dredging such as siltation and pollution; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan. **Main threats to species include:** • Impacts to movement / migration; • Impacts associated with pollution during the dredging; • Disturbance / displacement and habitat loss; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan.	Impacts to the hydrodynamic regime and/or geomorphology of the estuary are likely to change the balance and flux of sediments within the estuary and lead to modifications to the habitats for which the SAC is designated. Given the presence of designated habitats within the area where the proposed dredging works will take place, both direct and indirect impacts on designated habitats will need to be considered further. It should however be noted that this section of the estuary is subject to regular dredging as part of ongoing maintenance. The proposed Carter Patch Channel Widening and associated dredging will require works to take place within the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further consideration will therefore be required with regards to these species. However as noted above, the area is currently dredged. Further consideration with regard to impacts on Annexed habitats and species will be required in association with these works and further progression within the AA process will be required.	**Screened In**
Hook Head SAC	See Table 7 Above	**The main threats to the Hood Head SAC habitats include:** • Potential impacts on habitats as a result of deposition of dredged material; and, • Impacts associated with increased shipping activities and vessel movements, i.e. increased disturbance, erosion, impacts on	Further consideration of deposition site(s) will be required to ensure that impacts can be avoided. Should site be located within or near the SAC, there is potential for the deposited material to have an impact on habitats for which the SAC is designated. In addition, consideration will need to be taken with regards to increased vessel movements / routes in and out of the port and potential increase in vessels sizes.	**Screened in**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
		water quality (such as mobilisation of sediments, ballast water).		
Bannow Bay SAC	See Table 8 Above	No likely impacts.	It is not envisaged that the proposed Carter Patch Channel Widening and associated dredging works would result in any potential impacts on the Bannow Bay SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the SAC.	**Screened out**
Bannow Bay SPA	See Table 9 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts on these species during the dredging works. However it should be noted that the river is dredged on a regular basis as part of the maintenance works and there is potential that, following receipt of further information with regards to the works, these works could be screened out.	**Screened in**
Tramore Dunes and Backstrand SAC	See Table 10 Above	No likely impacts.	It is not envisaged that the proposed Carter Patch Channel Widening and associated dredging works would result in any potential impacts on the Tramore Dunes and Backstrand SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed degrading works and the SAC.	

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
Tramore Back Strand SPA	See Table 11 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts on these species during the dredging works. However it should be noted that the river is dredged on a regular basis as part of the maintenance works and there is potential that, following receipt of further information with regards to the works, these works could be screened out.	**Screened in**
Project 6: Approach Channel Deepening				
Lower River Suir SAC	See Tables 3 and 4 Above	**The main threats to the Lower River Suir SAC habitats include:** • Impacts to the hydrodynamic regime and/or geomorphology of the estuary; • Impacts during dredging such as siltation and pollution; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan. **Main threats to species include:** • Impacts to movement / migration; • Impacts associated with pollution during the dredging; • Disturbance / displacement and habitat loss; and,	Impacts to the hydrodynamic regime and/or geomorphology of the estuary are likely to change the balance and flux of sediments within the estuary and lead to modifications to the habitats for which the SAC is designated. Given the presence of designated habitats within close proximity to the proposed Approach Channel Deepening works and the hydrological links, impacts on designated habitats will need to be considered further. It should however be noted that sections of the estuary are subject to regular dredging as part of ongoing maintenance. The proposed Approach Channel Deepening works and associated dredging will require works to take place within close proximity to the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further consideration will therefore be required with regards to these species. However as noted above, the estuary is currently dredged.	**Screened In**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
		• In-combination effects as a result of the different elements of the proposed works as part of the Masterplan.	Further consideration with regard to impacts on Annexed habitats and species will be required in association with these works and further progression within the AA process will be required.	
River Barrow and River Nore SAC	See Tables 5 and 6 Above	**The main threats to the River Barrow and River Nore SAC habitats include:** • Impacts to the hydrodynamic regime and/or geomorphology of the estuary; • Impacts during dredging such as siltation and pollution; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan. **Main threats to species include:** • Impacts to movement / migration; • Impacts associated with pollution during the dredging; • Disturbance / displacement and habitat loss; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan.	Impacts to the hydrodynamic regime and/or geomorphology of the estuary are likely to change the balance and flux of sediments within the estuary and lead to modifications to the habitats for which the SAC is designated. Given the presence of designated habitats within the area where the proposed Approach Channel Deepening works will take place, both direct and indirect impacts on designated habitats will need to be considered further. It should however be noted that this section of the estuary is subject to regular dredging as part of ongoing maintenance. The proposed Approach Channel Deepening works and associated dredging will require works to take place within the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further consideration will therefore be required with regards to these species. However as noted above, the area is currently dredged. Further consideration with regard to impacts on Annexed habitats and species will be required in association with these works and further progression within the AA process will be required.	**Screened In**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
Hook Head SAC	See Table 7 Above	**The main threats to the Hood Head SAC habitats include:** • Potential impacts on habitats as a result of deposition of dredged material; and, • Impacts associated with increased shipping activities and vessel movements, i.e. increased disturbance, erosion, impacts on water quality (such as mobilisation of sediments, ballast water).	Further consideration of deposition site(s) will be required to ensure that impacts can be avoided. Should site be located within or near the SAC, there is potential for the deposited material to have an impact on habitats for which the SAC is designated. In addition, consideration will need to be taken with regards to increased vessel movements / routes in and out of the port and potential increase in vessels sizes.	**Screened in**
Bannow Bay SAC	See Table 8 Above	No likely impacts	It is not envisaged that the proposed Approach Channel Deepening works would result in any potential impacts on the Bannow Bay SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the SAC.	**Screened out**
Bannow Bay SPA	See Table 9 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts on these species during the dredging works. However it should be noted that the river is dredged on a regular basis as part of the maintenance works and there is potential that, following receipt of further information with regards to the works, these works could be screened out.	**Screened in**
Tramore Dunes and Backstrand SAC	See Table 10 Above	No likely impacts	It is not envisaged that the proposed Approach Channel Deepening works would result in any potential impacts on the Tramore Dunes and Backstrand SAC or any of the habitats for which it is designated. This assumption is	**Screened out**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
			based on the distance separating the proposed degrading works and the SAC.	
Tramore Back Strand SPA	See Table 11 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts on these species during the dredging works. However it should be noted that the river is dredged on a regular basis as part of the maintenance works and there is potential that, following receipt of further information with regards to the works, these works could be screened out.	**Screened in**
Project 7: Shore Side Developments				
Lower River Suir SAC*	See Tables 3 and 4 Above	**The main threats to the Lower River Suir SAC habitats include:** • Direct habitat loss and / or disturbance to habitats as a result of the Shore Side Developments; • Impacts during construction such as siltation and pollution; • Accidental introduction of invasive species; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan.	Given the presence of designated habitats adjacent to where the proposed Shore Side Developments are to be constructed, both direct and indirect impacts on designated habitats will need to be considered further. Sections of the proposed shore side development, along the southern boundary will require construction works to take place within the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further consideration will therefore be required with regards to these species. Further consideration with regard to impacts on Annexed habitats and species will be required in association with	**Screened In**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
		Main threats to species include: • Impacts associated with pollution during the construction works; • Disturbance / displaced and habitat loss; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan.	these works and further progression within the AA process will be required.	
River Barrow and River Nore SAC	See Tables 5 and 6 Above	As Above	As above.	**Screened In**
Hook Head SAC	See Table 7 Above	No likely impacts	It is not envisaged that the proposed Shore Side Developments would result in any potential impacts on the Hook Head SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the Hook Head SAC.	**Screened out**
Bannow Bay SAC	See Table 8 Above	No likely impacts	It is not envisaged that the proposed developments would result in any potential impacts on the Bannow Bay SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the SAC.	**Screened out**
Bannow Bay SPA	See Table 9 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts during both the construction stage and during the operational phase of the development.	**Screened in**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
Tramore Dunes and Backstrand SAC	See Table 10 Above	No likely impacts	It is not envisaged that the proposed developments would result in any potential impacts on the Tramore Dunes and Backstrand SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the SAC.	**Screened out**
Tramore Back Strand SPA	See Table 11 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts during both the construction stage and during the operational phase of the development.	**Screened in**
Project 8: O'Brien Quay Extension				
Lower River Suir SAC*	See Tables 3 and 4 Above	**The main threats to the Lower River Suir SAC habitats include:** • Impacts to the hydrodynamic regime and/or geomorphology of the estuary; • Direct habitat loss and / or disturbance to habitats as a result of construction of the proposed O'Brien Quay Extension; • Impacts during construction such as siltation and pollution; • Accidental introduction of invasive species; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan. **Main threats to species include:**	Impacts to the hydrodynamic regime and/or geomorphology of the estuary are likely to change the balance and flux of sediments within the estuary and lead to modifications to the habitats for which the SAC is designated. Given the presence of designated habitats within the area where the proposed O'Brien Quay Extension is to be constructed, both direct and indirect impacts on designated habitats will need to be considered further. The proposed O'Brien Quay Extension and associated deepening and maintenance dredging works as part of the proposed turning circle will require works to take place within the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further consideration will therefore be required with regards to these species.	**Screened In**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
		• Impacts to movement / migration; • Impacts associated with pollution during the construction works; • Disturbance / displacement and habitat loss; • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan; and, Impacts associated with increased shipping activities and vessel movements, i.e. increased disturbance, noise, erosion, impacts on water quality (such as mobilisation of sediments, ballast water).	In addition, consideration will need to be taken with regards to increased vessel movements / routes in and out of the port and potential increase in vessels sizes. Further consideration with regard to impacts on Annexed habitats and species will be required in association with these works and further progression within the AA process will be required.	
River Barrow and River Nore SAC	See Tables 5 and 6 Above	**The main threats to the River Barrow and Nore SAC habitats include:** • Impacts to the hydrodynamic regime and/or geomorphology of the estuary; • In-Direct impacts to habitats as a result of construction of the proposed O'Brien Quay Extension; • Impacts during construction such as siltation and pollution; • Accidental introduction of invasive species; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan. **Main threats to species include:** • Impacts to movement / migration;	Impacts to the hydrodynamic regime and/or geomorphology of the estuary are likely to change the balance and flux of sediments within the estuary and lead to modifications to the habitats for which the SAC is designated. Given the presence of designated habitats within close proximity to the proposed O'Brien Quay Extension and the hydrological links, impacts on designated habitats will need to be considered further. The proposed O'Brien Quay Extension and associated deepening and maintenance dredging works as part of the proposed turning circle will require works to take place within close proximity to the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further consideration will therefore be required with regards to these species.	**Screened In**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
		• Impacts associated with pollution during the construction works; • Disturbance / displacement and habitat loss; • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan; and, Impacts associated with increased shipping activities and vessel movements, i.e. increased disturbance, noise, erosion, impacts on water quality (such as mobilisation of sediments, ballast water).	In addition, consideration will need to be taken with regards to increased vessel movements / routes in and out of the port and potential increase in vessels sizes. Further consideration with regard to impacts on Annexed habitats and species will be required in association with these works and further progression within the AA process will be required.	
Hook Head SAC	See Table 7 Above	**The main threats to the Hood Head SAC habitats include:** • Potential impacts on habitats as a result of deposition of dredged material; Impacts associated with increased shipping activities and vessel movements, i.e. increased disturbance, erosion, impacts on water quality (such as mobilisation of sediments, ballast water).	Further consideration of deposition site(s) will be required to ensure that impacts can be avoided. Should the development site be located within or near the SAC, there is potential for the deposited material to have an impact on habitats for which the SAC is designated. In addition, consideration will need to be taken with regards to increased vessel movements / routes in and out of the port and potential increase in vessels sizes.	**Screened in**
Bannow Bay SAC	See Table 8 Above	No likely impacts	It is not envisaged that the proposed developments would result in any potential impacts on the Bannow Bay SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the SAC.	**Screened out**
Bannow Bay SPA	See Table 9 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts	**Screened in**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
			during both the construction stage and during the operational phase of the development.	
Tramore Dunes and Backstrand SAC	See Table 10 Above	No likely impacts	It is not envisaged that the proposed developments would result in any potential impacts on the Tramore Dunes and Backstrand SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the SAC.	**Screened out**
Tramore Back Strand SPA	See Table 11 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts during both the construction stage and during the operational phase of the development.	**Screened in**
Project 9: Berth Deepening at the Container Terminal				
Lower River Suir SAC*	See Tables 3 and 4 Above	**The main threats to the Lower River Suir SAC habitats include:** • Impacts to the hydrodynamic regime and/or geomorphology of the estuary; • Direct habitat loss and / or disturbance to habitats as a result of construction of the proposed berth deepening of the container terminal;	Impacts to the hydrodynamic regime and/or geomorphology of the estuary are likely to change the balance and flux of sediments within the estuary and lead to modifications to the habitats for which the SAC is designated. Given the presence of designated habitats within the area where the proposed berth deepening of the container terminal development is to be constructed, both direct and indirect impacts on designated habitats will need to be considered further.	**Screened In**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
		• Impacts during construction such as siltation and pollution; • Accidental introduction of invasive species; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan. **Main threats to species include:** • Impacts to movement / migration; • Impacts associated with pollution during the construction works; • Disturbance / displacement and habitat loss; • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan; and, Impacts associated with increased shipping activities and vessel movements, i.e. increased disturbance, noise, erosion, impacts on water quality (such as mobilisation of sediments, ballast water).	The berth deepening of the container terminal will require construction works to take place within the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further consideration will therefore be require with regards to these species. In addition, consideration will need to be taken with regards to increased vessel movements / routes in and out of the port and potential increase in vessels sizes. Further consideration with regard to impacts on Annexed habitats and species will be required in association with these works and further progression within the AA process will be required.	
River Barrow and River Nore SAC	See Tables 5 and 6 Above	**The main threats to the River Barrow and Nore SAC habitats include:** • Impacts to the hydrodynamic regime and/or geomorphology of the estuary; • In-Direct impacts to habitats as a result of construction of the proposed berth deepening of the container terminal;	Impacts to the hydrodynamic regime and/or geomorphology of the estuary are likely to change the balance and flux of sediments within the estuary and lead to modifications to the habitats for which the SAC is designated. Given the presence of designated habitats within the area where the proposed berth deepening of the container terminal is to be constructed, both direct and indirect	**Screened In**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
		• Impacts during construction such as siltation and pollution; • Accidental introduction of invasive species; and, • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan. **Main threats to species include:** • Impacts to movement / migration; • Impacts associated with pollution during the construction works; • Disturbance / displacement and habitat loss; • In-combination effects as a result of the different elements of the proposed works as part of the Masterplan; and, Impacts associated with increased shipping activities and vessel movements, i.e. increased disturbance, noise, erosion, impacts on water quality (such as mobilisation of sediments, ballast water).	impacts on designated habitats will need to be considered further. The proposed berth deepening of the container terminal will require construction works to take place within the SAC. These works have the potential to cause both direct and indirect impacts on species for which the SAC is designated. Further consideration will therefore be required with regards to these species. In addition, consideration will need to be taken with regards to increased vessel movements / routes in and out of the port and potential increase in vessels sizes. Further consideration with regard to impacts on Annexed habitats and species will be required in association with these works and further progression within the AA process will be required.	
Hook Head SAC	See Table 7 Above	**The main threats to the Hood Head SAC habitats include:** • Potential impacts on habitats as a result of deposition of dredged material; Impacts associated with increased shipping activities and vessel movements, i.e. increased disturbance, erosion, impacts on water quality (such as mobilisation of sediments, ballast water).	Further consideration of deposition site(s) will be required to ensure that impacts can be avoided. Should site be located within or near the SAC, there is potential for the deposited material to have an impact on habitats for which the SAC is designated. In addition, consideration will need to be taken with regards to increased vessel movements / routes in and out of the port and potential increase in vessels sizes.	**Screened in**

Site Name	Qualifying Interests	Potential Impacts Arising From Masterplan / Threats to Site Integrity	Screening Rationale	Screening conclusion
Bannow Bay SAC	See Table 8 Above	No likely impacts	It is not envisaged that the proposed berth deepening of the container terminal would result in any potential impacts on the Bannow Bay SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the SAC.	**Screened out**
Bannow Bay SPA	See Table 9 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts during both the construction stage and during the operational phase of the development.	**Screened in**
Tramore Dunes and Backstrand SAC	See Table 10 Above	No likely impacts	It is not envisaged that the proposed berth deepening of the container terminal would result in any potential impacts on the Tramore Dunes and Backstrand SAC or any of the habitats for which it is designated. This assumption is based on the distance separating the proposed development area and the SAC.	**Screened out**
Tramore Back Strand SPA	See Table 11 Above	**Potential threats to species include:** Disturbance / displacement as a result of the developments.	A number of the species for which the SPA is designated are known or likely to utilise the estuary within close proximity to the development. Further consideration will therefore be required with regards to potential impacts during both the construction stage and during the operational phase of the development.	**Screened in**

***Refer to tables within section 4 for details on qualifier feature of interest**

5.2 Screening Conclusion

The screening process has examined the details of the proposed projects associated with the POW Master Plan and has considered the potential for causing impacts on Natura 2000 sites and their qualifying features of interest within a 15km radius of the study area.

The screening exercise identified the Lower River Suir SAC, River Barrow and River Nore SAC, Hook Head SAC, Tramore Backstrand SPA and Bannow Bay SPA as requiring further consideration as part of the appropriate assessment process due to the potential for impacts to occur.

5.3 Analysis of 'In-Combination' Effects

The Habitats Directive requires competent authorities to make an appropriate assessment of any plan or project which is likely to have a significant effect alone or in-combination with other plans and projects.

Due to the large size of the Lower River Suir SAC and River Barrow and River Nore SAC, there are numerous projects and activities which have the potential to affect the conservation interests of the site.

The current proposal will provide a physical framework for the sustainable development of the Port and is comprised of multiple projects which aim to reduce dredging requirements at the Port, to increase navigational safety and access to the Port, to provide additional capacity at the Port and to facilitate the development of new shore side berthing provisions and facilities.

A range of both shore and marine based projects will be included in the Master Plan to achieve these objectives and the developments will most likely interact with each other. However, it is considered that there will be no in-combination effects between these elements as the Master Plan will take place over several phases, with no other similar operations / activities in the immediate locality.

Taking the above into account, and considering the best practice measures which will be implemented, it is concluded that there will not be any significant in-combination contribution by the project to possible adverse effects on the interests of the Lower River Suir SAC and River Barrow and River Nore SAC.

6 SCREENING CONCLUSIONS AND STATEMENT

The screening process has examined the details of the proposed projects associated with the POW Master Plan and has considered the potential for causing impacts on Natura 2000 sites and their qualifying features of interest within a 15km radius of the study area.

The screening exercise identified that the Lower River Suir SAC, River Barrow and River Nore SAC, Hook Head SAC, Tramore Backstrand SPA and Bannow Bay SPA require further consideration as part of the appropriate assessment process due to the potential for impacts to occur.

Accordingly, further assessment and progression within Appropriate Assessment process is required.

7 REFERENCES

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NPWS. (2014). *Bannow Bay SPA; Site Synopsis.* National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

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NPWS. (2014). *Tramore Back Strand SPA.* National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

APPENDIX A

N

W E

S

N29

R733

Waterford

R683

R683

Ballyhack

Passage East

R683

R684

Duncannon

R737

R708

R684

R684

0 1 2 km

Dunmore East

R734

Legend

- Overall Project Area
- Project 1: Cheekpoint Lower Bar River Training Wall
- Project 2: Quay Wall Continuity
- Project 3: Belview Quay Extention
- Project 4: Turning Basin Development
- Project 5: Carter Patch Channel Widening
- Project 6: Approach Channel Deepening
- Project 7: Shore Side Developments
- Project 8: O'Brien Quay Extension
- Project 9: Berth Deepening
- Placement Site
  (Permitted by the EPA under Dumping at Sea Act 1996, as amended)

APPENDIX B

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Lower River Suir SAC 002137

An Roinn Ealaíon, Oidhreachta,
Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

Department of Arts, Heritage,
Regional, Rural and Gaeltacht Affairs

National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,

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Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Notes/Guidelines:

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

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002137	Lower River Suir SAC
1029	Freshwater Pearl Mussel *Margaritifera margaritifera*
1092	White-clawed Crayfish *Austropotamobius pallipes*
1095	Sea Lamprey *Petromyzon marinus*
1096	Brook Lamprey *Lampetra planeri*
1099	River Lamprey *Lampetra fluviatilis*
1103	Twaite Shad *Alosa fallax fallax*
1106	Salmon *Salmo salar*
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
1355	Otter *Lutra lutra*
1410	Mediterranean salt meadows (Juncetalia maritimi)
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
91A0	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
91E0	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)*
91J0	*Taxus baccata* woods of the British Isles*

Please note that this SAC is adjacent to River Barrow and River Nore SAC (002162). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjacent site as appropriate.

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

NPWS Documents

Year :	1998
Title :	Conservation management of the white-clawed crayfish, *Austropotamobius pallipes*
Author :	Reynolds, J.D.
Series :	Irish Wildlife Manual No. 1
Year :	2006
Title :	Otter survey of Ireland 2004/2005
Author :	Bailey, M.; Rochford, J.
Series :	Irish Wildlife Manual No. 23
Year :	2006
Title :	Initiation of a monitoring program for the freshwater pearl mussel, *Margaritifera margaritifera*, in the Clodiagh River (Suir)
Author :	Ross, E.
Series :	Unpublished report to NPWS
Year :	2007
Title :	A survey of juvenile lamprey populations in the Corrib and Suir catchments
Author :	O'Connor, W.
Series :	Irish Wildlife Manual No. 26
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 :	National survey of native woodlands 2003-2008
Author :	Perrin, P.M.; Martin, J.; Barron, S.; O'Neill, F.H.; McNutt, K.E.; Delaney, A.
Series :	Unpublished report to NPWS
Year :	2009
Title :	Saltmarsh monitoring project 2007-2008
Author :	McCorry, M.; Ryle, T.
Series :	Unpublished report to NPWS
Year :	2009
Title :	NS II freshwater pearl mussel sub-basin management plans: monitoring of the freshwater pearl mussel in the Clodiagh
Author :	Ross, E.
Series :	Unpublished report to NPWS
Year :	2009
Title :	NS II freshwater pearl mussel sub-basin management plans: fisheries survey. Stage 1 report
Author :	Paul Johnston Associates
Series :	Unpublished report to NPWS
Year :	2009
Title :	NS II freshwater pearl mussel sub-basin management plans: report on biological monitoring of surface water quality in Clodiagh (Waterford) catchment
Author :	Morgan, G.
Series :	Unpublished report to NPWS

Year :	2010
Title :	A provisional inventory of ancient and long-established woodland in Ireland
Author :	Perrin, P.M.; Daly, O.H.
Series :	Irish Wildlife Manual No. 46
Year :	2010
Title :	A technical manual for monitoring white-clawed crayfish (*Austropotamobius pallipes*) in Irish lakes
Author :	Reynolds, J., O'Connor, W., O'Keeffe, C.; Lynn, D.
Series :	Irish Wildlife Manual No.45
Year :	2010
Title :	Second draft Clodiagh freshwater pearl mussel sub-basin management plan (2009-2015). March 2010
Author :	NPWS
Series :	Unpublished document to the Department of Environment, Heritage and Local Government
Year :	2010
Title :	NS2 freshwater pearl mussel sub-basin management plans. Phytobenthos monitoring of the Clodiagh catchment, Co. Waterford (SERBD). June and July
Author :	Ní Chatháin, B.
Series :	Unpublished report to NPWS
Year :	2012
Title :	Lower River Shannon SAC (site code: 2165) Conservation objectives supporting document- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation V1
Author :	NPWS
Series :	Conservation objectives supporting document
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 :	Irish semi-natural grasslands survey 2007-2012
Author :	O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; Perrin, P.M.
Series :	Irish Wildlife Manual No. 78
Year :	2013
Title :	Results of monitoring survey of old sessile oak woods and alluvial forests
Author :	O'Neill, F.H.; Barron, S.J.
Series :	Irish Wildlife Manual No. 71
Year :	2013
Title :	Results of a monitoring survey of yew woodland
Author :	Cross, J.; Lynn, D.
Series :	Irish Wlidlife Manual No. 72
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments
Author :	NPWS
Series :	Conservation assessments

Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2017
Title :	Lower River Suir SAC (site code: 2137) Conservation objectives supporting document- coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2017
Title :	Survey and condition assessment of the freshwater pearl mussel, *Margaritifera margaritifera* (L.), in the Clodiagh River (Suir, Portlaw)
Author :	Ross, E.; Moorkens, E.; Killeen, I.
Series :	Unpublished report to NPWS

Other References

Year :	1898
Title :	Contributions towards a Cybele Hibernica. Second Edition
Author :	Colgan, N.; Scully, R.W.
Series :	Edward Ponsonby, Dublin
Year :	1982
Title :	Otter survey of Ireland
Author :	Chapman, P.J.; Chapman, L.L.
Series :	Unpublished report to Vincent Wildlife Trust
Year :	1988
Title :	The reproductive biology of freshwater mussels in Ireland, with observations on their distribution and demography
Author :	Ross, E.D.
Series :	Unpublished Ph.D. Thesis, National University of Ireland, Galway
Year :	1991
Title :	The spatial organization of otters (*Lutra lutra*) in Shetland
Author :	Kruuk, H.; Moorhouse, A.
Series :	Journal of Zoology, 224: 41-57
Year :	1992
Title :	Status of the freshwater pearl mussels *Margaritifera margaritifera* and *M. m. durrovensis* in the Nore, Barrow and Suir River tributaries, south-east Ireland
Author :	Moorkens, E.A.; Costello, M.J.; Speight, M.C.D.
Series :	Irish Naturalists' Journal, 24(3): 127-131
Year :	1996
Title :	Studies on the biology and ecology of *Margaritifera* in Ireland
Author :	Moorkens, E.
Series :	Unpublished Ph.D. thesis, University of Dublin, Trinity College.
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 :	Biology and Environment: Proceedings of the Royal Irish Academy, 99B: 173-182

Year :	2001
Title :	Aquatic plants in Britain and Ireland
Author :	Preston, C.D.; Croft, J.M.
Series :	Harley Books, Colchester
Year :	2002
Title :	Reversing the habitat fragmentation of British woodlands
Author :	Peterken, G.
Series :	WWF-UK, London
Year :	2002
Title :	A survey of the white-clawed crayfish (*Austropotamobius pallipes*) Lereboullet and of water quality in two catchments of eastern Ireland
Author :	Demers, A.; Reynolds, J.D.
Series :	Bulletin Francais de la Peche et de la Pisciculture, 367: 729-740
Year :	2003
Title :	Monitoring the river, sea and brook lamprey, *Lampetra fluviatilis*, *L. planeri* and *Petromyzon marinus*
Author :	Harvey, J.; Cowx, I.
Series :	Conserving Natura 2000 Rivers Monitoring Series No. 5. English Nature, Peterborough
Year :	2003
Title :	Ecology of watercourses characterised by Ranunculion fluitantis and Callitricho-Batrachion Vegetation
Author :	Hatton-Ellis, T.W.; Grieve, N.
Series :	Conserving Natura 2000 Rivers Ecology Series No. 11. English Nature, Peterborough
Year :	2003
Title :	Ecology of the allis and twaite shad
Author :	Maitland, P.S.; Hatton-Ellis, T.W.
Series :	Conserving Natura 2000 Rivers Ecology Series No. 3. English Nature, Peterborough
Year :	2003
Title :	Pondweeds of Great Britain and Ireland
Author :	Preston, C.D.
Series :	BSBI Handbook, No. 8, London
Year :	2003
Title :	Identifying lamprey. A field key for sea, river and brook lamprey
Author :	Gardiner, R.
Series :	Conserving Natura 2000 rivers, Conservation techniques No. 4. English Nature, Peterborough
Year :	2006
Title :	Otters - ecology, behaviour and conservation
Author :	Kruuk, H.
Series :	Oxford University Press
Year :	2006
Title :	The status of host fish populations and fish species richness in European freshwater pearl mussel (*Margaritifera margaritifera*) streams
Author :	Geist, J.; Porkka, M.; Kuehn, R.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 16: 251-266
Year :	2007
Title :	Evolutionary history of lamprey paired species *Lampetra fluviatilis* L. and *Lampetra planeri* Bloch as inferred from mitochondrial DNA variation
Author :	Espanhol, R.; Almeida, P.R.; Alves, M.J.
Series :	Molecular Ecology, 16: 1909-1924

Year :	2008
Title :	Poor water quality constrains the distribution and movements of twaite shad (*Alosa fallax fallax*, Lacepede, 1803) in the watershed of river Scheldt
Author :	Maas, J.; Stevens, M.; Breine, J.
Series :	Hydrobiologia, 602: 129-143
Year :	2008
Title :	Flora of County Waterford
Author :	Green, P.
Series :	The National Botanic Gardens 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 :	Addressing the conservation and rehabilitation of *Margaritifera margaritifera* populations in the Republic of Ireland within the framework of the habitats and species directive
Author :	Moorkens, E.
Series :	Journal of Conchology, 40: 339
Year :	2011
Title :	Comparison of field- and GIS-based assessments of barriers to Atlantic salmon migration: a case study in the Nore Catchment, Republic of Ireland
Author :	Gargan, P.G.; Roche, W.K.; Keane, S.; King, J.J.; Cullagh, A.; Mills, P.; O'Keeffe, J.
Series :	Journal of Applied Ichthyology, 27 (Suppl. 3): 66-72
Year :	2012
Title :	Rare and threatened bryophytes of Ireland
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	National Museums Northern Ireland
Year :	2013
Title :	Aspects of brook lamprey (*Lampetra planeri* Bloch) spawning in Irish waters
Author :	Rooney, S.M.; O'Gorman, N.M.; Green, F.; King, J.J.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, 113B(1): 13-25
Year :	2013
Title :	Management strategies for the protection of high status water bodies
Author :	Ní Chatháin, B.; Moorkens, E.; Irvine, K.
Series :	Strive Report Series No. 99. EPA, Wexford
Year :	2013
Title :	Interpretation manual of European Union habitats- Eur 28
Author :	European Commission- DG Environment
Series :	European Commission
Year :	2014
Title :	Assessing near-bed velocity in a recruiting population of the endangered freshwater pearl mussel (*Margaritifera margaritifera*) in Ireland
Author :	Moorkens, E.; Killeen, I.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 24(6): 853-862

Year :	2015
Title :	Water quality in Ireland 2010-2012
Author :	Bradley, C.; Byrne, C.; Craig, M.; Free, G.; Gallagher, T.; Kennedy, B.; Little, R.; Lucey, J.; Mannix, A.; McCreesh, P.; McDermott, G.; McGarrigle, M.; Ní Longphuirt, S.; O'Boyle, S.; Plant, C.; Tierney, D.; Trodd, W.; Webster, P.; Wilkes, R.; Wynne, C.
Series :	EPA, Wexford
Year :	2015
Title :	Behaviour of sea lamprey (*Petromyzon marinus* L.) at man-made obstacles during upriver spawning migration: use of telemetry to access efficacy of weir modifications for improved passage
Author :	Rooney, S.M.; Wightman, G.D.; O Conchuir, R.; King, J.J.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, 115B: 1-12
Year :	2015
Title :	River engineering works and lamprey ammocoetes; impacts, recovery, mitigation
Author :	King, J.J.; Wightman, G.D.; Hanna, G.; Gilligan, N.
Series :	Water and Environment Journal, 29: 482-488
Year :	2016
Title :	A narrative for conserving freshwater and wetland habitats in England
Author :	Mainstone, C.; Hall, R.; Diack, I.
Series :	Natural England Research Reports Number 064
Year :	2016
Title :	The Status of Irish Salmon Stocks in 2015 with Precautionary Catch Advice for 2016
Author :	SSCS (Standing Scientific Committee on Salmon)
Series :	Independent Scientific Report to Inland Fisheries Ireland
Year :	Undated
Title :	WFD111 (2a) Coarse resolution rapid-assessment methodology to assess obstacles to fish migration: Field manual level A assessment
Author :	SNIFFER (Scotland and Northern Ireland Forum for Environmental Research)
Series :	SNIFFER WFD111

Spatial data sources

Year :	Revision 2010
Title :	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1330, 1410 (map 3)
Year :	Revision 2010
Title :	National Survey of Native Woodlands 2003-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	91A0, 91E0 (maps 4 and 5)
Year :	Revision 2012
Title :	Margaritifera Sensitive Areas data
GIS Operations :	Relevant catchment boundaries identified. Expert opinion used as necessary to resolve any issues arising
Used For :	1029 (map 6)
Year :	2016
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 :	1029, 1092 (maps 6 and 7)
Year :	2010
Title :	EPA WFD Waterbodies data
GIS Operations :	Creation of 20m buffer to river and stream centreline data. Dataset combined with derived OSi data for 1355 SSCO. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1355 (no map)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	Creation of 80m buffer on the marine side of high water mark (HWM); creation of 10m buffer on terrestrial side of HWM; combination of 80m and 10m HWM buffer datasets. Datasets combined with derived EPA WFD Waterbodies data for 1355 SSCO. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1355 (no map)

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

To restore the favourable conservation condition of Atlantic salt meadows (Glauco-Puccinellietalia maritimae) in Lower River Suir 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 the sub-site (Little Island) and potential areas mapped: 33.43ha. See map 3	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). The sub-site Little Island (SMP site ID: SMP0052) that supports Atlantic Salt Meadows (ASM) was mapped during the SMP (4.11ha) and additional areas of potential ASM habitat (29.32ha) were identified from an examination of aerial photographs, giving a total estimated area of 33.43ha within Lower River Suir SAC. NB further unsurveyed areas may be present within the SAC. See the Lower River Suir SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 3 for known and potential distribution	Based on data from McCorry and Ryle (2009). Saltmarsh occurs on the River Suir estuary downstream of Waterford City in old flood meadows where the embankment is absent, or has been breached, and along the tidal stretches of some of the in-flowing channels below Little Island. NB further unsurveyed areas may be present within the SAC. See the coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry and Ryle (2009). See the 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). Little Island saltmarsh contains a well-developed topography and large, deep creeks are present. See the coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Based on data from McCorry and Ryle (2009). Much of the shoreline along the Lower River Suir channel has been modified by embankments, infilling and drainage. See the 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). There are several saltmarsh communities present and zonation is moderately well-developed in the sub-site surveyed. The ASM transitions to grassland and freshwater habitats. This is typical of an estuary type saltmarsh with a significant freshwater influence. See the coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). As the sub-site is not grazed, the sward height is lush and rank in places. However, the overall sward structure is still quite variable. See the coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative number of monitoring stops	Maintain more than 90% of the area outside of creeks vegetated	Based on data from McCorry and Ryle (2009). See the 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 McCorry and Ryle (2009)	See the coastal habitats supporting document for further details

Vegetation composition: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1% where it is known to occur	Based on data from McCorry and Ryle (2009). Common cordgrass (*Spartina anglica*) is present in the SAC, but swards are not a significant feature. See the coastal habitats supporting document for further details

1410 Mediterranean salt meadows (Juncetalia maritimi)

To restore the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in Lower River Suir 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	Mediterranean Salt Meadows (MSM) habitat was not recorded in Lower River Suir SAC during the Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). Thus the total area of the qualifying habitat in the SAC is unknown. An NPWS survey in the 1990s noted stands of sea rush (*Juncus maritimus*), indicative of MSM, on the saltmarsh at Grantstown (NPWS internal files), but the habitat was not recorded in the Little Island sub-site during the SMP in 2007 (McCorry and Ryle, 2009). NB unsurveyed areas may be present within the SAC. See the Lower River Suir SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes	See note on area above. NB unsurveyed areas may be present within the SAC. See the coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Attribute and target based on data from McCorry and Ryle (2009). See the 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	Attribute and target based on data from McCorry and Ryle (2009). See the coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Attribute and target based on data from McCorry and Ryle (2009). Mediterranean salt meadow habitat is found high up in the saltmarsh but requires occasional tidal inundation. See the 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	Attribute and target based on data from McCorry and Ryle (2009). See the coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation in the sward	Attribute and target based on data from McCorry and Ryle (2009). See the coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative number of monitoring stops	Maintain more than 90% of the area outside of creeks vegetated	Attribute and target based on data from McCorry and Ryle (2009). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with characteristic species listed in McCorry and Ryle (2009)	See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1% where it is already known to occur	Attribute and target based on data from McCorry and Ryle (2009). See the coastal habitats supporting document for further details

3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

To maintain the favourable conservation condition of Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation in Lower River Suir SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Kilometres	Area stable or increasing, subject to natural processes	The description of habitat 3260 covers upland rivers with bryophytes and macroalgae to lowland depositing rivers with pondweeds and starworts. The selection of Lower River Suir SAC used this broad interpretation. Conservation objectives for habitat 3260 concentrate on the high conservation value sub-types, however, little is known of the habitat's distribution or its sub-types in Lower River Suir SAC. There is a large number of lowland and tidal rivers in the SAC, as well as faster-flowing tributaries. Note: rooted macrophytes should be absent or trace (<5% cover) in freshwater pearl mussel (*Margaritifera margaritifera*) habitat. The freshwater pearl mussel (1029) conservation objective takes precedence over this objective for habitat 3260 in the Clodiagh River (Portlaw) within this SAC, because the mussel requires environmental conditions close to natural background levels
Habitat distribution	Occurrence	No decline, subject to natural processes	Further study is needed of Irish sub-types and their conservation value to interpret the broad description of habitat 3260 (European Commission, 2013). As noted above, little is known about the distribution of the habitat and its sub-types in Lower River Suir SAC. The uncommon, protected opposite-leaved pondweed (*Groenlandia densa*) was recorded in the SAC from floodplain ditches of the Suir near Carrick-on-Suir and Clonmel, as well as the Clodiagh near Portlaw (Colgan and Scully, 1898; NPWS internal files). See NPWS (2012) for information on the requirements of opposite-leaved pondweed. There are no known records for rare or threatened bryophytes from the rivers in the SAC (Lockhart et al., 2012). The rivers in the SAC are mainly lowland, depositing and tidal, and are likely dominated by marginal and submerged higher plants. Some fast-flowing rivers also occur that should, naturally, be dominated by macroalgae and bryophytes, with limited submerged or emergent higher plants
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	High conservation value sub-types are associated with natural hydrology. A natural flow regime is required for both plant communities and channel geomorphology to be in favourable condition, exhibiting typical dynamics for the river type (Hatton-Ellis and Grieve, 2003). For many sub-types, high flows are required to maintain the substratum necessary for the characteristic species. Flow variation can be particularly important, with high and flood flows being critical to the hydromorphology. Other aspects of hydrology, such as tidal regime, are important for certain sub-types of the habitat. The rivers in the SAC vary from naturally flashy, through depositing to tidal reaches
Hydrological regime: groundwater discharge	Metres per second	Maintain appropriate hydrological regime	Even small groundwater contributions can significantly alter hydrochemistry, particularly where there is basic bedrock and/or subsoils. Freshwater seepages can be very important in tidal reaches

Hydrological regime: tidal influence	Daily water level fluctuations - metres	Maintain natural tidal regime	Opposite-leaved pondweed (*Groenlandia densa*) is typical of the tidal reaches of large Irish rivers, e.g. Suir, Slaney, Shannon and Blackwater (see Preston and Croft, 2001; Preston, 2003). This species is listed as Near Threatened (Wyse Jackson et al., 2016) and is protected on the Flora (Protection) Order, 2015 (Statutory Instrument No. 356 of 2015). Both the disturbance and substratum associated with the tidal regime may be important drivers
Substratum composition: particle size range	Millimetres	Maintain appropriate substratum particle size range, quantity and quality, subject to natural processes	Many of the high conservation value sub-types are dominated by coarse substrata, and it is likely that bedrock, boulders, cobbles and coarse gravels were naturally abundant in many tributaries in this SAC, particularly where the freshwater pearl mussel (*Margaritifera margaritifera*) occurred. Fine substrata are naturally abundant in depositing and tidal reaches. The size and distribution of particles are largely determined by the river flow. The chemical composition (particularly minerals and nutrients) of the substratum is also important. The quality of finer sediment particles is a notable driver of rooted plant communities. Note: increased fine sediment is contributing to the unfavourable status of the freshwater pearl mussel in the Clodiagh. See the freshwater pearl mussel (1029) conservation objective
Water quality	Various	Maintain appropriate water quality to support the natural structure and functioning of the habitat	The specific targets may vary among sub-types. Depositing and tidal stretches of rivers may, naturally, be more nutrient-rich and, therefore Water Framework Directive (WFD) good status may suffice in terms of nutrient and oxygenation standards, and EQRs (Ecological Quality Ratios) for macroinvertebrates and phytobenthos. Faster-flowing tributaries that are naturally dominated by bryophytes and macroalgae typically require WFD high status. High status targets apply to freshwater pearl mussel (*Margaritifera margaritifera*) habitat in the Clodiagh (see The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 - S.I. No. 296 of 2009). See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009), Environmental Protection Agency (EPA) river water quality reports (e.g. Bradley et al., 2015) and Ní Chatháin et al. (2013)
Typical species	Occurrence	Maintain typical species in good condition, including appropriate distribution and abundance	The sub-types of this habitat are poorly understood and their typical species have not yet been fully defined. The typical species may include higher plants, bryophytes, macroalgae and microalgae, and invertebrates. As noted above, the protected vascular plant species opposite-leaved pondweed (*Groenlandia densa*) is associated with rivers and floodplains in the SAC. The banks of the Suir, particularly its tidal stretches, support a notable population of the rare *Rumex crispus* subsp. *uliginosus* (Green, 2008)
Floodplain connectivity	Hectares	Maintain floodplain connectivity necessary to support the typical species and vegetation composition of the habitat	River connectivity with the floodplain is important for the functioning of this habitat. Channels with a naturally functioning floodplain are better able to maintain habitat and water quality (Hatton-Ellis and Grieve, 2003). Floodplain connectivity is particularly important in terms of sediment sorting and nutrient deposition. High conservation value rivers are intimately connected to floodplain habitats and function as important wildlife corridors, connecting otherwise isolated or fragmented habitats in the wider countryside (Hatton-Ellis and Grieve, 2003; Mainstone et al., 2016). Alluvial woodland (91E0) is an important feature of rivers in Lower River Suir SAC (see the conservation objective for 91E0)

Fringing habitats	Hectares	Maintain marginal fringing habitats that support the typical species and vegetation composition of the habitat	Riparian habitats (including those along lake shores), particularly natural/semi-natural woodlands and wetlands, are an integral part of the structure and functioning of river systems, even where they do not form part of a natural floodplain. Fringing habitats can contribute to the aquatic food web (e.g. allochthonous matter such as leaf fall), provide habitat (refuge and resources) for certain life-stages of fish, birds and aquatic invertebrates, assist in the settlement of fine suspended material, protect banks from erosion and contribute to nutrient cycling. Shade may also be important in suppressing algal growth in enriched rivers and moderating temperatures. Equally, fringing habitats are dependent on rivers/lakes, particularly their water levels, and support wetland communities and species of conservation concern. See Mainstone et al. (2016). Alluvial and riparian woodland is important for the rivers in Lower River Suir SAC

6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

To maintain the favourable conservation condition of Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels in Lower River Suir 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	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels habitat has not been mapped in detail for Lower River Suir SAC and thus the total area of the qualifying habitat in the SAC is unknown. The lowland type communities of the habitat are considered to occur in association with the various areas of alluvial forest (91E0) within the SAC, notably at Fiddown, below Carrick-on-Suir and at Tibberaghny Marshes. This habitat type would also be expected to occur in association with other woodland types in fringe areas along the river and with areas of open marsh or wet grassland within the SAC (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See notes on area above
Hydrological regime: Flooding depth/height of water table	Metres	Maintain appropriate hydrological regime	This habitat requires winter inundation, which results in deposition of naturally nutrient-rich sediment
Vegetation composition: positive indicator species	Number of species at a representative number of monitoring stops	At least three positive indicator species present	Attribute and target based on O'Neill et al. (2013), where the list of positive indicator species is also presented
Vegetation composition: positive indicator species	Percentage cover at a representative number of monitoring stops	Cover of positive indicator species at least 40%	Attribute and target based on O'Neill et al. (2013), where the list of positive indicator species is also presented
Vegetation composition: non-native species	Percentage cover at a representative number of monitoring stops	Cover of non-native species not more than 1%	Attribute and target based on O'Neill et al. (2013). The spread of Japanese knotweed (*Fallopia japonica*) is noted as a threat at Tibberaghny (NPWS internal files)
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Cover of negative indicator species not more than 33%	Attribute and target based on O'Neill et al. (2013), where the list of negative indicator species is also presented
Vegetation composition: scrub, bracken and heath	Percentage at a representative number of monitoring stops	Cover of scrub, bracken (*Pteridium aquilinum*) and heath not more than 5%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: height	Height (centimetres) at a representative number of monitoring stops	Herb height at least 50cm	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare soil	Percentage at a representative number of monitoring stops	Cover of bare soil not more than 10%	Attribute and target based on O'Neill et al. (2013)
Physical structure: grazing and disturbance	Square metres in local vicinity of a representative number of monitoring stops	Area of the habitat showing signs of serious grazing or disturbance less than 20m²	Attribute and target based on O'Neill et al. (2013)

91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles

To restore the favourable conservation condition of Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles in Lower River Suir 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 29.3ha for sites surveyed. See map 4	Old sessile oak woods with *Ilex* and *Blechnum* were surveyed in Lower River Suir SAC by Perrin et al. (2008) as part of the National Survey of Native Woodlands (NSNW) at Lyranearla (NSNW site code: 1834) and Inchinsqullib Wood (NSNW site code: 1898). The area of old oak woodlands in the surveyed sites within the SAC is estimated to be 29.3ha. It is important to note that further unsurveyed areas are present within the SAC, including at Portlaw Wood within the Curraghmore Estate and other small pockets within the SAC (NPWS internal files). Map 4 shows the old oak woodlands surveyed by Perrin et al. (2008)
Habitat distribution	Occurrence	No decline. Surveyed locations shown on map 4	Distribution shown based on Perrin et al. (2008). NB further unsurveyed areas are present within this SAC
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The target areas for individual woodlands aim to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). In some cases, 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 NPWS internal files
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008) and NPWS internal files
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Oak (*Quercus petraea*) generally regenerates poorly. In suitable sites, ash (*Fraxinus excelsior*) can regenerate in large numbers although few seedlings reach pole size
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; both categories should include stems greater than 40cm diameter	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
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 distinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands (see Perrin and Daly, 2010), archaeological and geological features as well as red-listed and other rare or localised species. The rare lichen tree lungwort (*Lobaria pulmonaria*), an indicator of ancient woodlands, is found in Portlaw Wood (NPWS internal files)
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008) and NPWS internal files

Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including oak (*Quercus petraea*) and birch (*Betula pubescens*)	Species reported in Perrin et al. (2008) and NPWS internal files
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	Rhododendron (*Rhododendron ponticum*) infestation at Portlaw Wood is noted as being serious, as well as the occurrence of beech (*Fagus sylvatica*), sycamore (*Acer pseudoplatanus*) and silver fir (*Abies alba*) in the woodland (NPWS internal files). Beech was reported from Lyranearla (NSNW site code: 1834) by Perrin et al. (2008)

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* (Alno-Padion, Alnion incanae, Salicion albae)* in Lower River Suir 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 32.9ha for sites surveyed. See map 5	Alluvial forest was surveyed in Lower River Suir SAC by Perrin et al. (2008) as part of the National Survey of Native Woodlands (NSNW) at Fiddown (NSNW site code: 0022), Mountbolton (NSNW site code: 1823) and Ballycanvan Big (NSNW site code: 1839). Fiddown (0022) was also included in a national monitoring survey (O'Neill and Barron, 2013). The area of alluvial woodlands in the surveyed sites within the SAC is estimated to be 32.9ha. It is important to note that further unsurveyed areas of alluvial forest are present within the SAC, for example at islands below Carrick-on-Suir, at Shanbally (Coillte LIFE project site), Tibberaghny Marshes, along the lower stretches of the more westerly of the Suir tributaries and along both banks of the Suir as far east as the Dawn River (NPWS internal files). Map 5 shows the alluvial woodlands surveyed by Perrin et al. (2008)
Habitat distribution	Occurrence	No decline. Surveyed locations shown on map 5	Distribution shown based on Perrin et al. (2008). NB further unsurveyed areas are present within the SAC
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The target areas for individual woodlands aim to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). In some cases, 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 NPWS internal files
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008) and NPWS internal files
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 (*Alnus glutinosa*) and oak (*Quercus* spp.) tend to regenerate poorly. Ash (*Fraxinus excelsior*) 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; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder (*Alnus glutinosa*))	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
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 distinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-listed and other rare or localised species. Perrin and Daly (2010) identify the site Ballycanvan Big (NSNW site code: 1839) as being "possible ancient woodland"
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008) and NPWS internal files
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including alder (*Alnus glutinosa*), willows (*Salix* spp.), oak (*Quercus* spp.), ash (*Fraxinus excelsior*) and birch (*Betula pubescens*)	Species reported in Perrin et al. (2008) and NPWS internal files
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	Norway spruce (*Picea abies*) and sycamore (*Acer pseudoplatanus*) occur at Shanbally (NPWS internal files). Spread of Japanese knotweed (*Fallopia japonica*) is a problem at Tibberaghny (NPWS internal files). Cherry laurel (*Prunus laurocerasus*) and rhododendron (*Rhododendron ponticum*) have been reported as occurring in part of Ballycanvan Big (NSNW site code: 1839) by Perrin et al. (2008), but not within the alluvial woodland

91J0 Taxus baccata woods of the British Isles

To restore the favourable conservation condition of *Taxus baccata* woods of the British Isles* in Lower River Suir 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	*Taxus baccata* woods of the British Isles habitat has not been mapped in detail for Lower River Suir SAC and thus the total area of the qualifying habitat is unknown. Yew (*Taxus baccata*) woodland is known to occur at Cahir Park in an area of c.500m by 50m. Cahir Park was included in a national monitoring survey of yew woodland (Cross and Lynn, 2013). NB further unsurveyed areas may be present within the SAC
Habitat distribution	Occurrence	No decline	A narrow stand of yew woodland occurs along the steep western flank of a limestone knoll at Cahir Park within Lower River Suir SAC. See Cross and Lynn (2013) for further details. NB further unsurveyed areas may be present within the SAC
Woodland size	Hectares	Area stable or increasing	Yew (*Taxus baccata*) has been planted on deeper soil on top of the knoll at Cahir Park. If the transplants survive, the area of yew woodland will be considerably expanded. See Cross and Lynn (2013) for further details
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 herb and bryophyte layer	See Perrin et al. (2008) and Cross and Lynn (2013) for further details
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	See Perrin et al. (2008) and Cross and Lynn (2013) 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	Yew (*Taxus baccata*) regenerates poorly under its own canopy but can regenerate under a canopy of other species or in the open if the competition from the field layer is not too strong
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; both categories should include stems greater than 40cm diameter	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
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 woodlands (see Perrin and Daly, 2010), archaeological and geological features as well as red-data and other rare or localised species
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	See Perrin et al. (2008) and Cross and Lynn (2013) for further details
Vegetation composition: typical species	Occurrence	A variety of typical native species present, including yew (*Taxus baccata*) and ash (*Fraxinus excelsior*)	See Perrin et al. (2008) and Cross and Lynn (2013) for further details

Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The most common invasive species in this woodland type is beech (*Fagus sylvatica*), although there is evidence to suggest that it actually facilitates regeneration of yew (*Taxus baccata*). Numerous exotic species, including cherry laurel (*Prunus laurocerasus*) in particular, have been reported from Cahir Park (Cross and Lynn, 2013)

1029 Freshwater Pearl Mussel *Margaritifera margaritifera*

To restore the favourable conservation condition of Freshwater Pearl Mussel in Lower River Suir SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Kilometres	Restore distribution to 10.4km. See map 6	The conservation objective applies to the Clodiagh freshwater pearl mussel (*Margaritifera margaritifera*) population, which is listed on The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. (S.I. 296 of 2009). Full baseline distribution and abundance mapping was conducted in 2006 (Ross, 2006). Mussel habitat is widespread in the Clodiagh, with mussels almost continually present in low numbers from downstream of Clonea to above Portlaw (Ross, 2006). Mussels were nowhere abundant; maximum density was 3 per square metre (Ross, 2006). The habitat is significantly below carrying-capacity. The distribution in the Clodiagh has contracted since the 1990s (Ross, 2006). The target is for the species to be sufficiently widespread to maintain itself on a long-term basis as a viable component of the Clodiagh system. See NPWS (2010) for further information
Population size	Number of adult mussels	Restore population to at least 10,000 adult mussels	Ross (2006) counted 1,206 mussels and estimated a total population of 2,412, concluding that, given the large areas of physically suitable habitat, a much larger population was previously present and a major population decline had occurred. Ross (2009) measured an 18.5% decline in mussel numbers between 2006 and 2009 at transect 1, indicating continued losses. Ross et al. (2017) recorded 'rapid and alarming' declines of 56-94% between 2006 and 2016 at five monitoring locations (67% decline overall). Moorkens (2010) estimated the population to be less than 10,000. The target of 10,000 is considered appropriate for a functional, self-sustaining population. NPWS (2013), in producing a national population estimate, assumed the Clodiagh population had declined at a rate of 3% per year. The target is for the species to be sufficiently abundant to maintain itself on a long-term basis as a viable component of the Clodiagh system
Population structure: recruitment	Percentage per size class	Restore to at least 20% of each population no more than 65mm in length; and at least 5% of each population no more than 30mm in length	Mussels ≤65mm are 'young mussels' and found buried in the substratum or beneath adult mussels. Mussels ≤30mm are 'juvenile mussels' and always buried in the substratum. See the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Clodiagh failed both targets in 2006, 2009 and 2016 (Ross, 2006, 2009; NPWS, 2010; Ross et al., 2017). Ross (2006) found no juveniles, ≤65mm extremely uncommon, smallest individual was 45.4mm and 97% was >80mm. In 2009, the smallest mussel was 78mm and (based on Ross, 1988) 15-20 years old (Ross, 2009). The smallest of 21 mussels measured in 1986 was 48.6mm (Ross, 1988). NPWS (2010) concluded there had been no successful recruitment from 1986 to 2009. The Clodiagh population is considered to be unsustainable owing to lack of survival of juvenile and adult mussels. The target is for sufficient juvenile recruitment to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system

Population structure: adult mortality	Percentage	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	5% is considered the cut-off between the combined errors associated with natural fluctuations and sampling methods and evidence of true population decline. 1% of dead shells is considered to be indicative of natural losses. The Clodiagh failed both targets in 2009 (Ross, 2009; NPWS, 2010) and, as noted above, a major population decline has occurred (Ross, 2006; Ross et al., 2017), and is presumed to be on-going. In 2009, 1 transect and 1 delimited count were counted: T1 numbers had fallen from 27 in 2006 to 22, representing a 18.5% decline, while numbers were the same in C2. Seven dead shells were found among 23 live mussels at one location, indicating high mortality in parts of the Clodiagh. In 2016, 67 mussels were counted at five monitoring sites that had 205 mussels in 2006 (Ross et al., 2017). The target is for sufficient survival of adults to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system
Suitable habitat: extent	Kilometres	Restore suitable habitat in more than 8.8km in the Clodiagh system and any additional stretches necessary for salmonid spawning	Mussel habitat in the Clodiagh is known to occur from Clonea to Portlaw, and is sparsely occupied from c.630m downstream of Clonea to c.1.8km above Portlaw (Ross, 2006). Mussels were recorded at Portlaw as recently as the 1990s and downstream of Portlaw in the early 20th century. It is possible that some mussel habitat occurs upstream or downstream of the mapped stretches, but few mussels are likely to be found (Ross, 2006). The mussel habitat has been severely impacted for a significant period by sedimentation, other hydromorphological changes, organic pollution and eutrophication (NPWS, 2010). The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system
Suitable habitat: condition	Kilometres	Restore condition of suitable habitat	The species' habitat is a combination of the area of 1) habitat adult and juvenile mussels can occupy; 2) spawning and nursery habitats host fish can occupy. Fish nursery and mussel habitat typically overlap. Fish spawning habitat is generally adjacent to mussel habitat, but may lie upstream of the generalised mussel distribution. Only spawning areas that regularly contribute juvenile fish to adult mussel habitat should be considered. Availability of mussel and fish habitat is determined by flow and substratum conditions. It is highly sensitive to hydromorphological changes, sedimentation and enrichment. Pressures throughout the catchment contribute to such impacts. Mussel habitat is widespread in the Clodiagh but in unfavourable condition owing to sedimentation, other hydro-morphological changes and nutrient enrichment. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system

Water quality: macroinvertebrate and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Restore water quality - macroinvertebrates: EQR greater than 0.90 (Q4-5 or Q5); phytobenthos: EQR greater than 0.93	The EQRs correspond to high ecological status for these two Water Framework Directive biological quality elements. They represent high water quality with very low nutrient concentrations (oligotrophic conditions). In 2009, the habitat in the Clodiagh system failed the macroinvertebrate target, but passed the phytobenthos target (Morgan, 2009; Ní Chatháin, 2010; NPWS, 2010). Q values in the mussel habitat were Q3-Q4 (Morgan, 2009). There has been a gradual decline in quality at several main-channel sites since the late 1970s (Morgan, 2009). Sewage discharge at Clonea is impacting water quality downstream of Clonea Bridge (Ross, 2006; Morgan, 2009; Ní Chatháin, 2010; NPWS, 2010). See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system
Substratum quality: filamentous algae (macroalgae); macrophytes (rooted higher plants)	Percentage	Restore substratum quality - filamentous algae: absent or trace (less than 5%); macrophytes: absent or trace (less than 5%)	The Clodiagh failed the macrophyte target, but marginally passed the macroalgal target in 2009 (NPWS, 2010). Patches of abundant *Ranunculus* were recorded by all surveyors, with up to 40% cover in places (Morgan, 2009; Ross, 2009; Ní Chatháin, 2010; NPWS, 2010). Ross (2006) also recorded widespread and, in places, abundant (up to 80%) *Ranunculus*. Algae were generally absent in 2009, however up to 10% *Cladophora* cover was recorded downstream of Clonea Bridge (Ní Chatháin, 2010; NPWS, 2010), where sewage fungus had previously been recorded (Ross, 2006). Algae were also sparse in 2006 and 2016 (Ross, 2006; Ross et al., 2017). Tree shade may be supressing plant growth over much of the mussel habitat (Ross et al., 2017). The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system
Substratum quality: sediment	Occurrence	Restore substratum quality - stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment	The Clodiagh failed the target for the Sub-basin Management Plan in 2009 and 2016, with strong silt plumes recorded in mussel habitat (Ross, 2009; NPWS, 2010; Ross et al., 2017). Ross et al. (2017) recorded extremely heavy silt plumes at every site, even in fast riffles. Ross (2006) recorded significant siltation of the mussel habitat and observed river bank erosion and collapse, and livestock entry to the river. Silt in the Clodiagh is providing a rooting medium for macrophytes. Sufficient survival of juvenile and adult mussels is being prevented by the poor condition of the river substratum. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system
Substratum quality: oxygen availability	Redox potential	Restore to no more than 20% decline from water column to 5cm depth in substrate	Differences in redox potential between the water column and the substrate correlate with differences in oxygen levels. Juvenile mussels require full oxygenation while buried in gravel. In suitable habitat, there should be very little loss of redox potential between the water column and underlying gravels. Average redox was very poor, 23-28% at four sites monitored in 2016, only three of the 40 measurements was <20% (Ross et al., 2017). The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system

Hydrological regime: flow variability	Metres per second	Maintain appropriate hydrological regime	The availability of suitable freshwater pearl mussel habitat is largely determined by flow (catchment geology being the other key factor). To restore the habitat for the species, flow variability over the annual cycle must be such that: 1) high flows can wash fine sediments from the substratum; 2) high flows are not artificially increased so as to cause excessive scour of mussel habitat; 3) low flows do not exacerbate the deposition of fine sediment or growth of algae/macrophytes and 4) low flows do not cause stress to mussels in terms of exposure, water temperatures, food availability or aspects of the reproductive cycle; see Moorkens and Killeen (2014). Groundwater inflow to the substratum contributes to water-cycling. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of Clodiagh system
Host fish	Number	Maintain sufficient juvenile salmonids to host glochidial larvae	Salmonid fish are host to the larval stage of the freshwater pearl mussel and essential to completion of the life cycle. 0+ and 1+ fish are typically used, both because of habitat overlaps and the development of immunity with age in fish. Fish presence is sufficient, as higher fish density and biomass is indicative of enriched conditions in mussel rivers. Geist et al. (2006) found that higher densities of host fish coincided with eutrophication, poor substrate quality for mussels and a lack of mussel recruitment, while significantly lower host fish density and biomass were associated with high juvenile mussel numbers. Fish movements must be such that 0+ fish remain in the mussel habitat until their 1+ summer. No fish stocking should occur within the mussel habitat, nor any works that may change the salmonid balance or residency time. No glochidia were found on young Clodiagh fish in May 2009, although six trout and 38 salmon were caught (Johnston, 2009; NPWS, 2010)
Fringing habitat: area and condition	Hectares	Restore the area and condition of fringing habitats necessary to support the population	Riparian habitats, including those along lake fringes, particularly natural/semi-natural woodlands and wetlands, even where they do not form part of a natural floodplain, are an integral part of the structure and functioning of river systems. Fringing habitats aid in the settlement of fine suspended matter, protect banks from erosion, contribute to nutrient cycling and to the aquatic food web (e.g. allochthonous matter such as leaf fall) and provide habitat for life-stages of fish, birds and aquatic invertebrates. Shade may also be important in suppressing algal and macrophyte growth in enriched rivers (e.g. along parts of the Clodiagh) and moderating temperatures. Equally, fringing habitats are dependent on rivers/lakes, particularly their water levels, and support wetland communities and species of conservation concern. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Clodiagh system

1092 White-clawed Crayfish *Austropotamobius pallipes*

To maintain the favourable conservation condition of White-clawed Crayfish in Lower River Suir SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Occurrence	No reduction from baseline. See map 7	White-clawed crayfish (*Austropotamobius pallipes*) occurs extensively on the River Suir and on many of its tributaries. On the River Suir main channel, the species has been recorded on almost the entire length of non-tidal river from the most upstream point at Cabragh, near Thurles, to downstream of Kilsheelan. It is also present on the following tributaries: Anner and Clashawley, Clodiagh and Owenbeg, Multeen, Tar, Nier, and Clodiagh Lower
Population structure: recruitment	Occurrence of juveniles and females with eggs	Juveniles and/or females with eggs in all occupied tributaries	See Reynolds et al. (2010) for further details
Negative indicator species	Occurrence	No alien crayfish species	Alien crayfish species are identified as a major direct threat to this species and as a disease vector. Ireland is currently free of non-native invasive crayfish species. See Reynolds (1998) for further details
Disease	Occurrence	No instances of disease	Disease is identified as a major threat and crayfish plague has occurred in Ireland even in the absence of alien vectors. Disease can, in some circumstances, be introduced through contaminated equipment and water in the absence of vector species. See Reynolds (1998) for further details
Water quality	EPA Q value	At least Q3-4 at all sites sampled by EPA	Target taken from Demers and Reynolds (2002). Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)
Habitat quality: heterogeneity	Occurrence of positive habitat features	No reduction in habitat heterogeneity or habitat quality	Crayfish need high habitat heterogeneity. Larger crayfish must have stones to hide under, or an earthen bank in which to burrow. Hatchlings shelter in vegetation, gravel and among fine tree roots. Smaller crayfish are typically found among weed and debris in shallow water. Larger juveniles in particular may also be found among cobbles and detritus, such as leaf litter. These conditions must be available on the whole length of occupied habitat

1095 Sea Lamprey *Petromyzon marinus*

To restore the favourable conservation condition of Sea Lamprey in Lower River Suir SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	Artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting the species to lower stretches and restricting access to spawning areas (Gargan et al., 2011; Rooney et al., 2015). Float-over surveys by Inland Fisheries Ireland (IFI) point to little success of sea lamprey adults in passing the weirs in Clonmel in Lower River Suir SAC. Modifications to these weirs would facilitate upstream passage of sea lamprey. IFI has embarked on a programme of detailed survey of major barriers in SAC catchments, in the context of sea lamprey passage, using the SNIFFER (Scotland and Northern Ireland Forum for Environmental Research) WFDIII methodology
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor (2007). A catchment-wide larval lamprey survey was completed by IFI in 2016. The data are currently being analysed
Juvenile density in fine sediment	Juveniles/m²	Juvenile density at least 1/m²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003). A catchment-wide larval lamprey survey was completed by IFI in 2016. The data are currently being analysed
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by IFI. Lampreys spawn in clean gravels. Substantial areas of suitable spawning habitat are available from Cahir to Carrick-on-Suir, but access to areas upstream of Clonmel is problematic
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	Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King et al., 2015). However, it is vital that such sedimenting habitats are retained

1096 Brook Lamprey *Lampetra planeri*

To restore the favourable conservation condition of Brook Lamprey in Lower River Suir SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage of river accessible	Access to all water courses down to first order streams	Artificial barriers can block or cause difficulties to lampreys' migration both up- and downstream, thereby possibly limiting species to specific stretches, restricting access to spawning areas and creating genetically isolated populations (Espanhol et al., 2007)
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor (2007). It is impossible to distinguish between brook and river lamprey juveniles in the field (Gardiner, 2003), 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. A catchment-wide larval lamprey survey was completed by Inland Fisheries Ireland (IFI) in 2016. The data are currently being analysed
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by IFI. Brook lampreys spawn in clean gravels where they excavate shallow nests and can spawn communally (Rooney et al., 2013)
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	Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King et al., 2015). However, it is vital that such sedimenting habitats are retained

1099 River Lamprey *Lampetra fluviatilis*

To restore the favourable conservation condition of River Lamprey in Lower River Suir SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage of river accessible	Access to all water courses down to first order streams	Artificial barriers can block river lampreys' migration both up- and downstream, thereby limiting species to specific stretches, restricting access to spawning areas and creating genetically isolated populations (Espanhol et al., 2007)
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) and O'Connor (2007). It is impossible to distinguish between river and brook lamprey juveniles in the field (Gardiner, 2003), 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. A catchment-wide larval lamprey survey was completed by Inland Fisheries Ireland (IFI) in 2016. The data are currently being analysed
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by Inland Fisheries Ireland (IFI). River lampreys spawn in clean gravels where thay excavate shallow nests and can spawn communally in numbers (Rooney et al., 2013)
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	Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King et al., 2015). However, it is vital that such sedimenting habitats are retained

1103 Twaite Shad *Alosa fallax fallax*

To restore the favourable conservation condition of Twaite Shad in Lower River Suir SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	In some catchments, artificial barriers block twaite shads' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas
Population structure: age classes	Number of age classes	More than one age class present	
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning habitats	
Water quality: oxygen levels	Milligrams per litre	No lower than 5mg/l	Attribute and target based on Maas et al. (2008)
Spawning habitat quality: Filamentous algae; macrophytes; sediment	Occurrence	Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth	See Maitland and Hatton-Ellis (2003) for further information

1106 Salmon *Salmo salar*

To restore the favourable conservation condition of Atlantic Salmon in Lower River Suir SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmons' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas
Adult spawning fish	Number	Conservation limit (CL) for each system consistently exceeded	A conservation limit (CL) 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 on Salmon (SSCS) annual model output of CL attainment levels. See SSCS (2016). Attainment of CL estimates are derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The Suir is currently below CL, meeting 79% of CL
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 minutes sampling	The target is the threshold value for rivers currently exceeding their conservation limit (CL). The average electrofishing value for the Suir in 2016 was 10.2 salmon fry, which is below the 17 fry target
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 are generally not currently preventing salmon from accessing suitable spawning habitat in Lower River Suir SAC
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)

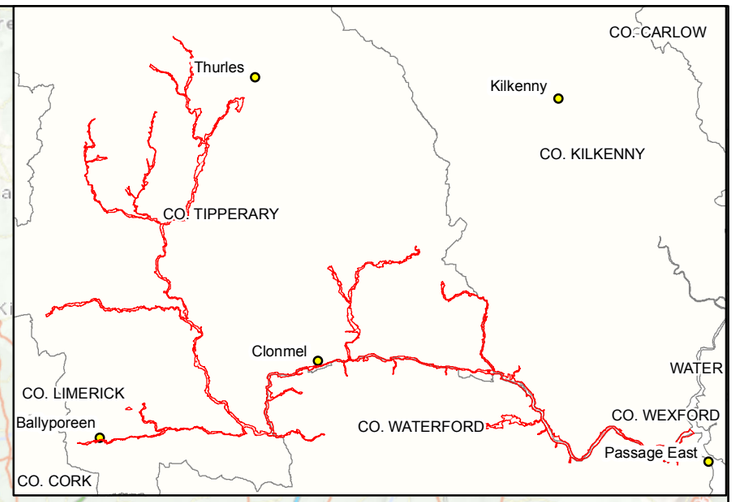
1355 Otter *Lutra lutra*

To maintain the favourable conservation condition of Otter in Lower River Suir 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. Favourable Conservation Status (FCS) target, based on 1980/81 survey findings, is 88% in SACs. Current range is estimated at 93.6% (Reid et al. 2013)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 116.17ha above high water mark (HWM) and 726.61ha 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 712.27ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (Kruuk, 2006; NPWS, 2007)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 382.31km	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 and Moorhouse, 1991; Kruuk, 2006)
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	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

Legend

Lower River Suir SAC 002137



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Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 1:
LOWER RIVER SUIR SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE: SAC 002137; version 3.
CO. WATERFORD, CO. LIMERICK, CO.TIPPERARY, CO. KILKENNY

0 3 6 9 12 15 km

N

Map Version 1
Date: Oct 2016

Legend

- Lower River Suir SAC 002137
- River Barrow and River Nore SAC 002162
- OSi Discovery Series County Boundary

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 2:
LOWER RIVER SUIR SAC
CONSERVATION OBJECTIVES
ADJOINING DESIGNATION

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

SITE CODE:
SAC 002137; version 3. SAC 002162; version 3.01
CO. WATERFORD, CO. LIMERICK, CO.TIPPERARY, CO. KILKENNY

0 6 12 18 24 30 km

N

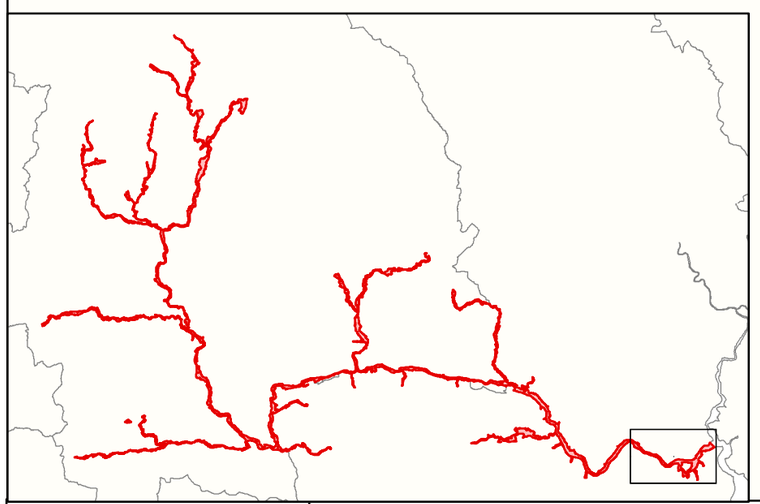
Map Version 1
Date: Oct 2016

Legend

- Lower River Suir SAC 002137
- Saltmarsh Monitoring Project Survey Area

Annex I Saltmarsh Habitats

- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Potential 1330 Potential Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- OSi Discovery Series County Boundary



SMP Site Code: SMP0052

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MAP 3:
LOWER RIVER SUIR SAC
CONSERVATION OBJECTIVES
SALTMARSH HABITATS

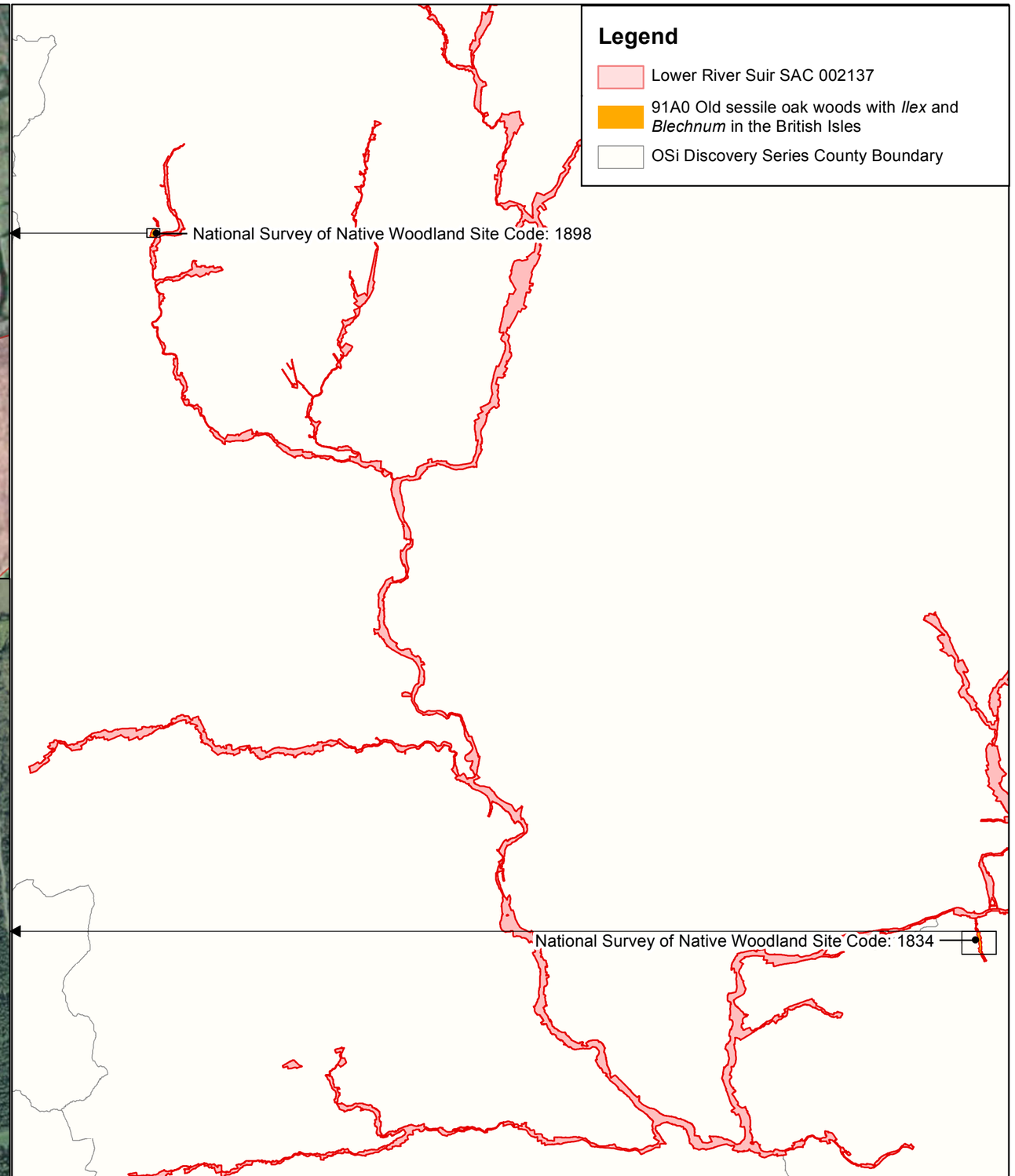
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002137; version 3.
CO. WATERFORD, CO. LIMERICK, CO.TIPPERARY, CO. KILKENNY

0 0.3 0.6 0.9 1.2 1.5 km

N

Map Version 1
Date: Oct 2016



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Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 4:
LOWER RIVER SUIR SAC
CONSERVATION OBJECTIVES
OLD SESSILE OAK WOODLAND

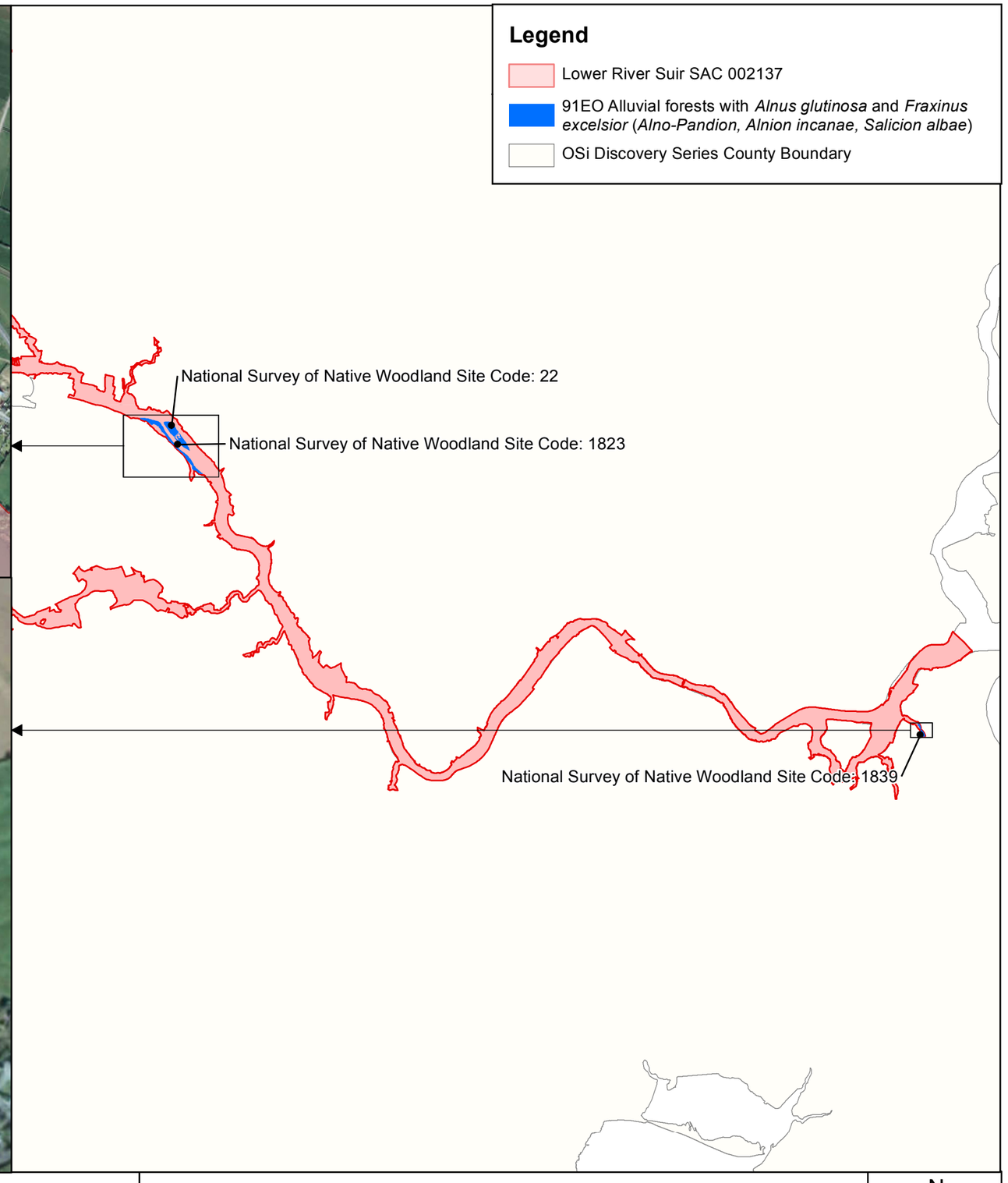
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002137; version 3.
CO. WATERFORD, CO. LIMERICK, CO.TIPPERARY, CO. KILKENNY

0 0.035 0.07 0.105 0.14 0.175 km

N

Map Version 1
Date: Oct 2016



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MAP 5:
LOWER RIVER SUIR SAC
CONSERVATION OBJECTIVES
ALLUVIAL WOODLAND

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

SITE CODE: SAC 002137; version 3.
CO. WATERFORD, CO. LIMERICK, CO.TIPPERARY, CO. KILKENNY

0 0.15 0.3 0.45 0.6 0.75 km

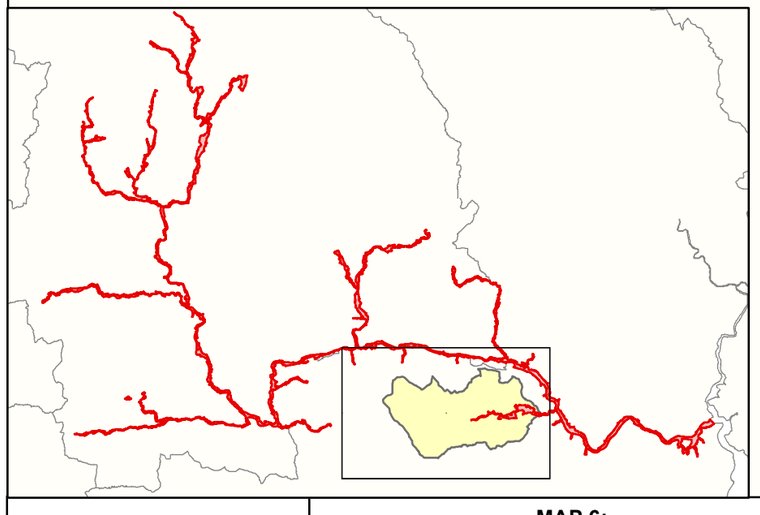
N

Map Version 1
Date: Oct 2016

Legend

- Lower River Suir SAC 002137
- 1029 Freshwater Pearl Mussel *Margaritifera margaritifera* Suitable habitat length
- 1029 Freshwater Pearl Mussel *Margaritifera margaritifera* Distribution target
- 1029 Freshwater Pearl Mussel *Margaritifera margaritifera* Catchment
- OSi Discovery Series County Boundary

Clodiagh Catchment



An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 6:
LOWER RIVER SUIR SAC
CONSERVATION OBJECTIVES
FRESHWATER PEARL MUSSEL -
MARGARITIFERA MARGARITIFERA

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

SITE CODE:
SAC 002137; version 3.
CO. WATERFORD, CO. LIMERICK, CO.TIPPERARY, CO. KILKENNY

0 0.8 1.6 2.4 3.2 4 km

N

Map Version 1
Date: Oct 2016

Legend

- Lower River Suir SAC 002137
- 1092 White-clawed Crayfish *Austropotamobius pallipes*
- OSi Discovery Series County Boundary

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 7:
LOWER RIVER SUIR SAC
CONSERVATION OBJECTIVES
WHITE-CLAWED CRAYFISH

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

SITE CODE:
SAC 002137; version 3.
CO. WATERFORD, CO. LIMERICK, CO.TIPPERARY, CO. KILKENNY

0 3 6 9 12 15 km

N

Map Version 1
Date: Oct 2016

APPENDIX C

National Parks and Wildlife Service

Conservation Objectives

River Barrow and River Nore SAC 002162

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***

002162 River Barrow and River Nore SAC

QI	Description
1016	Desmoulin's whorl snail *Vertigo moulinsiana*
1029	Freshwater pearl mussel *Margaritifera margaritifera*
1092	White-clawed crayfish *Austropotamobius pallipes*
1095	Sea lamprey *Petromyzon marinus*
1096	Brook lamprey *Lampetra planeri*
1099	River lamprey *Lampetra fluviatilis*
1103	Twaite shad *Alosa fallax*
1106	Atlantic salmon (*Salmo salar*) (only in fresh water)
1130	Estuaries
1140	Mudflats and sandflats not covered by seawater at low tide
1310	*Salicornia* and other annuals colonizing mud and sand
1330	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
1355	Otter *Lutra lutra*
1410	Mediterranean salt meadows (*Juncetalia maritimi*)
1421	Killarney fern *Trichomanes speciosum*
1990	Nore freshwater pearl mussel *Margaritifera durrovensis*
3260	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
4030	European dry heaths
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
7220	* Petrifying springs with tufa formation (*Cratoneurion*)
91A0	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
91E0	* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

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

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

Title: Desmoulin's whorl snail (*Vertigo moulinsiana* - 1016) Conservation Status Assessment Report
Year: 2011
Author: Moorkens, E. ; Killeen, I.
Series: Unpublished Report to NPWS

Title: River Barrow and River Nore SAC (002162): Conservation objectives supporting document - woodland habitats [Version 1]
Year: 2011
Author: NPWS
Series: Unpublished Report to NPWS

Title: River Barrow and River Nore SAC (002162): Conservation objectives supporting document - coastal habitats [Version 1]
Year: 2011
Author: NPWS
Series: Unpublished Report to NPWS

Title: River Barrow and River Nore SAC (002162): Conservation objectives supporting document - marine habitats [Version 1]
Year: 2011
Author: NPWS
Series: Unpublished Report to NPWS

Title: Second Draft Nore Freshwater Pearl Mussel Sub-basin Management Plan (2009-2015)
Year: 2010
Author: DEHLG
Series: Unpublished Report to NPWS

Title: Site investigations for *Sabellaria alveolata* (Honey-comb worm) biogenic reefs in Ireland
Year: 2010
Author: NPWS
Series: Unpublished Report to NPWS

Title: Irish Semi-natural Grasslands Survey. Annual report no. 3: Counties Donegal, Dublin, Kildare & Sligo
Year: 2010
Author: O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; McNutt, K.E.; Perrin, P.M. ; Delaney, A.
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: Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland [Version 1.0]
Year: 2010
Author: Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series: Irish Wildlife Manuals No. 48

Title: A technical manual for monitoring white-clawed crayfish *Austropotamobius pallipes* in Irish lakes

Year: 2010

Author: Reynolds, J.D.; O'Connor, W.; O'Keeffe, C.; Lynn, D.

Series: Irish Wildlife Manuals No. 45

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: The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. [S.I. 296 of 2009]

Year: 2009

Author: Government of Ireland

Series: Irish Statute Book

Title: The European Communities Environmental Objectives (Surface Water) Regulations 2009. [S.I. 272 of 2009]

Year: 2009

Author: Government of Ireland

Series: Irish Statute Book

Title: Saltmarsh Monitoring Report 2007-2008

Year: 2009

Author: McCorry, M.; Ryle, T.

Series: Unpublished Report to NPWS

Title: *Margaritifera durrovensis* Survey of Nore River. June – July 2009. NS 2 project

Year: 2009

Author: Moorkens, E. A.

Series: Unpublished Report to NPWS

Title: Benthic Biotope classification of subtidal sedimentary habitats in the Lower River Suir candidate Special Area of Conservation and the River Nore and River Barrow candidate Special Area of Conservation

Year: 2008

Author: ARMS

Series: Unpublished Report to NPWS

Title: A survey of mudflats and sandflats in Ireland. An intertidal soft sediment survey of Waterford Estuary

Year: 2008

Author: ASU

Series: Unpublished Report to NPWS

Title: Assessment of the Risk of Barriers to Fish Migration in the Nore Catchment, Southern Regional Fisheries Board

Year: 2008

Author: CFB; Compass Informatics

Series: Unpublished Report to CFB

Title: Poor water quality constrains the distribution and movements of Twaite shad *Alosa fallax fallax* (Lacepede, 1803) in the watershed of river Scheldt

Year: 2008

Author: Maas, J.; Stevens, M. ; Breine, J.

Series: Hydrobiologia 602, 129 - 143

Title: All Ireland Species Action Plan - Killarney fern

Year: 2008

Author: NPWS ; EHS-NI

Series: Unpublished Report to NPWS & EHS-NI

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: Assessment of fish passage and the ecological impact of migration barriers on the River Nore catchment

Year: 2007

Author: Sullivan, A.

Series: Nore Suir Rivers Trust & OPW

Title: Otter Survey of Ireland 2004/2005

Year: 2006

Author: Bailey, M.; Rochford, J.

Series: Irish Wildlife Manuals No. 23

Title: The status of host fish populations and fish species richness in European freshwater pearl mussel (*Margaritifera margaritifera*) streams

Year: 2006

Author: Geist, J.; Porkka, M.; Kuehn, R.

Series: Aquatic Conservation: Marine and Freshwater Ecosystems 16, 251–266

Title: The distribution of Lamprey in the River Barrow SAC

Year: 2006

Author: King, J.J.

Series: Irish Wildlife Manuals No. 21

Title: Otters - ecology, behaviour and conservation

Year: 2006

Author: Kruuk, H.

Series: Oxford University Press

Title: The ecology and conservation of the gametophyte generation of the Killarney Fern (*Trichomanes speciosum* Willd.) in Ireland

Year: 2005

Author: Kingston, N. ; Hayes, C.

Series: Biology and Environment: Proceedings of the Royal Irish Academy 105B(2): 71-79

Title: Pilot Project for Monitoring Populations of the Freshwater Pearl Mussel. Baseline survey of the Nore River SAC, Counties Laois and Kilkenny

Year: 2004

Author: Moorkens, E. A.

Series: Unpublished Report to NPWS

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

---

Title: Ecology of Watercourses Characterised by *Ranunculion fluitantis* and *Callitricho-Batrachion* Vegetation

Year: 2003

Author: Hatton-Ellis, T.W.; Grieve, N.

Series: Conserving Natura 2000 Rivers Ecology Series No. 11. English Nature, Peterborough.

Title: Ecology of the Allis and Twaite shad

Year: 2003

Author: Maitland, P.S.; Hatton-Ellis, T.W.

Series: Conserving Natura 2000 Rivers Ecology Series No. 3. English Nature, Peterborough

---

Title: A survey of the white-clawed crayfish, *Austropotamobius pallipes* (Lereboullet) and of water quality in two catchments of Eastern Ireland

Year: 2002

Author: Demers, A.; Reynolds, J. D.

Series: Bulletin Français de la Pêche et de la Pisciculture, 367: 729-740

Title: Reversing the habitat fragmentation of British woodlands

Year: 2002

Author: Peterken, G.

Series: WWF-UK, London

Title: A survey of broadleaf woodlands in 3 SACs: Barrow-Nore, River Unshin & Lough Forbes

Year: 2000

Author: Browne, A.; Dunne, F.; Roche, N.

Series: Unpublished Report to NPWS

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:	Conservation Management of the White-clawed Crayfish, *Austropotamobius pallipes*
Year:	1998
Author:	Reynolds, J.D.
Series:	Irish Wildlife Manuals No. 1
Title:	Studies on the biology and ecology of Margaritifera in Ireland
Year:	1996
Author:	Moorkens, E.A.
Series:	Unpublished PhD thesis, University of Dublin, Trinity College.
Title:	Imminent extinction of the Nore freshwater pearl mussel *Margaritifera durrovensis* Phillips: a species unique to Ireland
Year:	1994
Author:	Moorkens, E.A. ; Costello, M.J.
Series:	Aquatic Conservation: Marine and Freshwater Ecosystems 4,363-365
Title:	The spatial organization of otters (*Lutra lutra*) in Shetland
Year:	1991
Author:	Kruuk, H.; Moorhouse, A.
Series:	J. Zool, 224: 41-57
Title:	The vegetation of Irish rivers
Year:	1987
Author:	Heuff, H.
Series:	Unpublished Report
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 and subtidal surveys 2008 & 2010
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 datasets erased out if applicable
Used for:	Marine community types base data (map 4)

Year:	Revision 2010
Title:	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS operations:	QIs selected; clipped to SAC boundary; overlapping regions with Sand Dune data investigated and resolved with expert opinion used
Used for:	1310, 1330, 1410 (map 5)

Year:	Derived 2011
Title:	Internal NPWS files
GIS operations:	Dataset created from spatial reference contained in files
Used for:	7220 (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:	91A0, 91E0 (map 6)

Year:	2011
Title:	NPWS rare and threatened species database
GIS operations:	Dataset created from spatial references in database records
Used for:	1016, 1092, 1421, 1990 (map 7)

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)

1016 Desmoulin's whorl snail *Vertigo moulinsiana*

To maintain the favourable conservation condition of Desmoulin's whorl snail in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: occupied sites	Number	No decline. Two known sites: Borris Bridge, Co. Carlow S711503; Boston Bridge, Kilnaseer S338774, Co. Laois. See map 7	Data from NPWS rare and threatened species database
Population size: adults	Number per positive sample	At least 5 adults snails in at least 50% of samples	Attribute and target from Moorkens and Killeen (2011)
Population density	Percentage positive samples	Adult snails present in at least 60% of samples per site	Attribute and target from Moorkens and Killeen (2011)
Area of occupancy	Hectares	Minimum of 1ha of suitable habitat per site	Attribute and target from Moorkens and Killeen (2011)
Habitat quality: vegetation	Percentage of samples with suitable vegetation	90% of samples in habitat classes I and II as defined in Moorkens & Killeen (2011)	Attribute and target from Moorkens and Killeen (2011)
Habitat quality: soil moisture levels	Percentage of samples with appropriate soil moisture levels	90% of samples in moisture class 3-4 as defined in Moorkens & Killeen (2011)	Attribute and target from Moorkens and Killeen (2011)

1029 Freshwater pearl mussel *Margaritifera margaritifera*

The status of the freshwater pearl mussel (*Margaritifera margaritifera*) as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. The outcome of this review will determine whether a site-specific conservation objective is set for this species. Please note that the Nore freshwater pearl mussel (*Margaritifera durrovensis*) remains a qualifying species for this SAC. This document contains a conservation objective for the latter species.

1092 White-clawed crayfish *Austropotamobius pallipes*

To maintain the favourable conservation condition of White-clawed crayfish in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Occurrence	No reduction from baseline. See map 7	The crayfish is present almost throughout this SAC. The records extend as far downstream as Thomastown on the Nore and Graiguenamanagh on the Barrow
Population structure: recruitment	Percentage occurrence of juveniles and females with eggs	Juveniles and/or females with eggs in at least 50% of positive samples	See Reynolds et al. (2010) for further details
Negative indicator species	Occurrence	No alien crayfish species	Alien crayfish species are identified as major direct threat to this species and as disease vector. See Reynolds (1998) for further details
Disease	Occurrence	No instances of disease	Disease is identified as major threat and has occurred in Ireland even in the absence of alien vectors. See Reynolds (1998) for further details
Water quality	EPA Q value	At least Q3-4 at all sites sampled by EPA	Target taken from Demers and Reynolds (2002). Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)
Habitat quality: heterogeneity	Occurrence of positive habitat features	No decline in heterogeneity or habitat quality	Crayfish need high habitat heterogeneity. Larger crayfish must have stones to hide under, or an earthen bank in which to burrow. Hatchlings shelter in vegetation, gravel and among fine tree-roots. Smaller crayfish are typically found among weed and debris in shallow water. Larger juveniles in particular may also be found among cobbles and detritus such as leaf litter. These conditions must be available on the whole length of occupied habitat

1095 Sea lamprey *Petromyzon marinus*

To restore the favourable conservation condition of Sea lamprey in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem length of rivers 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. See King (2006), Sullivan (2007) and CFB and Compass Informatics (2008) for further information on artificial barriers
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor, (2007). King (2007) provides survey information for the Barrow
Juvenile density in fine sediment	Juveniles/m²	Juvenile density at least 1/m²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003)
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by Inland Fisheries Ireland (IFI). Lampreys spawn in clean gravels. Artificial barriers are currently preventing lamprey from accessing suitable spawning habitat. See King (2006), Sullivan (2007) and CFB and Compass Informatics (2008) for further information
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 are currently preventing juvenile lampreys from accessing the full extent of suitable habitat. See King (2006), Sullivan (2007) and CFB and Compass Informatics (2008) for further information

1096 Brook lamprey *Lampetra planeri*

To restore the favourable conservation condition of Brook lamprey in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	% of river accessible	Access to all watercourses down to first order streams	Artificial barriers can block lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. See King (2006), Sullivan (2007) and CFB and Compass Informatics (2008) for further information on artifical barriers
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present	Attribute and target based on data from Harvey and Cowx (2003). King (2007) provides survey information for the Barrow. 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	Attribute and target based on spawning bed mapping by Inland Fisheries Ireland (IFI). Lampreys spawn in clean gravels. Artificial barriers are currently preventing lamprey from accessing suitable spawning habitat. See King (2006), Sullivan (2007) and CFB and Compass Informatics (2008) for further information
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 are currently preventing juvenile lampreys from accessing the full extent of suitable habitat. See King (2006), Sullivan (2007) and CFB and Compass Informatics (2008) for further information

1099 River lamprey *Lampetra fluviatilis*

To restore the favourable conservation condition of River lamprey in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem and major tributaries down to second order accessible from estuary	Artificial barriers can block lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. See King (2006), Sullivan (2007) and CFB and Compass Informatics (2008) for further information on artificial barriers
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). King (2007) provides survey information for the Barrow. 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	Attribute and target based on spawning bed mapping by Inland Fisheries Ireland (IFI). Lampreys spawn in clean gravels. Artificial barriers are currently preventing lamprey from accessing suitable spawning habitat. See King (2006), Sullivan (2007) and CFB and Compass Informatics (2008) for further information
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 are currently preventing juvenile lampreys from accessing the full extent of suitable habitat. See King (2006), Sullivan (2007) and CFB and Compass Informatics (2008) for further information

1103 Twaite shad *Alosa fallax*

To restore the favourable conservation condition of Twaite shad in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	In some catchments, artificial barriers block twaite shads' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas
Population structure: age classes	Number of age classes	More than one age class present	Regular breeding has been confirmed in the River Barrow in recent years, but not in the Nore
Extent and distribution of spawning habitat	m^2 and occurrence	No decline in extent and distribution of spawning habitats	
Water quality: oxygen levels	Milligrammes per litre	No lower than 5mg/l	Attribute and target based on Maas, Stevens and Briene (2008)
Spawning habitat quality: Filamentous algae; macrophytes; sediment	Occurrence	Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth	See Maitland and Hatton-Ellis (2003) for further information

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

To restore the favourable conservation condition of Salmon in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmons' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. See Sullivan (2007) and CFB and Compass Informatics (2008) for further information on artificial barriers
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. The Nore is currently exceeding its CL, while the Barrow is below its CL
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)
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 are currently preventing salmon from accessing suitable spawning habitat
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)

1130 Estuaries

To maintain the favourable conservation condition of Estuaries in the River Barrow and River Nore 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 2	Habitat area was estimated using OSI data and the defined Transitional Water Body area under the Water Framework Directive as 3856ha. See marine supporting document for further details
Community distribution	Hectares	The following sediment communities should be maintained in a natural condition: Muddy estuarine community complex; Sand to muddy fine sand community complex; Fine sand with *Fabulina fabula* community. See map 4	The likely area of sediment communities was derived from a combination of intertidal and subtidal surveys undertaken in 2008 (ARMS, 2008; ASU, 2008). See marine supporting document for further details
Community extent	Hectares	Maintain the natural extent of the Sabellaria alveolata reef, subject to natural process. See map 4	The likely area of this community is derived from a survey undertaken in 2010 (NPWS, 2010). See marine supporting document for further details

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of the Mudflats and sandflats not covered by seawater at low tide in the River Barrow and River Nore 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 926ha. See marine supporting document for further details
Community distribution	Hectares	The following sediment communities should be maintained in a natural condition: Muddy estuarine community complex; Sand to muddy fine sand community complex. See map 4	The likely area of sediment communities was derived from a combination of intertidal and subtidal surveys undertaken in 2008 (ARMS, 2008; ASU, 2008). See marine 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 the River Barrow and River Nore 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 the one sub-site mapped: Ringville - 0.03ha. See map 5	Based on data from the Saltmarsh Monitoring Project (McCorry and Ryle, 2009). The Ringville sub-site was mapped and no additional areas of potential Salicornia mudflat were identified from an examination of aerial photographs, giving a total estimated area of 0.03ha. NB futher 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 5	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	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
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession. See map 5	Based on McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on 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 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).	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 McCorry and Ryle (2009). See coastal habitats supporting document for further details

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

To restore the favourable conservation condition of Atlantic salt meadows in the River Barrow and River Nore 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: Dunbrody Abbey - 1.25ha, Killowen - 2.59ha, Rochestown - 17.50ha, Ringville - 6.70ha. See map 5	Based on data from the Saltmarsh Monitoring Project (McCorry and Ryle, 2009). Four sub-sites were mapped and additional areas of potential saltmarsh were identified from an examination of aerial photographs, giving a total estimated area of Atlantic salt meadow of 35.07ha. NB futher 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 5	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: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession. See map 5	Based on McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on 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 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)	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 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 the River Barrow and River Nore 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 in south-east estimated at 73% (Bailey and Rochford, 2006)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 122.8ha above high water mark (HWM); 1136.0ha along river banks / around ponds	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 857.7ha	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 616.6km	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) habitat	Hectares	No significant decline. Area mapped and calculated as 2.6ha	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) and wrasse and rockling in coastal waters (Kingston et al., 1999)

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

To restore the favourable conservation condition of Mediterranean salt meadows in the River Barrow and River Nore 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: Dunbrody Abbey - 0.08ha, Rochestown - 0.04ha, Ringville - 6.70ha. See map 5	Based on data from the Saltmarsh Monitoring Project (McCorry and Ryle, 2009). Three sub-sites were mapped and no additional areas of potential saltmarsh were identified from an examination of aerial photoraphs, giving a total estimated area of Mediterranean salt meadow of 6.82ha. 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 5	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	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
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession. See map 5	Based on McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on 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 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)	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 McCorry and Ryle (2009). See coastal habitats supporting document for further details

1421 Killarney fern *Trichomanes speciosum*

To maintain the favourable conservation condition of Killarney Fern in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Location	No decline. Three locations known, with three colonies of gametophyte and one sporophyte colony. See map 7	Data from NPWS rare and threatened species database
Population size	Number	Maintain at least three colonies of gametophyte, and at least one sporophyte colony of over 35 fronds	Data from NPWS rare and threatened species database
Population structure: juvenile fronds	Occurrence	At least one of the locations to have a population structure comprising sporophyte, unfurling fronds, 'juvenile' sporophyte and gametophyte generations	'Juvenile' sporophytes, which appear as small entire fronds, are known from this site. However, it is unknown whether they are due to apogamous growth or sexual reproduction. Based on Kingston and Hayes (2005) and Ni Dhuill (pers. Comm.)
Habitat extent	m^2	No loss of suitable habitat, such as shaded rock crevices, caves or gullies in or near to, known colonies. No loss of woodland canopy at or near to known locations	Based on Kingston and Hayes (2005) and Ni Dhuill (pers. Comm.)
Hydrological conditions: visible water	Occurrence	Maintain hydrological conditions at the locations so that all colonies are in dripping or damp seeping habitats, and water is visible at all locations	Based on Kingston and Hayes (2005) and Ni Dhuill (pers. Comm.)
Hydrological conditions: humidity	Number of dessicated fronds	No increase. Presence of dessicated sporophyte fronds or gametophyte mats indicates conditions are unsuitable	Based on Kingston and Hayes (2005) and Ni Dhuill (pers. Comm.)
Light levels: shading	Percentage	No changes due to anthropogenic impacts	Based on Kingston and Hayes (2005) and Ni Dhuill (pers. Comm.)
Invasive species	Occurrence	Absent or under control	NPWS and EHS-NI (2008) provides further details

1990 Nore freshwater pearl mussel *Margaritifera durrovensis*

To restore the favourable conservation condition of the Nore freshwater pearl mussel in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Kilometres	Maintain at 15.5km. See map 7	The population stretches from Poorman's Bridge (S407859) to Lismaine Bridge (S442660), with most of the population found between Poorman's Bridge and the Avonmore Creamery above Ballyragget (S 440 722) (Moorkens, 1996)
Population size: adult mussels	Number	Restore to 5,000 adult mussels	The extant wild population of Nore freshwater pearl mussel is estimated as 300 adult individuals (Moorkens, 2009)
Population structure: recruitment	Percentage per size class	Restore to at least 20% of population no more than 65mm in length; and at least 5% of population no more than 30mm in length	Mussels of no more than 65mm are considered 'young mussels' and may be found buried in the substratum and/or beneath adult mussels. Mussels of no more than 30mm are 'juvenile mussels' and are always buried in the substratum. This species is known not to have reproduced successfully in the River Nore since 1970 (Moorkens and Costello, 1994; Moorkens, 2004; Government of Ireland, 2009 [S.I. 272 of 2009])
Population structure: adult mortality	Percentage	No more than 5% decline from previous number of live adults counted; dead shells less than 1% of the adult population and scattered in distribution	5% is considered the cut-off between the combined errors associated with natural fluctuations and sampling methods and evidence of true population decline. 1% of dead shells is considered to be indicative of natural losses
Habitat extent	Kilometres	Restore suitable habitat in length of river corresponding to distribution target (15.5km; see map 7) and any additional stretches necessary for salmonid spawning	The species habitat is a stretch of large lowland river and is a combination of 1) the area of habitat adult and juvenile mussels can occupy and 2) the area of spawning and nursery habitats the host fish can occupy. Fish nursery habitat typically overlaps with mussel habitat. Fish spawning habitat is generally adjacent mussel habitat, but may lie upstream of the generalised mussel distribution. Only those salmonid spawning areas that could regularly contribute juvenile fish to the areas occupied by adult mussels should be considered. The availability of mussel habitat and fish spawning and nursery habitats are determined by flow and substratum conditions. The habitat for the species is currently unsuitable for the survival of adult mussels or the recruitment of juveniles

1990 Nore freshwater pearl mussel *Margaritifera durrovensis*

To restore the favourable conservation condition of the Nore freshwater pearl mussel in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Water quality: Macroinvertebrates and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Restore water quality-macroinvertebrates: EQR greater than 0.90; phytobenthos: EQR greater than 0.93	These EQRs correspond to high ecological status for these two Water Framework Directive biological quality elements. They represent high water quality with very low nutrient concentrations (oligotrophic conditions). The habitat of the Nore pearl mussel failed both standards during 2009 sampling for the Sub-basin Management Plan (DEHLG, 2010). See also The European Communities Environmental Objectives (Surface Water Objectives) Regulations 2009
Substratum quality: Filamentous algae (macroalgae), macrophytes (rooted higher plants)	Percentage	Restore substratum quality-filamentous algae: absent or trace (<5%); macrophytes: absent or trace (<5%)	High abundance of macroalgae was recorded during 2009 sampling for the Sub-basin Management Plan (DEHLG, 2010). Recruitment of juvenile mussels is being prevented by the poor quality of the river substrate
Substratum quality: sediment	Occurrence	Restore substratum quality-stable cobble and gravel substrate with very little fine material; no artificially elevated levels of fine sediment	The habitat for the species is currently unsuitable for the survival of adult mussels or the recruitment of juveniles owing to sedimentation of the substratum. Significant sedimentation has been recorded during all recent mussel monitoring surveys. Recruitment of juvenile mussels is being prevented by the poor quality of the river substrate
Substratum quality: oxygen availability	Redox potential	Restore to no more than 20% decline from water column to 5cm depth in substrate	Differences in redox potential between the water column and the substrate correlate with differences in oxygen levels. Juvenile mussels require full oxygenation while buried in gravel. In suitable habitat, there should be very little loss of redox potential between the water column and underlying gravels. The redox potential loss in 2009 was 58-64% at 5cm depth (DEHLG, 2010)
Hydrological regime: flow variability	Metres per second	Restore appropriate hydrological regimes	The availability of suitable Nore freshwater pearl mussel habitat is largely determined by flow (catchment geology being the other important factor). In order to restore the habitat for the species, flow variability over the annual cycle must be such that: 1) high flows can wash fine sediments from the substratum, 2) low flows do not exacerbate the deposition of fines and 3) low flows do not cause stress to mussels in terms of exposure, water temperatures, food availability or aspects of the reproductive cycle

1990 Nore freshwater pearl mussel *Margaritifera durrovensis*

To restore the favourable conservation condition of the Nore freshwater pearl mussel in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Host fish	Number	Maintain sufficient juvenile salmonids to host glochidial larvae	Salmonid fish are host to the larval form of freshwater pearl mussels and thus, they are essential to the completion of the life cycle. 0+ and 1+ fish are typically used, both because of the habitat overlaps and the development of immunity with age in the fish. Fish presence is considered sufficient, as higher densities and biomass of fish is indicative of enriched conditions in mussel rivers. Geist et al. (2006) found that higher densities of host fish coincided with eutrophication, poor substrate quality for pearl mussels and a lack of pearl mussel recruitment, while significantly lower densities and biomass of host fish were associated with high numbers of juvenile mussels. Fish movement patterns must be such that 0+ fish in the vicinity of the mussel habitat remain in the mussel habitat until their 1+ summer. As native brown trout appear to be favoured by the Nore freshwater pearl mussel, it is particularly important that these are not out-competed by stocked fish

3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat distribution	Occurrence	No decline, subject to natural processes	The full distribution of this habitat and its sub-types in this site is currently unknown. The basis of the selection of the SAC for the habitat is the presence of an excellent example of the vegetation community (nutrient-rich type) associated with extensive tufa deposits on the river bed in the Kings tributary of the Nore (Heuff, 1987). Other examples of this or other sub-types may be present within the SAC
Habitat area	Kilometres	Area stable or increasing, subject to natural processes	The full extent of this habitat in this site is currently unknown. See above
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	Due to regular disturbance (through variations in flow), river macrophytes rarely reach a climax condition but frequently occur as transient communities. A natural (relatively unmodified) flow regime is required for both plant communities and channel geomorphology to be in favourable condition, exhibiting typical dynamics for the river type (Hatton-Ellis and Grieve, 2003). For most of the sub-types of this habitat, high flows are required to maintain the substratum (see below) necessary for the characteristic species. Flow variation is particularly important, with high and flood flows being critical to the hydromorphology
Hydrological regime: groundwater discharge	Metres per second	The groundwater flow to the habitat should be permanent and sufficient to maintain tufa formation	This attribute refers to sub-types with tufa formations. Groundwater discharges to this habitat throughout the year
Substratum composition: particle size range	Millimetres	The substratum should be dominated by large particles and free from fine sediments	The tufaceous sub-types develop on relatively stable substrata such as bedrock, boulders and cobbles, where tufa can deposit and accumulate. Tufa deposition is believed to be biologically mediated, by algae and bryophytes. The substratum must remain free of fine sediments such as clay, silt and fine sand, which would adversely affect the growth of algae and mosses

3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Water chemistry: minerals	Milligrammes per litre	The groundwater and surface water should have sufficient concentrations of minerals to allow deposition and persistence of tufa deposits	The tufaceous sub-types require mineral-(typically calcium-) rich groundwaters to allow deposition of tufa. Surface water must also be sufficiently base-rich to prevent chemical erosion. Alkalinity and/or total hardness data may also be relevant
Water quality: suspended sediment	Milligrammes per litre	The concentration of suspended solids in the water column should be sufficiently low to prevent excessive deposition of fine sediments	See substratum composition above. Turbidity data may also be relevant
Water quality: nutrients	Milligrammes per litre	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	Phosphorus (MRP) is typically the limiting nutrient, however increased nitrogen (NO3-) negatively impacts upon the N-fixing blue-green algal communities that frequently contribute to tufa deposition. Nutrient enrichment of the habitat typically leads to increased filamentous-green-algal biomass, and consequent changes in other algae, bryophyte and macrophyte species composition and abundance. Water quality should reach a minimum of Water Framework Directive good status, in terms of nutrient standards, and macroinvertebrate and phytobenthos quality elements
Vegetation composition: typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition	The sub-types of this habitat are poorly understood and their typical species have not yet been defined. Typical species and appropriate targets may emerge to be site-specific. The typical species of the tufaceous sub-type in the Kings tributary of the Nore are identified in Heuff (1987). The typical species may include higher plants, bryophytes, macroalgae and microalgae
Floodplain connectivity	Area	The area of active floodplain at and upstream of the habitat should be maintained	River connectivity with the floodplain is essential for the functioning of this habitat. The site of the tufaceous sub-type in the King's River is within an area of floodplain, with further large floodplains upstream. Floodplains regulatefine sediment deposition within the channel. See substratum composition above

4030 European dry heaths

To maintain the favourable conservation condition of European dry heaths in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat distribution	Occurrence	No decline from current habitat distribution, subject to natural processes	Spatial extent currently unmapped but indicated as occurring on the steep, free-draining, river valley sides especially the Barrow and tributaries in the foothills of the Blackstairs Mountains (based on NPWS NHA Survey - 1997/98 Site Notes; Natura 2000 Form Explanatory Notes - May 2006; The above NHA survey was prior to the extensions to the SAC that included river habitat and estuary at Ballyhack which may have incorporated additional dry heath habitat)
Habitat area	Hectares	Area stable or increasing, subject to natural processes. Habitat area is not known but estimated as less than 400ha of the area of the SAC, occurring in dispersed locations	Based on NPWS NHA Survey Site Notes (1997/98); Natura 2000 Form Explanatory Notes - May 2006
Physical structure: free-draining, acid, low nutrient soil; rock outcrops	Occurrence	No significant change in soil nutrient status, subject to natural processes. No increase or decrease in area of natural rock outcrop	Based on NPWS NHA Survey Site Notes - 1997/98; Natura 2000 Form Explanatory Notes - May 2006
Vegetation structure: sub-shrub indicator species	Percentage cover	Cover of characteristic sub-shrub indicator species at least 25%: gorse (*Ulex europaeus*) and where rocky outcrops occur bilberry (*Vaccinium myrtillus)* and woodrush (*Luzula sylvatica*). Some rock outcrops support English stonecrop (*Sedum anglicum*), sheep's bit (*Jasione montana*) and wild madder (*Rubia peregrina*) as well as important moss and lichen assemblages	Dry heath in this SAC occurs on free-draining nutrient poor soils and is often characterised by gorse and open acid grassland areas. A characteristic coastal dry heath of the southeast also occurs. Several rare plants occur including two species listed in the Red Data Book (Curtis and McGough, 1988). The species occurring on the site are listed in NPWS NHA Survey Site Notes - 1997/98. A brief overview of the principal characteristics of the dry heath habitat of this SAC is given in the Natura 2000 Explanatory Notes - May 2006
Vegetation structure: senescent gorse	Percentage cover	Cover of senescent gorse less than 50%	Based on NPWS NHA Survey Site Notes and Natura 2000 Form Explanatory Notes - May 2006 and on a modified version of the dry heath condition assessment methodology of Perrin et al. (2010)
Vegetation structure: browsing	Percentage cover	Long shoots of bilberry with signs of browsing collectively less than 33%	Based on NPWS NHA Survey Site Notes and Natura 2000 Form Explanatory Notes - May 2006 and on a modified version of the dry heath condition assessment methodology of Perrin et al. (2010)

4030 European dry heaths

To maintain the favourable conservation condition of European dry heaths in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation structure: native trees and shrubs	Percentage cover	Cover of scattered native trees and shrub less than 20%	Based on NPWS NHA Survey Site Notes - 1997/98; Natura 2000 Form Explanatory Notes - May 2006 and on a modified version of the dry heath habitat condition assessment methodology of Perrin et al. (2010). From the NHA survey notes the main threats appear to be reclamation or invasion by scrub woodland
Vegetation composition: positive indicator species	Number	Number of positive indicator species at least 2 e.g. gorse and associated dry heath/ acid grassland flora	Dry heath in this SAC occurs on free-draining nutrient poor soils and is characterised by gorse and acid grassland areas. It corresponds to Annex I sub-type "heaths rich in gorse (*Ulex*) of the Atlantic margins" (European Commission, 2007). Based on NPWS NHA Survey Site Notes -1997/98; Natura 2000 Form Explanatory Notes - May 2006 and a modified version of the dry heath habitat condition assessment methodology of Perrin et al. (2010)
Vegetation structure: positive indicator species	Percentage cover	Cover of positive indicator species at least 60%. This should include plant species characterisitic of dry heath in this SAC including gorse, bilberry and associated acid grassland flora	Dry heath in this SAC is characterised by gorse and acid grassland areas and locally bilberry and woodrush. Based on NPWS NHA Survey Site Notes and Natura 2000 Form Explanatory Notes - May 2006 and a modified version of the dry heath habitat condition assessment methodology of Perrin et al. (2010)
Vegetation composition: bryophyte and non-crustose lichen species	Number	Number of bryophyte or non-crustose lichen species present at least 2	Based on NPWS NHA Survey Site Notes and Natura 2000 Form Explanatory Notes - May 2006 and on a modified version of the dry heath habitat condition assessment methodology of Perrin et al. 2010
Vegetation composition: bracken (*Pteridium aquilinum*)	Percentage cover	Cover of bracken less than 10% - however see 'Notes'	Based on NPWS NHA Survey Site Notes and Natura 2000 Form Explanatory Notes - May 2006 and on a modified version of the dry heath habitat condition assessment methodology of Perrin et al. (2010). Bracken appears to be quite dense in places and before any management action is considered its rate of spread needs to be established as well as its threat, if any, to other dry heath species and its potential value to important fauna (e.g. Twite)

4030 European dry heaths

To maintain the favourable conservation condition of European dry heaths in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation structure: weedy negative indicator species	Percentage cover	Cover of agricultural weed species (negative indicator species) less than 1%	Based on NPWS NHA Survey Site Notes and Natura 2000 Form Explanatory Notes - May 2006 and on a modified version of the dry heath habitat condition assessment methodology of Perrin et al. (2010)
Vegetation composition: non-native species	Percentage cover	Cover of non-native species less than 1%.	Based on NPWS NHA Survey Site Notes and Natura 2000 Form Explanatory Notes - May 2006 and on a modified version of the dry heath habitat condition assessment methodology of Perrin et al. (2010)
Vegetation composition: rare/scarce heath species	Location, area and number	No decline in distribution or population sizes of rare, threatened or scarce species, including Greater Broomrape (*Orobanche rapum-genistae)* and the legally protected clustered clover (*Trifolium glomeratum*)	Broomrape is dependent on gorse at this site as it is parasitic on gorse roots. It is recorded as occurring on steep slopes above New Ross. A small area of excellent dry coastal heath at Ballyhack is interspersed with patches rock and of dry lowland grassland and has a high species diversity. Notably there is an excellent range of Clover (*Trifolium*) species including the legally protected clustered clover, a species known only from one other site in Ireland. Also *T. ornithopodiodes*, *T. striatum* and *Torilus nodosa*. Based on Natura 2000 Form Explanatory Notes May 2006, Irish Red Data Book (Curtis and Mc Gough, 1988) and on the NPWS database of rare and threatened vascular plants. Other areas of coastal heath may also occur
Vegetation structure: disturbed bare ground	Percentage cover	Cover of disturbed bare ground less than 10% (but if peat soil less than 5%)	Based on NPWS NHA Survey Site Notes and Natura 2000 Form Explanatory Notes - May 2006 and on a modified verison of the dry heath habitat condition assessment methodology of Perrin et al. (2010)
Vegetation structure: burning	Occurrence	No signs of burning within sensitive areas	Perrin et al. (2010) defines sensitive areas

6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

To maintain the favourable conservation condition of Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat distribution	Occurrence	No decline, subject to natural processes	Distribution of this habitat in this site is currently unknown. Considered to occur in association with some riverside woodlands, unmanaged river islands and in narrow bands along the floodplain of slow-flowing stretches of river (Natura 2000 Form Explanatory Notes)
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Extent of this habitat in this site is currently unknown. See above
Hydrological regime: Flooding depth/height of water table	Metres	Maintain appropriate hydrological regimes	This habitat requires winter inundation, which results in deposition of naturally nutrient-rich sediment
Vegetation structure:sward height	Centimetres	30-70% of sward is between 40 and 150cm in height	Bare ground, due to natural indundation processes, may often be present. Attribute and target based on the Irish Semi-natural Grassland Survey (O'Neill et al., 2010)
Vegetation composition: broadleaf herb: grass ratio	Percentage	Broadleaf herb component of vegetation between 40 and 90%	Attribute and target based on O'Neill et al. (2010)
Vegetation composition: typical species	Number	At least 5 positive indicator species present	List of positive indicator species identified by O'Neill et al. (2010)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control- NB Indian balsam (*Impatiens glandulifera*), monkeyflower (*Mimulus guttatus*), Japanese knotweed (*Fallopia japonica*) and giant hogweed (*Heracleum mantegazzianum*)	Species listed as being present in the site (Natura 2000 Form Explanatory Notes)

7220 * Petrifying springs with tufa formation (*Cratoneurion*)

To maintain the favourable conservation condition of Petrifying springs with tufa formation (*Cratoneurion*) in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Square metres	Area stable or increasing, subject to natural processes	Extent of this habitat in this site is currently unknown. An area ("Tens of square metres") has been described at one location (Natura 2000 Form Explanatory Notes; internal NPWS files), see below
Habitat distribution	Occurrence	No decline. See map 6 for recorded location	Full distribution of this habitat in this site is currently unknown. It has been described in woodlands at Dysart, between Thomastown and Inistioge (Natura 2000 Form Explanatory Notes; internal NPWS files). NB futher areas are likely to occur within the site
Hydrological regime: height of water table; water flow	Metres; metres per second	Maintain appropriate hydrological regimes	Current hydrological regimes are unknown. Petrifying springs rely on permanent irrigation, usually from upwelling groundwater sources or seepage sources
Water quality	Water chemistry measures	Maintain oligotrophic and calcareous conditions	Water chemistry is currently unknown. Water supply to petrifying springs is characteristically oligotrophic and calcareous
Vegetation composition: typical species	Occurrence	Maintain typical species	The bryophytes *Cratoneuron commutatum* and *Eucladium verticillatum* are diagnostic of this habitat. Both are found at the location described above. Natura 2000 Form Explanatory Notes and internal NPWS files also list other typical species

91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

To restore the favourable conservation condition of Old oak woodland with Ilex and Blechnum in the River Barrow and River Nore 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 85.08ha for sub-sites surveyed: see map 6	Minimum area, based on 13 sites surveyed by Perrin et al. (2008) - site codes 14, 20, 49, 73, 125, 508, 509, 510, 514, 515, 518, 519, 521, and other sources. NB further unsurveyed areas maybe present within the site
Habitat distribution	Occurrence	No decline. Surveyed locations shown on map 6	Distribution based on Perrin et al. (2008). NB further unsurveyed areas maybe present within the site
Woodland size	Hectares	Area stable of increasing. 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 and land ownership 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); Browne et al. (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); Browne et al. (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	Oak regenerates poorly. In suitable sites ash can regenerate in large numbers although few seedlings reach pole size
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; both categories should include stems greater than 40cm diameter	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem.
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

91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

To restore the favourable conservation condition of Old oak woodland with Ilex and Blechnum in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Woodland structure: indicators of local disctinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-listed and other rare or localised species. Perrin and Daly (2010) list sites 14, 20, 73, 125, 508, 509, 510, 514, 515, 518, 521 as potential ancient/long established woodlands
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008); Browne et al. (2000)
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including oak (*Quercus petraea*) and birch (*Betula pubescens*)	Species reported in Perrin et al. (2008); Browne et al. (2000)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common invasive species in this woodland type: beech (*Fagus sylvatica*), rhododendron (*Rhododendron ponticum*), cherry laurel (*Prunus laurocerasus*)

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

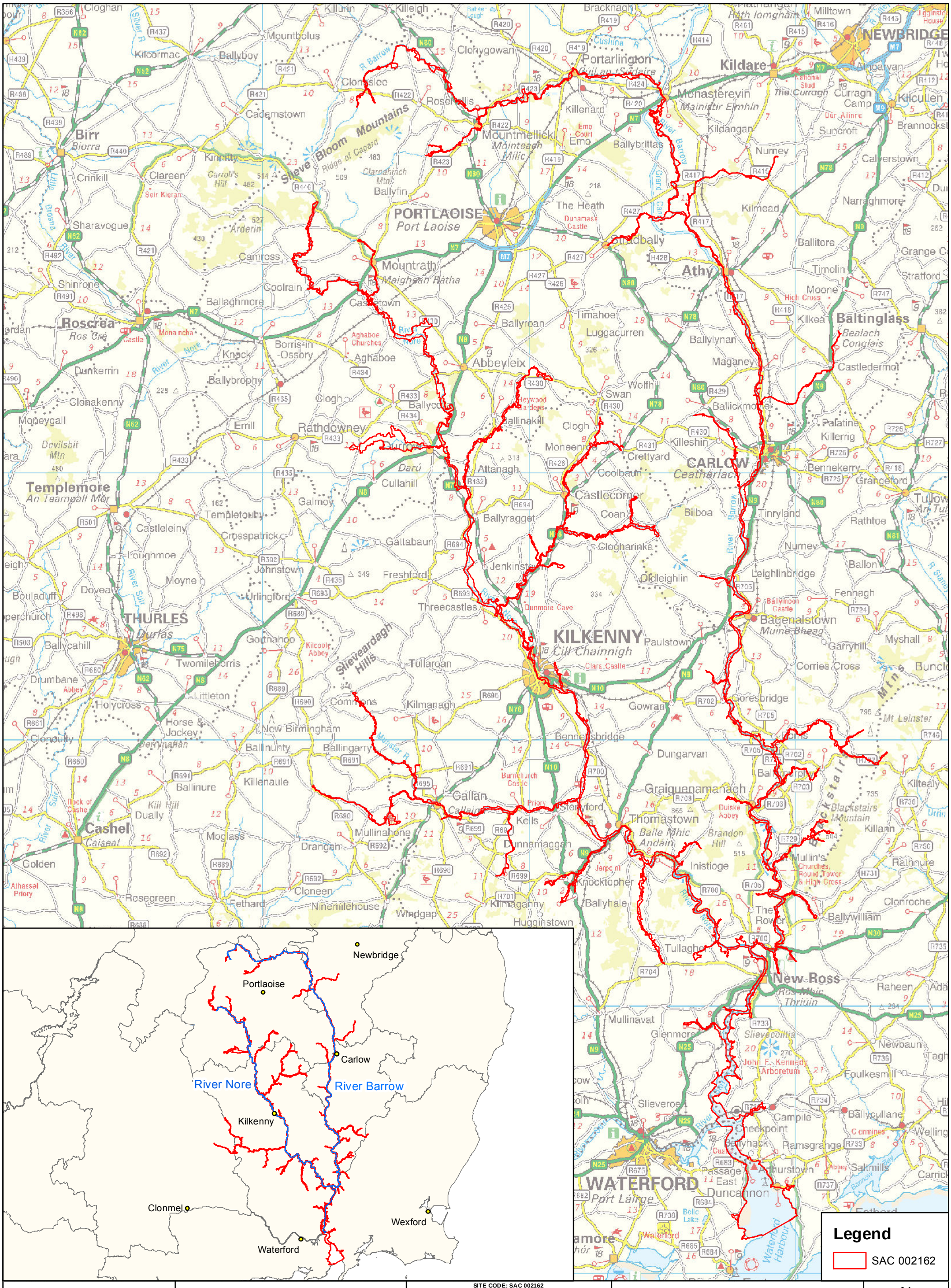
To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least 181.54ha for sites surveyed: see map 6	Minimum area, based on 16 sites surveyed by Perrin et al. (2008) - site codes 10, 15, 17, 126, 127, 262, 282, 287, 511, 516, 517, 518, 520, 608, 1021; Coillte LIFE project and other sources. NB further unsurveyed areas maybe present within the SAC
Habitat distribution	Occurrence	No decline. Surveyed locations shown on map 6	Distribution based on Perrin et al. (2008). NB further unsurveyed areas maybe present within the site
Woodland size	Hectares	Area stable of increasing. 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 and land ownership 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); Browne et al. (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); Browne et al. (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 regenerate 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 flood plains 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; 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* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) in the River Barrow and River Nore 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 woodlands, archaeological and geological features as well as red-listed and other rare or localised species. Perrin and Daly (2010) list sites 10, 15, 17, 127, 282, 516, 517, 518, 608 as potential ancient/long established woodlands
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008); Browne et al. (2000)
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including ash (*Fraxinus excelsior*) alder (*Alnus glutinosa*), willows (*Salix* spp) and locally, oak (*Quercus robur*)	Species reported in Perrin et al. (2008); Browne et al. (2000)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common invasive species in this woodland type: sycamore (*Acer pseudoplatanus*), beech (*Fagus sylvatica*), rhododendron (*Rhododendron ponticum*), cherry laurel (*Prunus laurocerasus*), dogwood (*Cornus sericea*), Himalayan honeysuckle (*Leycesteria formosa*) and Himalayan balsam (*Impatiens grandiflora*)



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MAP 1: RIVER BARROW AND RIVER NORE CONSERVATION OBJECTIVES SAC DESIGNATION

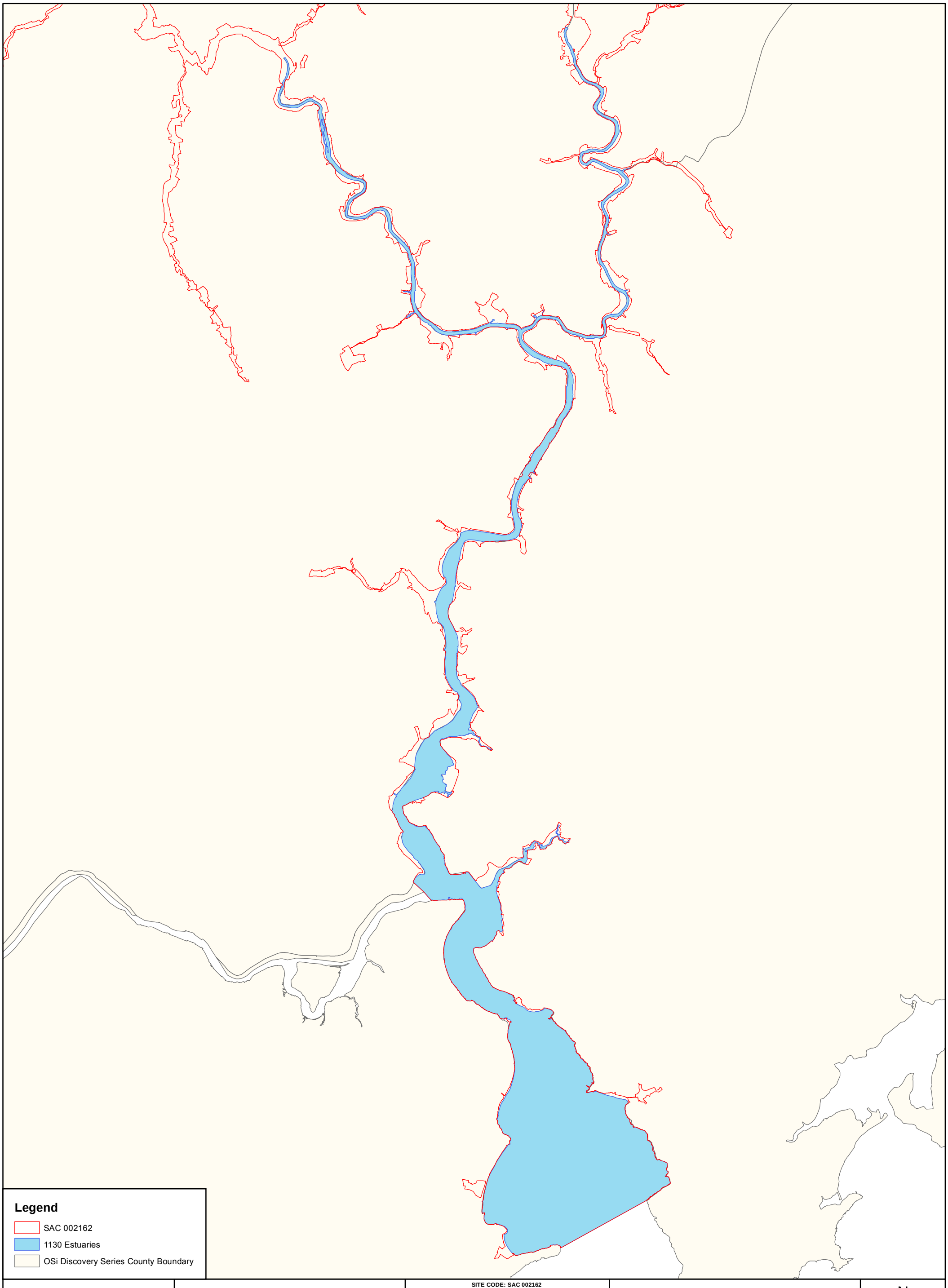
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002162
CO. CARLOW; version 1.03, CO. KILDARE; version 1.04, CO. KILKENNY; version 1.1, CO. LAOIS; version 1.07, CO. OFFALY; version 1.01, CO. TIPPERARY; version 1.01, CO. WATERFORD; version 1.01, CO. WEXFORD; version 1.01

0 5 10 15 km

N

Map Version 1
Date: April 2011



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MAP 2:
RIVER BARROW AND RIVER NORE CONSERVATION OBJECTIVES ESTUARIES

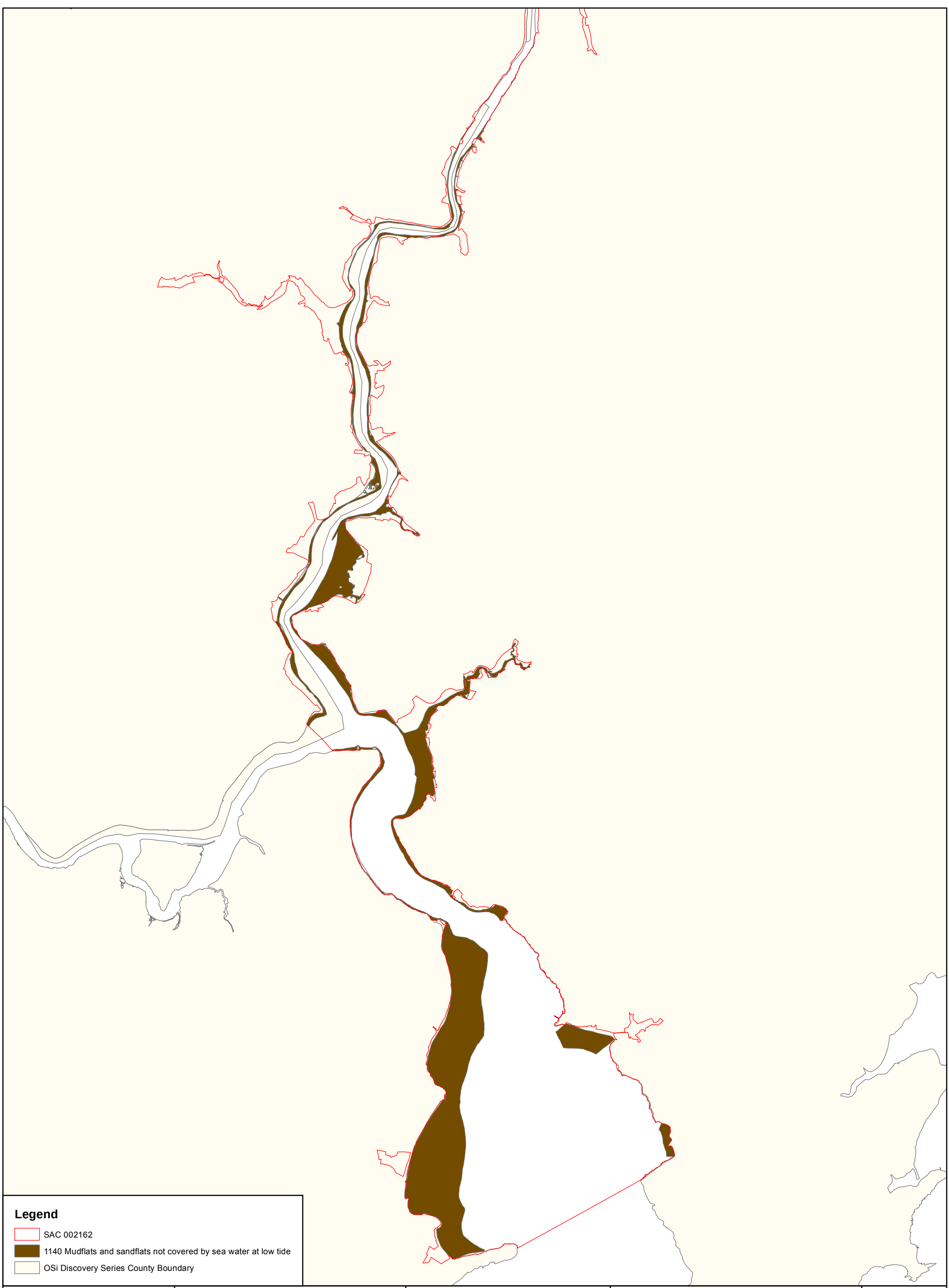
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002162
CO. CARLOW; version 1.03, CO. KILDARE; version 1.04, CO. KILKENNY; version 1.1, CO. LAOIS; version 1.07, CO. OFFALY; version 1.01, CO. TIPPERARY; version 1.01, CO. WATERFORD; version 1.01, CO. WEXFORD; version 1.01

0 1 2 3 4 5 km

N

Map Version 1
Date: April 2011



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MAP 3:
RIVER BARROW AND RIVER NORE CONSERVATION OBJECTIVES TIDAL MUDFLATS AND SANDFLATS

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

SITE CODE: SAC 002162
CO. CARLOW; version 1.03, CO. KILDARE; version 1.04,
CO. KILKENNY; version 1.1, CO. LAOIS; version 1.07,
CO. OFFALY; version 1.01, CO. TIPPERARY; version 1.01,
CO. WATERFORD; version 1.01, CO. WEXFORD; version 1.01

0 1 2 3 km

N

Map Version 1
Date: April 2011

Legend

- SAC 002162
- OSi Discovery Series County Boundary

Community Types

- Fine sand with *Fabulina fabula* community
- Muddy estuarine community complex
- Sand to Muddy fine sand community complex
- *Sabellaria alveolata* reef

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MAP 4:
RIVER BARROW AND RIVER NORE CONSERVATION OBJECTIVES MARINE COMMUNITY TYPES

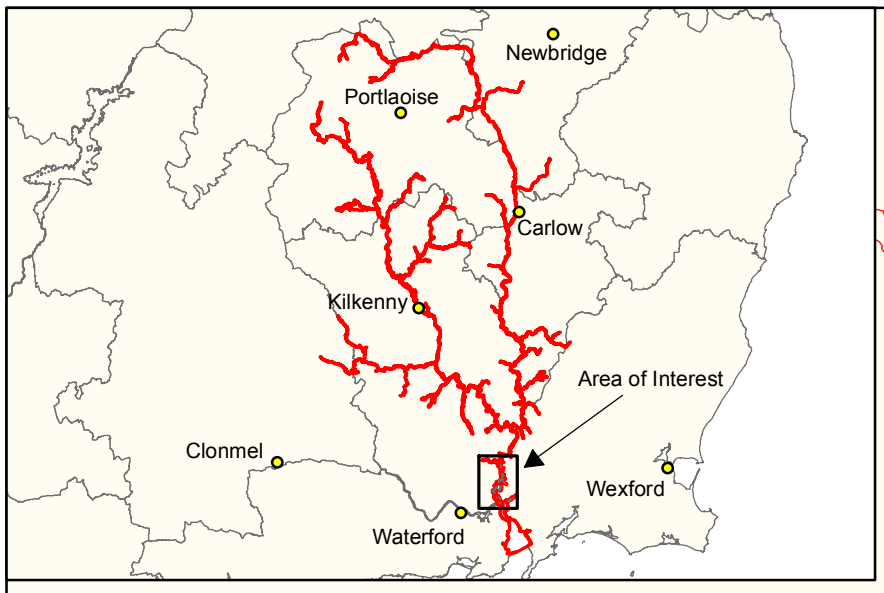
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 002162
CO. CARLOW; version 1.03, CO. KILDARE; version 1.04, CO. KILKENNY; version 1.1, CO. LAOIS; version 1.07, CO. OFFALY; version 1.01, CO. TIPPERARY; version 1.01, CO. WATERFORD; version 1.01, CO. WEXFORD; version 1.01

0 1 2 3 km

N

Map Version 1
Date: April 2011



SMP0049

SMP0050

SMP0051

SMP0048

Legend

- SAC 002162
- 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 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

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Department of Arts, Heritage and the Gaeltacht

MAP 5:
RIVER BARROW AND RIVER NORE CONSERVATION OBJECTIVES SALTMARSH HABITATS

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

SITE CODE: SAC 002162
CO. CARLOW; version 1.03, CO. KILDARE; version 1.04, CO. KILKENNY; version 1.1, CO. LAOIS; version 1.07, CO. OFFALY; version 1.01, CO. TIPPERARY; version 1.01, CO. WATERFORD; version 1.01, CO. WEXFORD; version 1.01

0 0.25 0.5 0.75 1 km

N

Map Version 1
Date: April 2011

Newbridge

262

Portlaoise

1021

608

287

282

Carlow

10

Kilkenny

127

15

17

49

73

14

516

517

126

518

519

520

515

125

521

20

514

510

508

509

511

Legend

- SAC 002162
- OSi Discovery Series County Boundary
- 7220 *Petrifying springs with tufa formation (Cratoneurion)

Woodland Habitats

- 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- 91E0 *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-padion, Alnion incanae, Salicion albae)
- 91A0 / 91E0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles / *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-padion, Alnion incanae, Salicion albae)
- WD1 (Mixed) broadleaved woodland
- WN2 / WD1 Oak-ash-hazel woodland / (Mixed) broadleaved woodland
- WN2 / WN6 Oak-ash-hazel woodland / Wet willow-alder-ash woodland

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Department of Arts, Heritage and the Gaeltacht

MAP 6:
RIVER BARROW AND RIVER NORE CONSERVATION OBJECTIVES OLD OAK WOODLANDS, ALLUVIAL FORESTS & PETRIFYING SPRINGS

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

SITE CODE: SAC 002162
CO. CARLOW; version 1.03, CO. KILDARE; version 1.04, CO. KILKENNY; version 1.1, CO. LAOIS; version 1.07, CO. OFFALY; version 1.01, CO. TIPPERARY; version 1.01, CO. WATERFORD; version 1.01, CO. WEXFORD; version 1.01

0 2 4 6 8 10 km

N

Map Version 1
Date: April 2011

Legend

- SAC 002162
- OSi Discovery Series County Boundary
- 1016 Desmoulin's Whorl Snail - *Vertigo moulinsiana*
- 1092 White-Clawed Crayfish - *Austropotamobius pallipes*
- 1421 Killarney Fern - *Trichomanes speciosum*
- 1990 Nore Freshwater Pearl Mussel - *Margaritifera durrovensis*

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

MAP 7:
RIVER BARROW AND RIVER NORE CONSERVATION OBJECTIVES DESMOULIN'S WHORL SNAIL, WHITE-CLAWED CRAYFISH, NORE FRESHWATER PEARL MUSSEL & KILLARNEY FERN

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

SITE CODE: SAC 002162
CO. CARLOW; version 1.03, CO. KILDARE; version 1.04, CO. KILKENNY; version 1.1, CO. LAOIS; version 1.07, CO. OFFALY; version 1.01, CO. TIPPERARY; version 1.01, CO. WATERFORD; version 1.01, CO. WEXFORD; version 1.01

0 2 4 6 8 10 km

N

Map Version 1
Date: April 2011

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

Produced by: National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,
7 Ely Place, Dublin 2, Ireland.
Web: www.npws.ie
E-mail: natureconservation@environ.ie

Citation:
NPWS (2011) Conservation Objectives: River Barrow and River Nore SAC 002162. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editors: Rebecca Jeffrey & Naomi Kingston
ISSN 2009-4086

APPENDIX D

National Parks and Wildlife Service

Conservation Objectives Series

Hook Head SAC 000764

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: natureconservation@environ.ie

Citation:
NPWS (2011) Conservation Objectives: Hook Head SAC 000764. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editors: Rebecca Jeffrey & Naomi Kingston
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***

000764	Hook Head SAC
1160	Large shallow inlets and bays
1170	Reefs
1230	Vegetated sea cliffs of the Atlantic and Baltic coasts

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

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

Title: Subtidal Investigations in Hook Head cSAC (000764), Co. Wexford
Year: 2011
Author: Aquafact
Series: Unpublished Report to NPWS

Title: Reef Investigations in Hook Head cSAC (000764), Co. Wexford
Year: 2011
Author: Aquafact
Series: Unpublished Report to NPWS

Title: National survey and assessment of the conservation status of Irish sea cliffs
Year: 2011
Author: Barron, S.J.; Delaney, A.; Perrin, P.M.; Martin, J.; O'Neill, F.
Series: Irish Wildlife Manuals No. 53

Title: Hook Head SAC (000764) Conservation objectives supporting document - coastal habitats [Version 1]
Year: 2011
Author: NPWS
Series: Unpublished Report to NPWS

Title: Hook Head SAC (000764). Conservation objectives supporting document - marine habitats [Version 1]
Year: 2011
Author: NPWS
Series: Unpublished Report to NPWS

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

Spatial data sources

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. Seaward boundary defined by expert judgement
Used for:	1160 (map 2)
Year:	
Title:	Subtidal soft sediment survey 2010; reef survey 2010; 1994 BioMar Survey
GIS operations:	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising
Used for:	Marine community types, 1170 (maps 3 and 4)
Year:	2005
Title:	OSi Discovery series vector data
GIS operations:	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined
Used for:	Marine community types base data (map 4)
Year:	2011
Title:	National survey and assessment of the conservation status of Irish sea cliffs
GIS operations:	Clipped to SAC boundary
Used for:	1230 (map 5)

1160 Large shallow inlets and bays

To maintain the favourable conservation condition of Large shallow inlets and bays in Hook Head 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 2	Habitat area was estimated using OSI data as 5,244ha. See marine supporting document for further details
Community extent	Hectares	The following communities should be maintained in a natural condition: Sand with *Chaetozone christiei* and *Tellina* sp. community; and Coarse sediment with *Pisidia longicornis* and epibenthic fauna community complex. See map 4	Based on information from a subtidal survey (Aquafact, 2011). See marine supporting document for further details

1170 Reefs

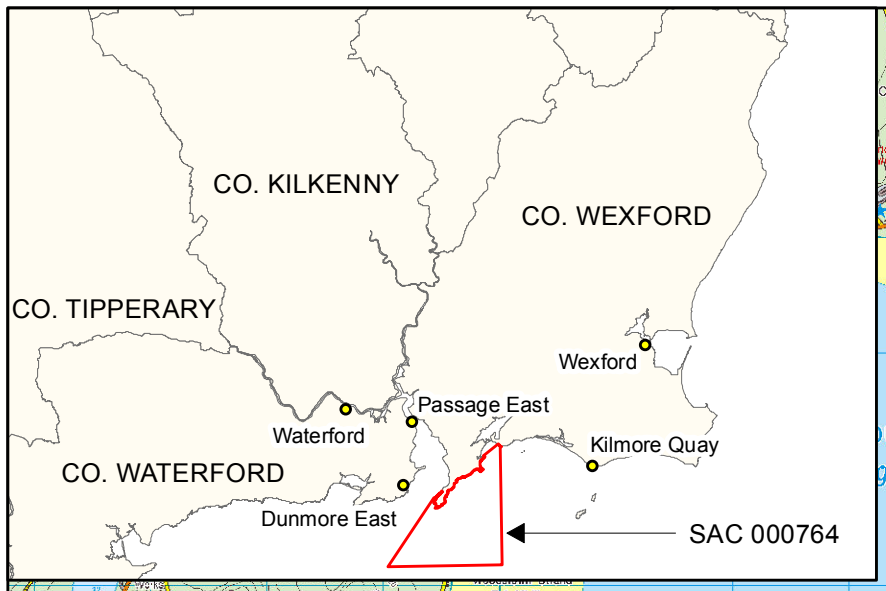
To maintain the favourable conservation condition of Reefs in Hook Head SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Occurrence	The distribution of reefs should remain stable, subject to natural processes. See map 3 for mapped distribution	Reef mapping based on information from a subtidal survey (Aquafact, 2011) and from 1994 BioMar Survey (Picton and Costello, 1997). See marine supporting document for further details
Habitat area	Hectares	The permanent area is stable, subject to natural processes. See map 3	Habitat area was estimated using 2010 survey data as 10,534ha. See marine supporting document for further details
Community structure	Biological composition	The following reef community complexes should be maintained in a natural condition: Exposed to moderately exposed intertidal reef community complex; and Echinoderm and sponge dominated community complex. See map 4	Based on information from a subtidal survey (Aquafact, 2011) and from 1994 BioMar Survey (Picton and Costello, 1997). See marine supporting document for further details
Community extent	Hectares	The extent of *Laminaria* dominated community should be conserved, subject to natural processes. See map 4	Based on information from a subtidal survey (Aquafact, 2011) and from 1994 BioMar Survey (Picton and Costello, 1997). See marine supporting document for further details
Community structure	Biological composition	The biology of *Laminaria* dominated community should be conserved, subject to natural processes	Based on information from a subtidal survey (Aquafact, 2011). See marine supporting document for further details

1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

To maintain the favourable conservation condition of Vegetated sea cliffs of the Atlantic and Baltic coasts in Hook Head SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat length	Kilometres	Area stable, subject to natural processes, including erosion. For sub-sites mapped: Loftushall - 0.55km; Hook Head - 2.36km; and Baginbun Head - 9.20km. See map 5	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). Three sub-sites were identified using a combination of aerial photos and the DCENR helicopter viewer giving a total estimated area of 12.11km within the SAC. Cliffs are linear features and are therefore measured in kilometres. Length of cliff likely to be underestimated. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 5	See coastal habitats supporting document for further details
Physical structure: functionality and hydrological regime	Occurrence of artificial barriers	No alteration to natural functioning of geomorphological and hydrological processes due to artificial structures	Maintaining natural geomorphological processes including natural erosion is important for the health of a vegetated sea cliff. Hydrological processes maintain flushes and in some cases tufa formations that can be associated with sea cliffs. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of sea cliff habitat zonations including transitional zones, subject to natural processes including erosion and succession	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimeters	Maintain structural variation within sward	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). 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 the Irish Sea Cliff Survey (Barron et al., 2011)	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). See coastal habitats supporting document for further details
Vegetation composition: bracken and woody species	Percentage	Cover of bracken (*Pteridium aquilinum*) on grassland and/or heath less than 10%. Cover of woody species on grassland and/or heath less than 20%	Based on data from the Irish Sea Cliff Survey (Barron et al., 2011). See coastal habitats supporting document for further details



MAP 1: HOOK HEAD CONSERVATION OBJECTIVES SAC DESIGNATION

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

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

COUNTY WEXFORD

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)

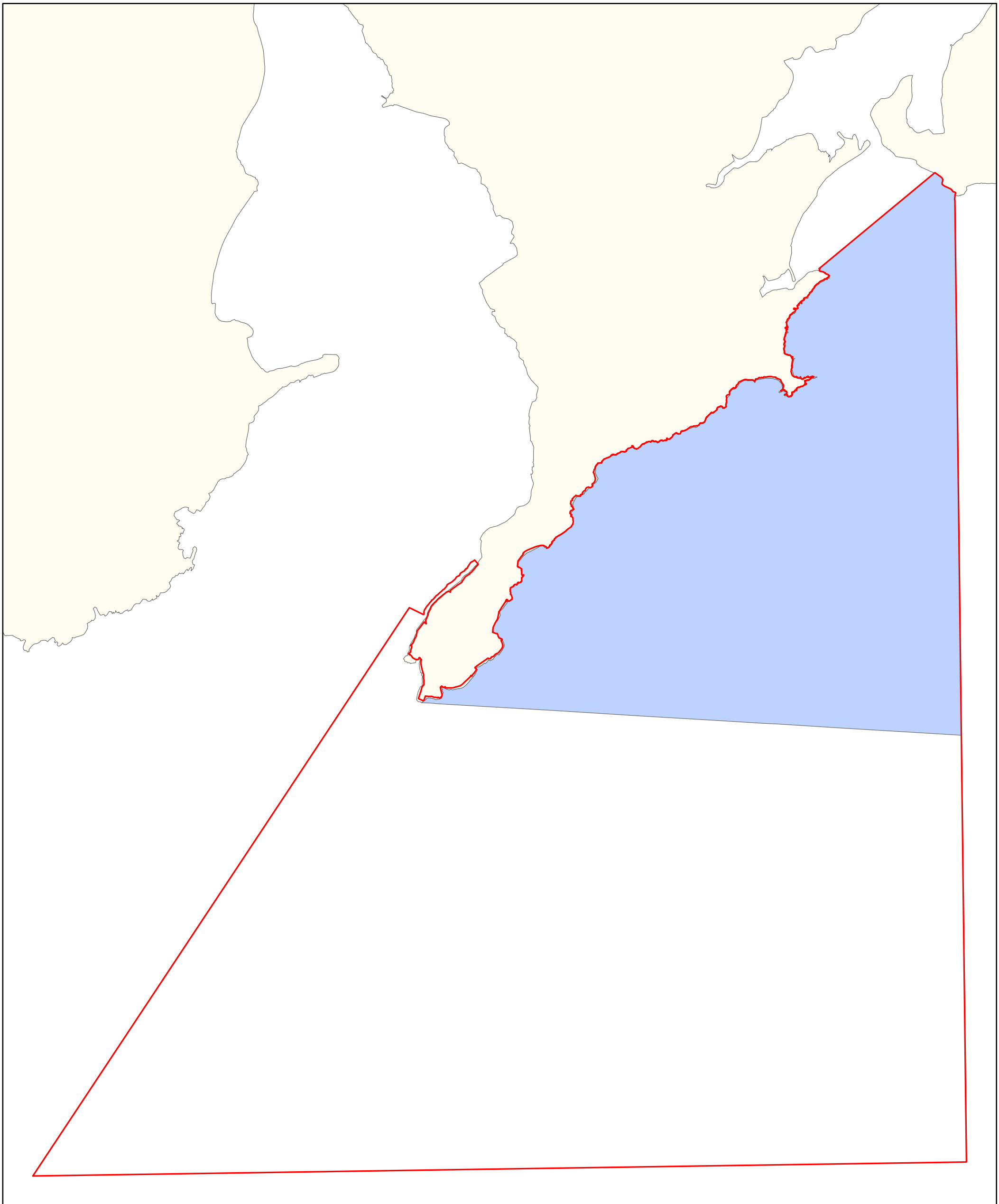
SITE CODE

SAC 000764
Version 1

Map Version 1
Date: July 2011

Legend

SAC 000764



Legend

- SAC 000764
- 1160 Large shallow inlets and bays
- OSi Discovery Series County Boundary

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MAP 2:
HOOK HEAD
CONSERVATION OBJECTIVES
LARGE SHALLOW INLETS & BAYS

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

COUNTY WEXFORD

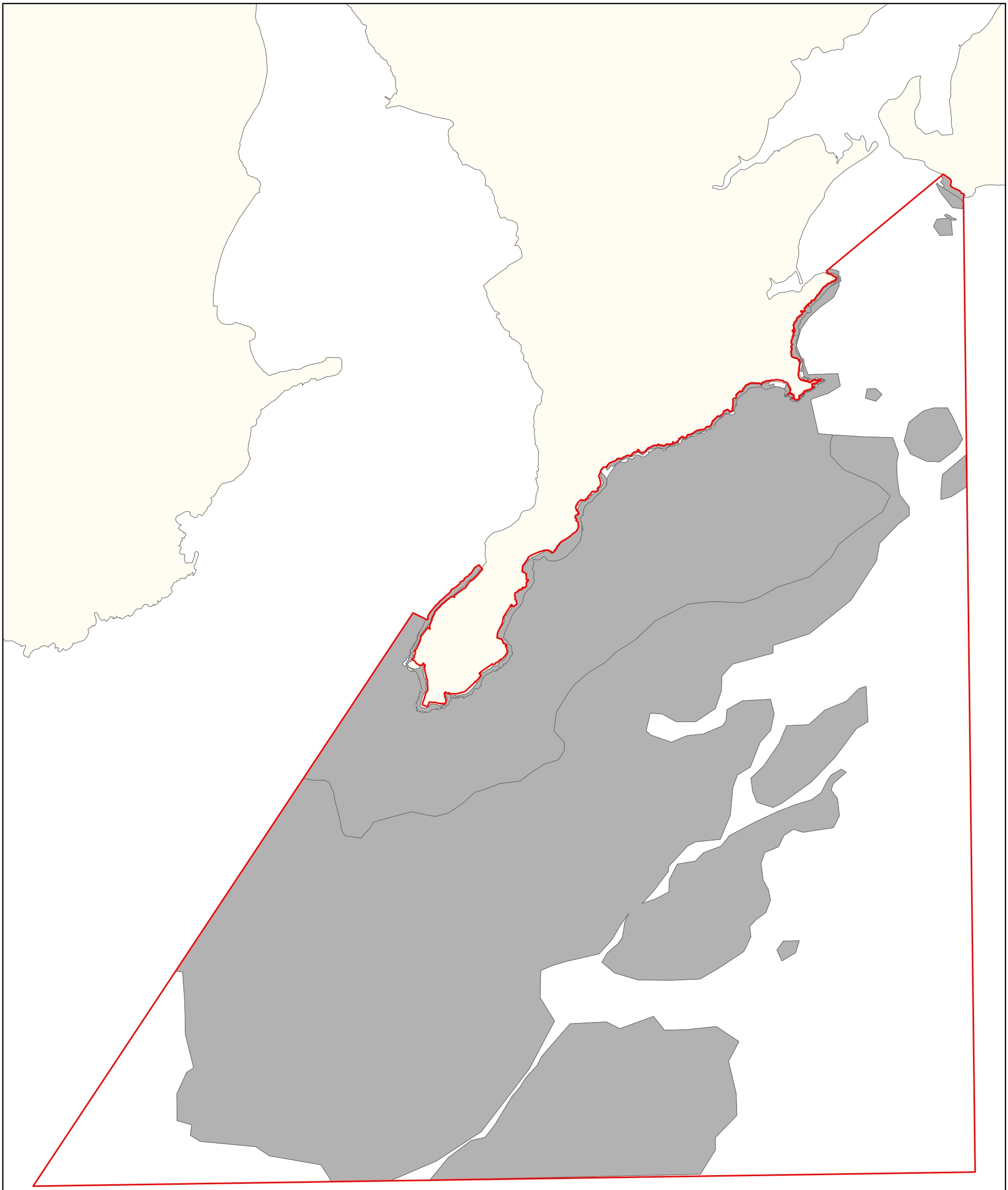
0 1 2 3 km

N

SITE CODE

SAC 000764
Version 1

Map Version 1
Date: July 2011



Legend

- SAC 000764
- 1170 Reefs
- OSi Discovery Series County Boundary

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Department of
Arts, Heritage and the Gaeltacht

MAP 3:
HOOK HEAD
CONSERVATION OBJECTIVES
REEFS

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

COUNTY WEXFORD

0 1 2 3 km

N

SITE CODE

SAC 000764
Version 1

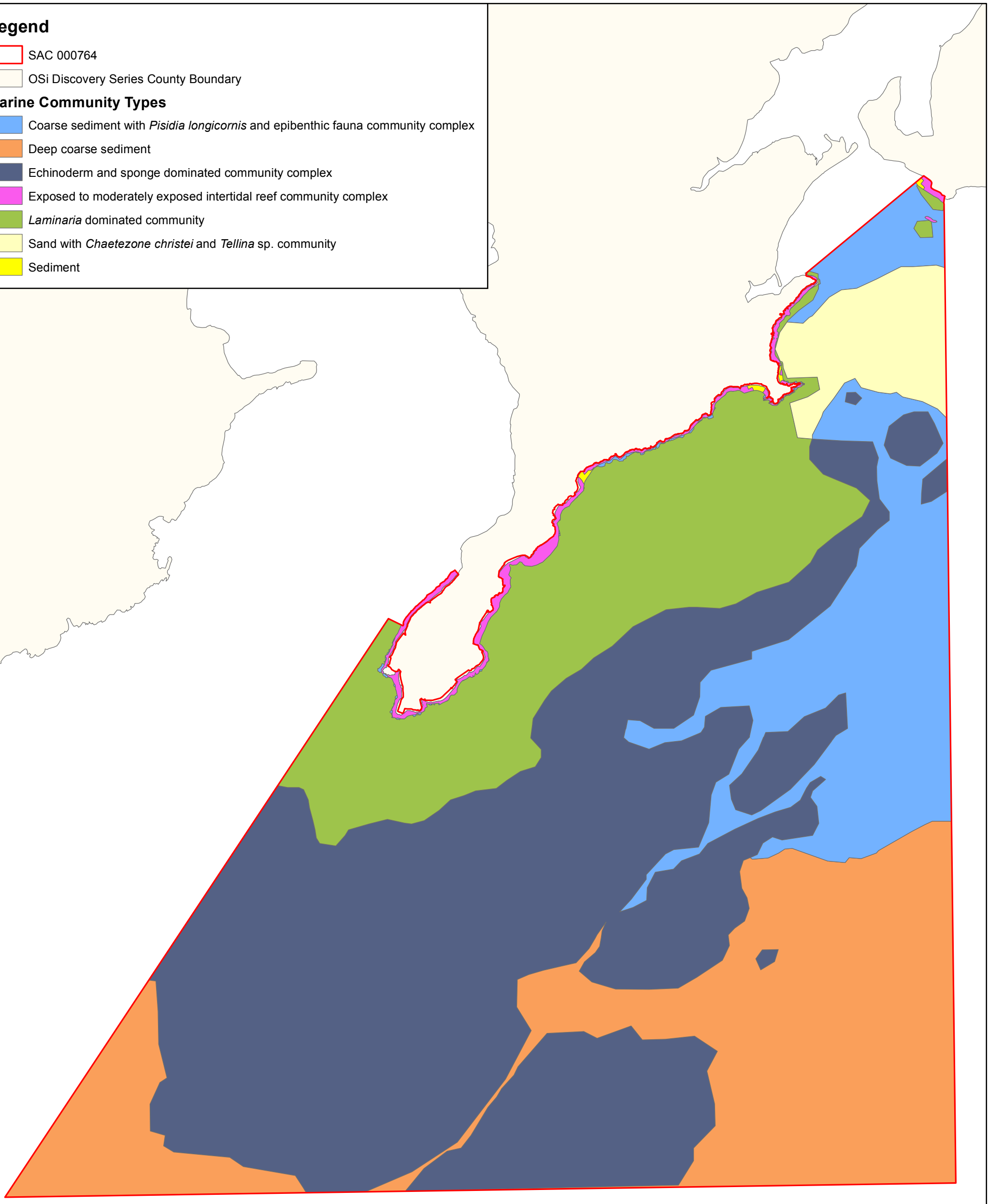
Map Version 1
Date: July 2011

Legend

- SAC 000764
- OSi Discovery Series County Boundary

Marine Community Types

- Coarse sediment with *Pisidia longicornis* and epibenthic fauna community complex
- Deep coarse sediment
- Echinoderm and sponge dominated community complex
- Exposed to moderately exposed intertidal reef community complex
- *Laminaria* dominated community
- Sand with *Chaetezone christei* and *Tellina* sp. community
- Sediment



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Department of
Arts, Heritage and the Gaeltacht

MAP 4:
HOOK HEAD
CONSERVATION OBJECTIVES
MARINE COMMUNITY TYPES

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

COUNTY WEXFORD

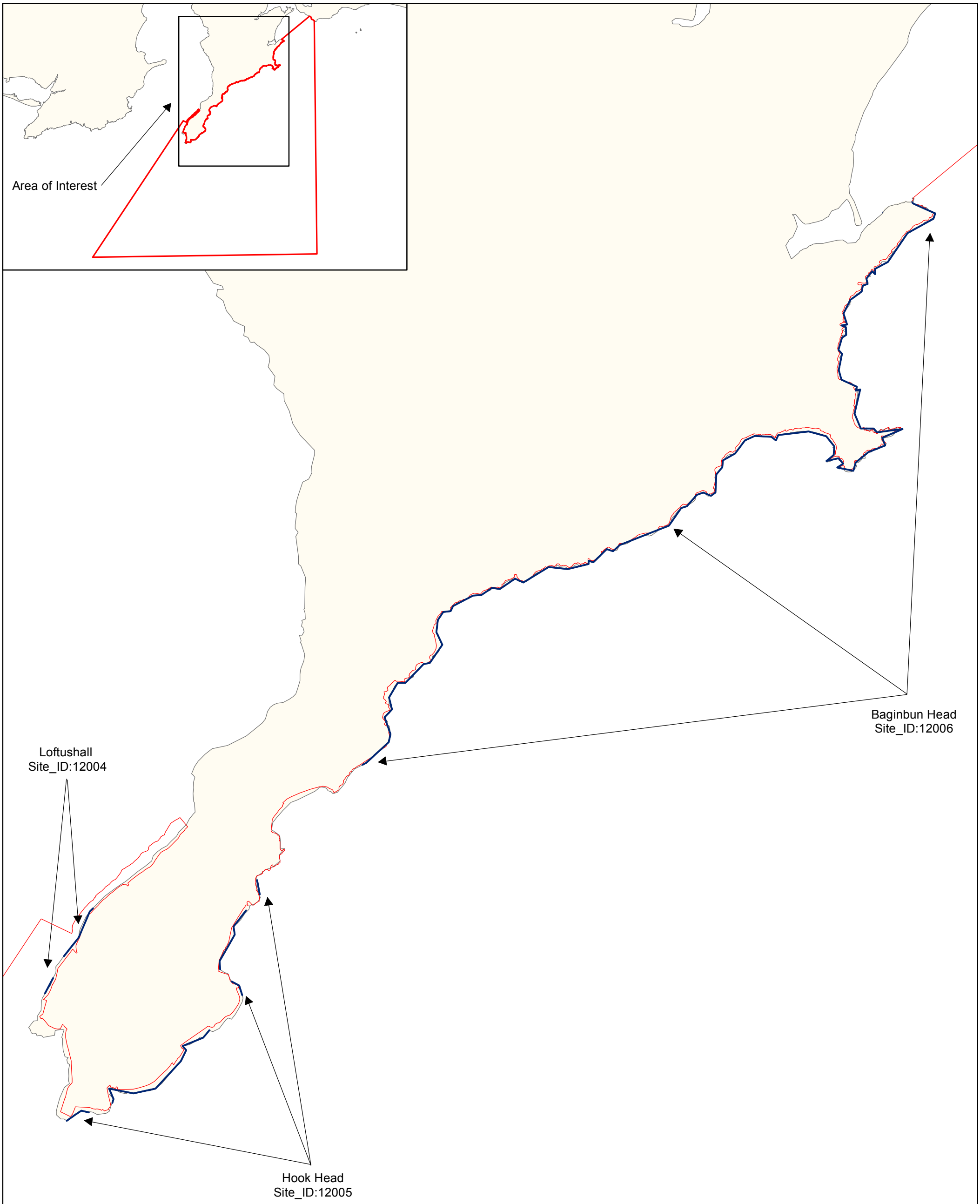
0 1 2 3 km

N

SITE CODE

SAC 000764
Version 1

Map Version 1
Date: July 2011



Legend

- SAC 000764
- 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts
- OSi Discovery Series County Boundary

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Department of Arts, Heritage and the Gaeltacht

MAP 5: HOOK HEAD CONSERVATION OBJECTIVES VEGETATED SEA CLIFFS

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

COUNTY WEXFORD

0 0.5 1 km

N

SITE CODE

SAC 000764
Version 1

Map Version 1
Date: July 2011

APPENDIX E

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Bannow Bay SAC 000697

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 (2012) Conservation Objectives: Bannow Bay SAC 000697. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editors: Rebecca Jeffrey & Naomi Kingston

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.

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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.

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- 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.

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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***

000697	Bannow Bay SAC
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*)
1410	Mediterranean salt meadows (*Juncetalia maritimi*)
1420	Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)
2110	Embryonic shifting dunes
2120	Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')
2130	*Fixed coastal dunes with herbaceous vegetation ('grey dunes')

Please note that this SAC overlaps with Bannow Bay SPA (004033) and is adjacent to Hook Head SAC (000764). See map 2. The conservation objectives for this site should be used in conjuntion with those for overlapping and adjacent sites as appropriate.

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

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

Title: Bannow Bay SAC (000697). Conservation objectives supporting document - coastal habitats [Version 1]

Year: 2012

Author: NPWS

Series: Unpublished Report to NPWS

Title: Bannow Bay SAC (000697). Conservation objectives supporting document - marine habitats and species [Version 1]

Year: 2011

Author: NPWS

Series: Unpublished Report to NPWS

Title: Subtidal Benthic Investigations in Bannow Bay SAC (Site Code: IE000697) and SPA (Site Code: IE004033), Co. Wexford.

Year: 2010

Author: Aquafact

Series: Unpublished Report to NPWS & MI

Title: A survey of mudflats and sandflats in Ireland. An intertidal soft sediment survey of Bannow Bay

Year: 2010

Author: Aquatic Services Unit

Series: Unpublished Report to NPWS & MI

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: The phytosociology and conservation value of Irish sand dunes

Year: 2008

Author: Gaynor, K.

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

---

Title: National Shingle Beach Survey of Ireland 1999

Year: 1999

Author: Moore, D.; Wilson, F.

Series: Unpublished Report to NPWS

Title: A survey of intertidal sediment biotopes in estuaries in Ireland

Year: 1997

Author: Falvey, J.P.; Costello, M.J.; Dempsey, S.

Series: Unpublished Report

Title:	A Preliminary Report on Areas of Scientific Interest in County Wexford
Year:	1979
Author:	Goodwillie, R.
Series:	Unpublished Report

Spatial data sources

Year:	2010
Title:	EPA WFD transitional waterbody data
GIS operations:	Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used for:	1130 (map 3)
Year:	
Title:	Mudflat and sandflat survey 2009; subtidal benthic survey 2009
GIS operations:	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising
Used for:	Marine community types, 1140 (maps 4 and 5)
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 5)
Year:	
Title:	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS operations:	QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used
Used for:	1310, 1330, 1410, 1420 (map 6)
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 (map 7)

1130 Estuaries

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 3	Habitat area was estimated as 34ha 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	Conserve the following community type in a natural condition: Fine sands with *Pygospio elegans* and *Corophium volutator* community complex. See map 5	The likely area of sediment communities was derived from intertidal and subtidal surveys undertaken in 2009 (ASU, 2010; Aquafact, 2010). 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 Bannow Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 4	Habitat area was estimated as 893ha using OSi data. See marine supporting document for further information
Community distribution	Hectares	Maintain the extent of the *Zostera*-dominated and the *Barnea candida* communities, subject to natural processes. See map 5	Estimated during 2009 intertidal survey (ASU, 2010). See marine supporting document for further information
½2ăűŜℕI· shoot density	Shoots/m²	Conserve the high quality of the *Zostera*-dominated community, subject to natural processes	See marine supporting document for further information
. I·ℕyŜI· ŎI·yŘℝŘI· density	Individuals/m²	Conserve the high quality of the *Barnea candida* community, subject to natural processes	See marine supporting document for further information
Community distribution	Hectares	Conserve the following community complexes in a natural condition: Fine sands with *Pygospio elegans* and *Corophium volutator* community complex; and Intertidal sand dominated by polychaetes community complex. See Map 5	The likely area of sediment communities was derived from intertidal surveys undertaken in 2009 (ASU, 2010). See marine supporting document for further information

1210 Annual vegetation of drift lines

To maintain the favourable conservation condition of annual vegetation of drift lines in Bannow Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Grange - 0.023ha, Bannow Island - 0.002ha. See map 7	Based on data from the Coastal Monitoring Project (Ryle et al. 2009). Two sub-sites were mapped giving a total estimated area of 0.025ha. 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, or change in habitat distribution, subject to natural processes. See map 7	Based on data from Ryle et al. (2009). Strandline is more extensive at Grange sub-site than at Bannow Island. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.	Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Accumulation of organic matter in tidal litter is essential for trapping sand and initiating dune formation. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from 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 Bannow Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. See map 7 for mapped location	Current area unknown. One area of vegetated shingle was recorded during the Coastal Monitoring Project (Ryle et al., 2009): Grange - 0.05ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 6 for mapped location	Current distribution unknown. Shingle known to occur at Grange, Saltmills and Taulaght. Likely to be more widespread. 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 & Wilson (1999) . 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 typical vegetated shingle flora including the range of sub-communities within the different zones	Based on data from Moore & Wilson (1999). 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 & Wilson (1999). 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 restore the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in Bannow Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Bannow Island -0.002ha, Clonmines - 0.02ha, Taulaght - 0.01ha, Saltmills - 0.01ha, Gorteens - 0.01ha, Fethard - 0.10ha. See map 6	Based on data from Saltmarsh Monitoring Project (McCorry & Ryle, 2009). Habitat recorded at six of the seven sub-sites surveyed and mapped, giving a total estimated area of 0.15ha. 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 6 for known distribution	Based on data from McCorry & 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 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 backing document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on data from McCorry & Ryle (2009). Creeks deliver sediment throughout saltmarsh system. Creeks and pan structures well developed at Fethard and Talaught. 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 & 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 & 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 & Ryle (2009). See coastal habitats supporting document for further details
Vegetation composition: typical species & sub-communities	Percentage cover	Maintain the presence of species-poor communities with typical species listed in saltmarsh Monitoring Project (McCorry & Ryle, 2009)	Based on data from McCorry & Ryle (2009). See coastal habitats supporting document for further details

1310 *Salicornia* and other annuals colonizing mud and sand

To restore the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in Bannow Bay 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 common cordgrass (*Spartina anglica*), with an annual spread of less than 1%	Based on data from McCorry & Ryle (2009). See coastal habitats supporting document for further details

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

To restore the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in Bannow Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Bannow Island - 2.57ha, Clonmines - 16.16ha, Taulaght - 2.95ha, Saltmills - 1.14ha, Gorteens - 1.17ha, Grange - 0.01ha, Fethard - 5.85ha. See map 6	Based on data from the Saltmarsh Monitoring Project (McCorry & Ryle 2009). Seven sub-sites that supported Atlantic salt meadow were mapped giving a total estimated area of 29.87ha. 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 6 for known distribution	Based on data from McCorry & Ryle (2009). See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure to develop, subject to natural processes, including erosion and succession	Creeks and pan structures well developed at Fethard and Talaught sub-sites. 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 & Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimeters	Maintain structural variation within sward	See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain >90% of the saltmarsh area vegetated	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)	See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%	Based on data from McCorry & Ryle (2009). See coastal habitats supporting document for further details

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

To restore the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in Bannow Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Clonmines - 1.92ha, Taulaght - 0.49ha, Saltmills - 0.83ha, Gorteens - 0.77ha, Grange - 0.40ha. See map 6	Based on data from the Saltmarsh Monitoring Project (McCorry & Ryle, 2009). Five sub-sites that support Mediterranean salt meadows were mapped giving a total estimated area of 4.41ha. 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 6 for known distribution	See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on data from the Saltmarsh Monitoring Project (McCorry & Ryle, 2009). The Mediterranean salt meadows at Taulaght has a well developed saltmarsh structure in places with creeks and small salt pans present. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Mediterranean salt meadows 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 & Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within the sward	Based on data from McCorry & Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain >90% of area outside creeks vegetated	Based on data from McCorry & Ryle (2009). Grazing is only recorded at Clonmines, though natural grazing by wildfowl reported at most sub-sites. 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 restore the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in Bannow Bay 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 common cordgrass (*Spartina anglica*), with an annual spread of less than 1%	Based on data from McCorry & Ryle (2009). Spartina swards occur at all sub-sites except Grange (although clumps of *Spartina* were recorded here). Occupies a significant proportion of the total saltmarsh area in most sub-sites . See coastal habitats supporting document for further details

1420 Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)

To restore the favourable conservation condition of Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) in Bannow Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Bannow Island - 0.17ha, Taulaght - 0.01ha, Gorteens - 0.06ha, Fethard - 0.12ha. See map 6	Based on data from the Saltmarsh Monitoring Project (McCorry & Ryle, 2009). four sub-sites that support Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi)* were mapped giving a total estimated area of 0.36ha. 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 6 for known distribution	See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Based on data from the Saltmarsh Monitoring Project (McCorry & Ryle, 2009). 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	Halophilous scrub occurs in association with ASM, MSM, Spartina swards and shingle at Bannow Bay. Based on data from McCorry & Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within the sward	Based on data from McCorry & Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain >90% of area outside creeks vegetated	Based on data from McCorry & Ryle (2009). Grazing is only recorded at Clonmines, though natural grazing by wildfowl reported at most sub-sites. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain range of sub-communities with typical species listed in Saltmarsh Monitoring Project (McCorry & Ryle, 2009)	Halophilous scrubs are characterised by the precence of perennial glasswort (*Sarcocornia perennis*). See coastal habitats supporting document for further details

1420 Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)

To restore the favourable conservation condition of Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) in Bannow Bay 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 common cordgrass (*Spartina anglica*), with an annual spread of less than 1%	Based on data from McCorry & Ryle (2009). *Spartina* swards occur at all sub-sites except Saltmills and Grange, and in most sites occupy a significant proportion of the total saltmarsh area. Spartina seems to provide new habitat for colonisation by perennial glasswort (*Sarcocornia perennis*). See coastal habitats supporting document for further details

2110 Embryonic shifting dunes

To restore the favourable conservation condition of embryonic shifting dunes at Bannow Bay, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Grange - 1.37ha. See map 7	Based on data from the Coastal Monitoring Project (Ryle et al., 2009). Habitat is very difficult to measure in view of its dynamic nature and was only recorded at the Grange sub-site. Embryonic dunes have been decimated at the northern end. Accretion was noted from the north-western corner and southern end of 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 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	Dunes are naturally dynamic systems that require continuous supply and circulation of sand. 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: 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 restore the favourable conservation condition of shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) in Bannow Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped:Bannow Island 0.11ha; Grange: 0.55ha. See map 7	Habitat was mapped during the Coastal Monitoring Project (Ryle et al. 2009). Habitat mapped at two sub-sites to give a total estimated area of 0.66ha. 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 7 for known distribution	Significant area of shifting dunes have been lost to erosion at the Grange sub-site though despite the erosion, sand is accumulating in places. The front of the dune face at Bannow Island sub-site is being regularly reworked and only a narrow band of shifting dunes occur in front of fixed dune 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	Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Ammophila reproduces vegetaqtively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: plant health of dune grasses	Percentage cover	>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
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 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

2130 *Fixed coastal dunes with herbaceous vegetation ('grey dunes')

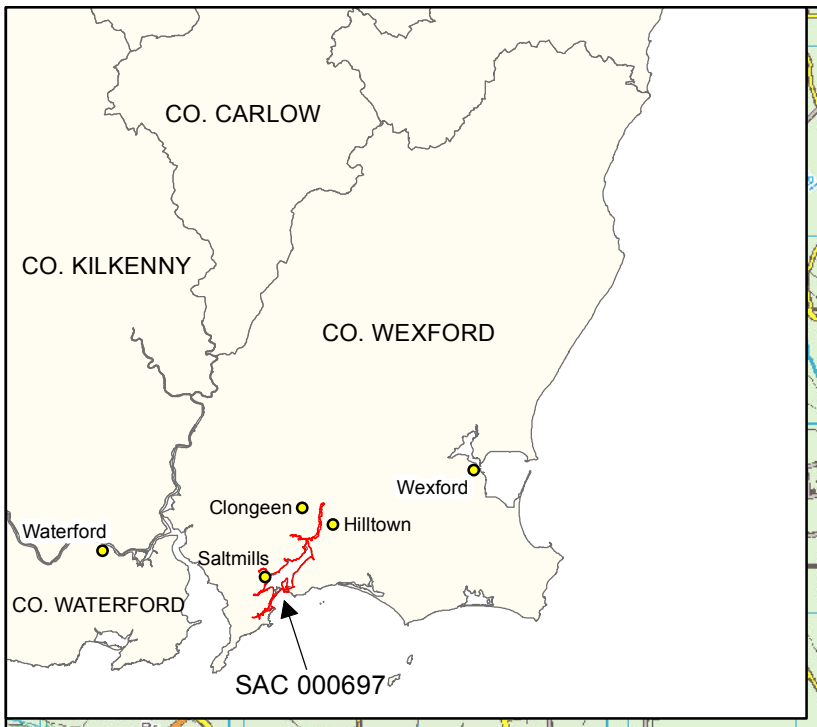
To restore the favourable conservation condition of fixed coastal dunes with herbaceous vegetation (grey dunes) in Bannow Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Grange -0.85ha, Bannow Island - 3.21ha. See map 7	Based on data from the Coastal Monitoring Project (Ryle et al., 2009). Two sub-sites were mapped, giving a total estimated area of 4.05ha. 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	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). See coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes	Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation 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). The presence of the Red Data Book species wild asparagus (*Asparagus officinalis* subsp. *prostratus*) is an indicator of local distinctiveness. 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. Bracken (*Pteridium aquilinum*) was recorded at Grange sub-site and is spreading at the rear of the dune system (Ryle et al., 2009) 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 Bannow Bay 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). Blackthorn (*Prunus spinosa*) occurs at Grange and shrub-dominated vegetation is a feature of the fixed dune at Bannow Island. See coastal habitats supporting document for further details



MAP 1: BANNOW BAY CONSERVATION OBJECTIVES SAC DESIGNATION

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

SITE CODE: SAC 000697 Version 1.02

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Feb 2012

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000697

004033

000764

Legend

- SAC 000697
- SAC 000764
- SPA 004033
- OSi Discovery Series County Boundary

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MAP 2:
BANNOW BAY SAC
CONSERVATION OBJECTIVES
ADJOINING / OVERLAPPING DESIGNATIONS

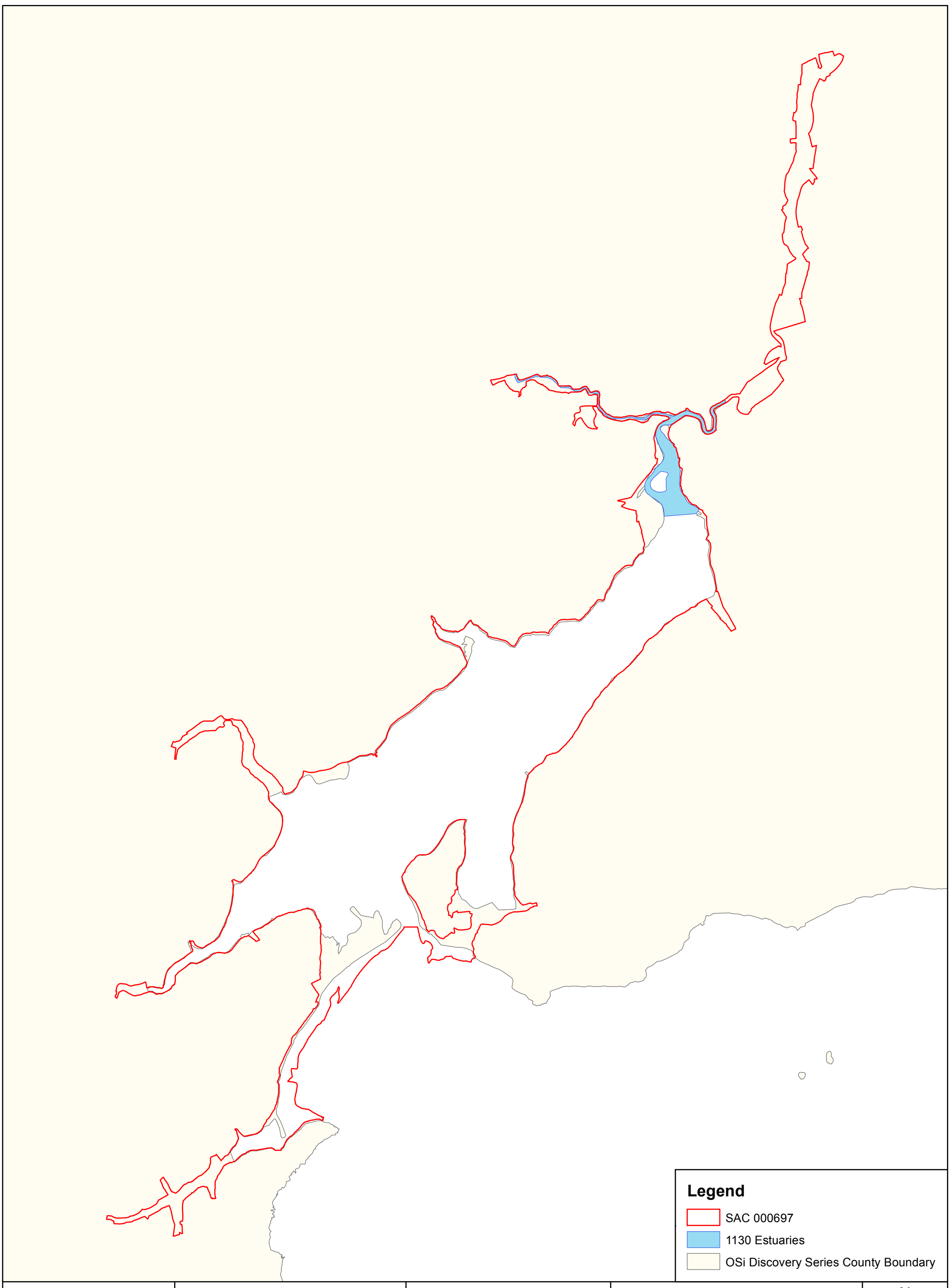
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 000697 Version 1.02
SAC 000764 Version 1
SPA 004033 Version 1.01

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Feb 2012



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MAP 3: BANNOW BAY SAC CONSERVATION OBJECTIVES ESTUARIES

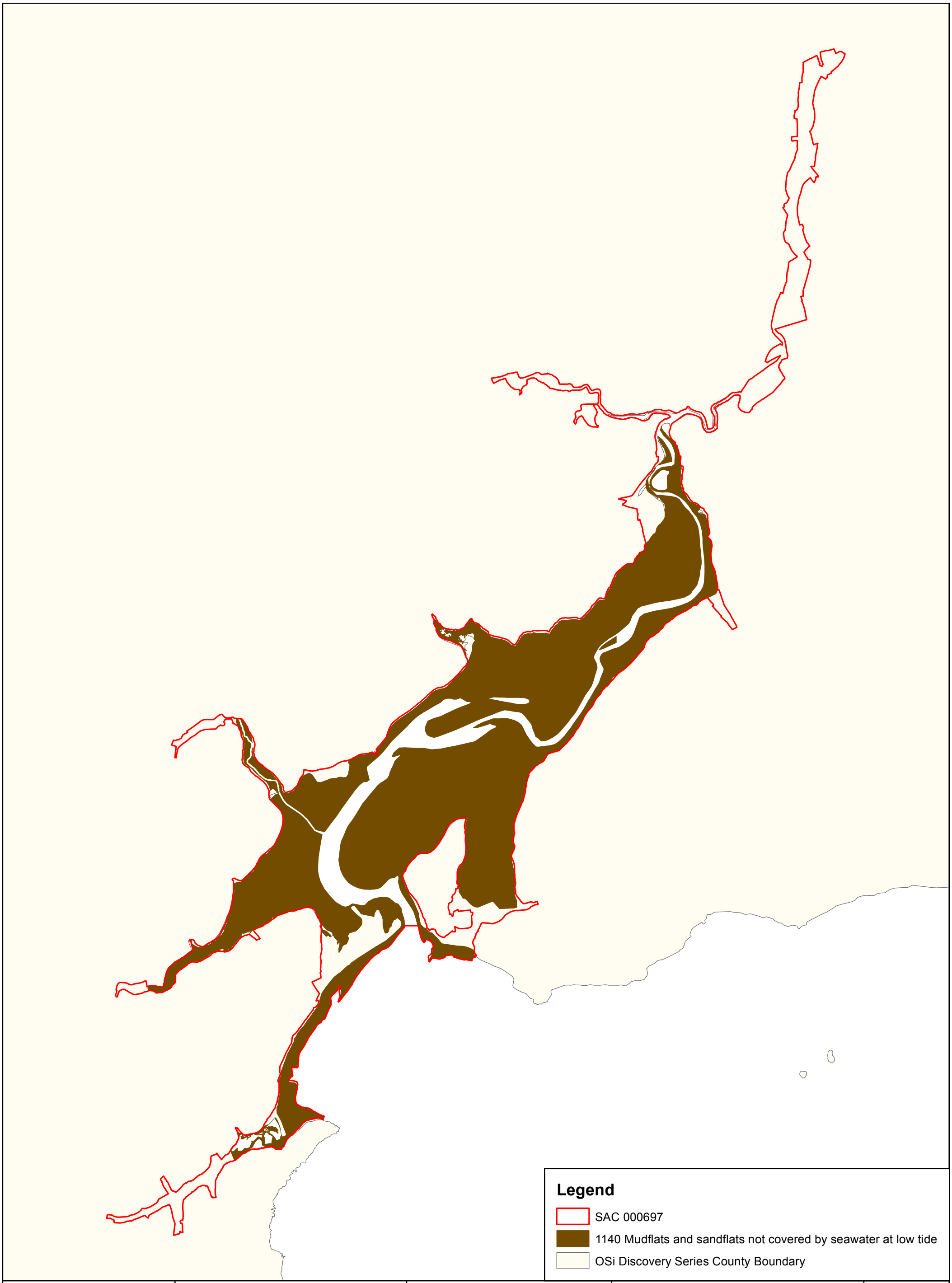
Map to be read in conjunction with the NPWS Conservation Objectives Document.

CO. WEXFORD

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Feb 2012



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MAP 4:
BANNOW BAY SAC
CONSERVATION OBJECTIVES
TIDAL MUDFLATS & SANDFLATS

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

CO. WEXFORD

0 0.5 1 1.5 2 km

N

Map Version 1
Date: March 2012

Legend

- SAC 000697
- SPA 004033
- OSi Discovery Series County Boundary

Marine Community Types

- *Barnea candida* community
- Coarse sediment with Pisidia longicornis & epibenthic fauna community complex
- Fine sands with *Pygospio elegans* and *Corophium volutator* community complex
- Intertidal sand dominated by polychaetes community complex
- River
- Sand with *Chaetozone christei* and *Tellina* sp. community complex
- *Zostera*-dominated community

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MAP 5:
BANNOW BAY SAC
CONSERVATION OBJECTIVES
MARINE COMMUNITY TYPES

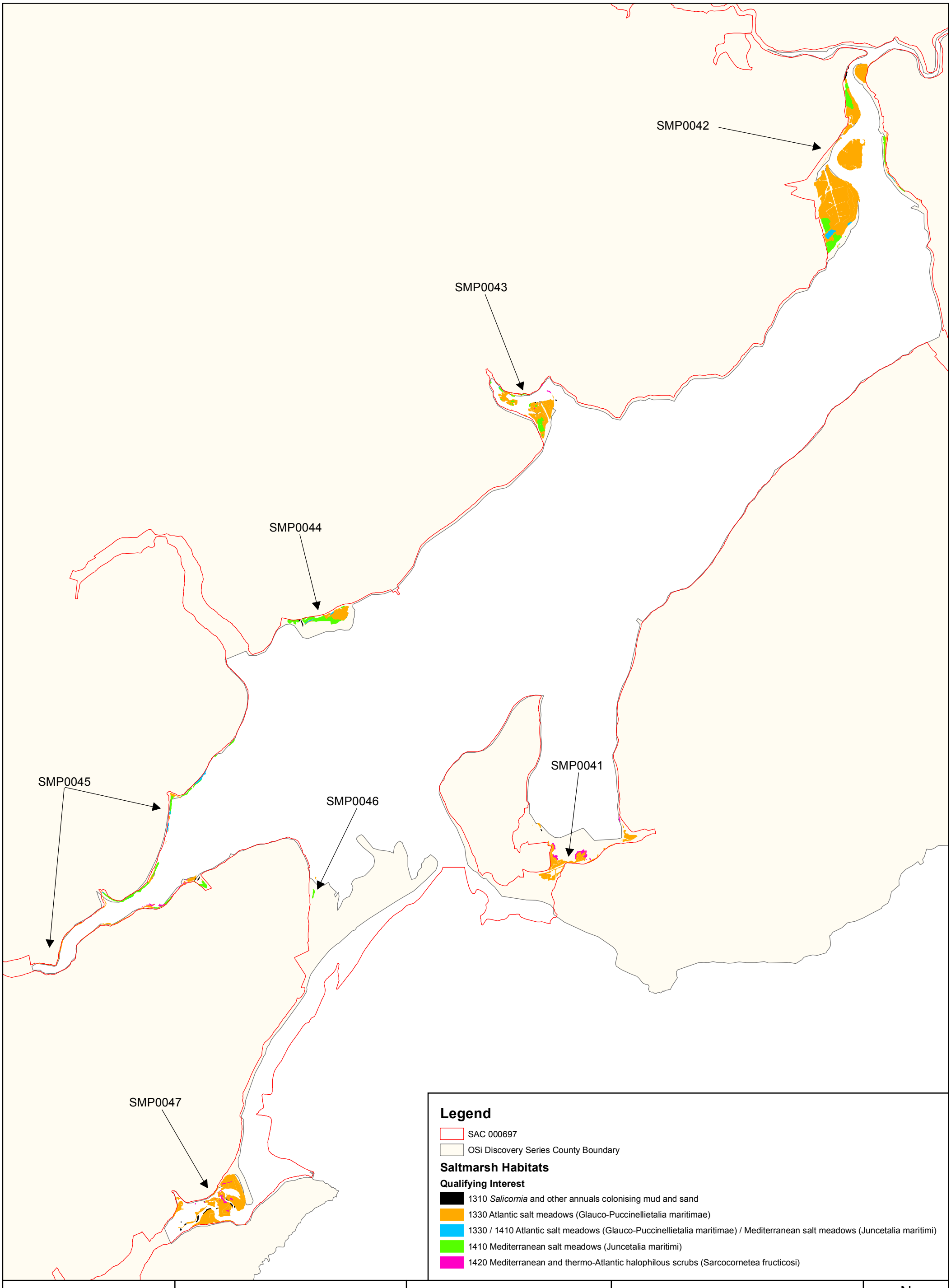
Map to be read in conjunction with the NPWS Conservation Objectives Document.

CO. WEXFORD

0 0.5 1 1.5 2 km

N

Map Version 1
Date: March 2012



Legend

SAC 000697

OSi Discovery Series County Boundary

Saltmarsh Habitats

Qualifying Interest

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)

1420 Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fructicosi)

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MAP 6:
BANNOW BAY SAC
CONSERVATION OBJECTIVES
SALTMARSH HABITATS

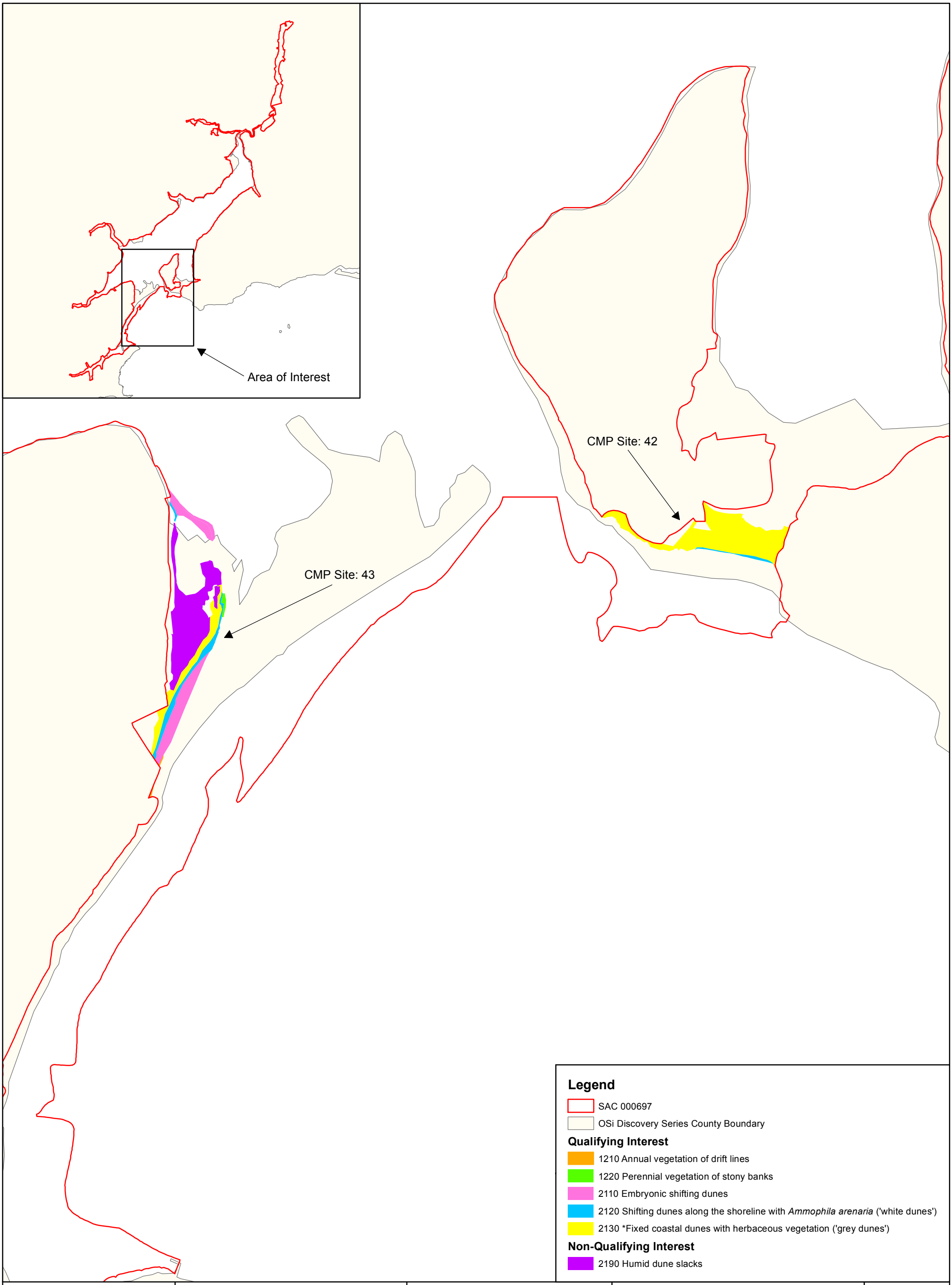
Map to be read in conjunction with the NPWS Conservation Objectives Document.

CO. WEXFORD

0 0.25 0.5 0.75 1 km

N

Map Version 1
Date: Feb 2012



Legend

SAC 000697

OSi Discovery Series County Boundary

Qualifying Interest

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')

Non-Qualifying Interest

2190 Humid dune slacks

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MAP 7: BANNOW BAY SAC CONSERVATION OBJECTIVES SAND DUNE HABITATS

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

CO. WEXFORD

0 100 200 300 400 500 m

N

Map Version 1
Date: Feb 2012

APPENDIX F

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Bannow Bay SPA 004033

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

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Series Editors: Rebecca Jeffrey & Naomi Kingston

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***

004033 Bannow Bay SPA

A046	Light-bellied Brent Goose *Branta bernicla hrota*	wintering
A048	Shelduck *Tadorna tadorna*	wintering
A054	Pintail *Anas acuta*	wintering
A130	Oystercatcher *Haematopus ostralegus*	wintering
A140	Golden Plover *Pluvialis apricaria*	wintering
A141	Grey Plover *Pluvialis squatarola*	wintering
A142	Lapwing *Vanellus vanellus*	wintering
A143	Knot *Calidris canutus*	wintering
A149	Dunlin *Calidris alpina*	wintering
A156	Black-tailed Godwit *Limosa limosa*	wintering
A157	Bar-tailed Godwit *Limosa lapponica*	wintering
A160	Curlew *Numenius arquata*	wintering
A162	Redshank *Tringa totanus*	wintering
A999	Wetlands	

Please note that this SPA overlaps with Bannow Bay SAC (000697) and Hook Head SAC (000764). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping sites as appropriate.

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

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

Title: Bannow Bay SPA (004033): Conservation objectives supporting document [Version 1]

Year: 2012

Author: NPWS

Series: Unpublished Report to NPWS

A046 Light-bellied Brent Goose *Branta bernicla hrota*

To maintain the favourable conservation condition of Light-bellied Brent Goose in Bannow Bay 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	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by Light-bellied Brent Goose, 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 part five of the conservation objectives supporting document

A048 Shelduck *Tadorna tadorna*

To maintain the favourable conservation condition of Shelduck in Bannow Bay 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	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by Shelduck, 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 part five of the conservation objectives supporting document

A054 Pintail *Anas acuta*

To maintain the favourable conservation condition of Pintail in Bannow Bay 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	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by Pintail, 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 part five of the conservation objectives supporting document

A130 Oystercatcher *Haematopus ostralegus*

To maintain the favourable conservation condition of Oystercatcher in Bannow Bay 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	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by Oystercatcher, 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 part five of the conservation objectives supporting document

A140 Golden Plover *Pluvialis apricaria*

To maintain the favourable conservation condition of Golden Plover in Bannow Bay 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	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by Golden Plover, 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 part five of the conservation objectives supporting document

A141 Grey Plover *Pluvialis squatarola*

To maintain the favourable conservation condition of Grey Plover in Bannow Bay 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	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by Grey Plover, 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 part five of the conservation objectives supporting document

A142 Lapwing *Vanellus vanellus*

To maintain the favourable conservation condition of Lapwing in Bannow Bay 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	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by Lapwing 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 part five of the conservation objectives supporting document

A143 Knot *Calidris canutus*

To maintain the favourable conservation condition of Knot in Bannow Bay 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	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by Knot, 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 part five of the conservation objectives supporting document

A149 Dunlin *Calidris alpina*

To maintain the favourable conservation condition of Dunlin in Bannow Bay 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	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by Dunlin, 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 part five of the conservation objectives supporting document

A156 Black-tailed Godwit *Limosa limosa*

To maintain the favourable conservation condition of Black-tailed Godwit in Bannow Bay 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	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by Black-tailed Godwit, 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 part five of the conservation objectives supporting document

A157 Bar-tailed Godwit *Limosa lapponica*

To maintain the favourable conservation condition of Bar-tailed Godwit in Bannow Bay 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	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by Bar-tailed Godwit, 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 part five of the conservation objectives supporting document

A160 Curlew *Numenius arquata*

To maintain the favourable conservation condition of Curlew in Bannow Bay 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	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by Curlew, 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 part five of the conservation objectives supporting document

A162 Redshank *Tringa totanus*

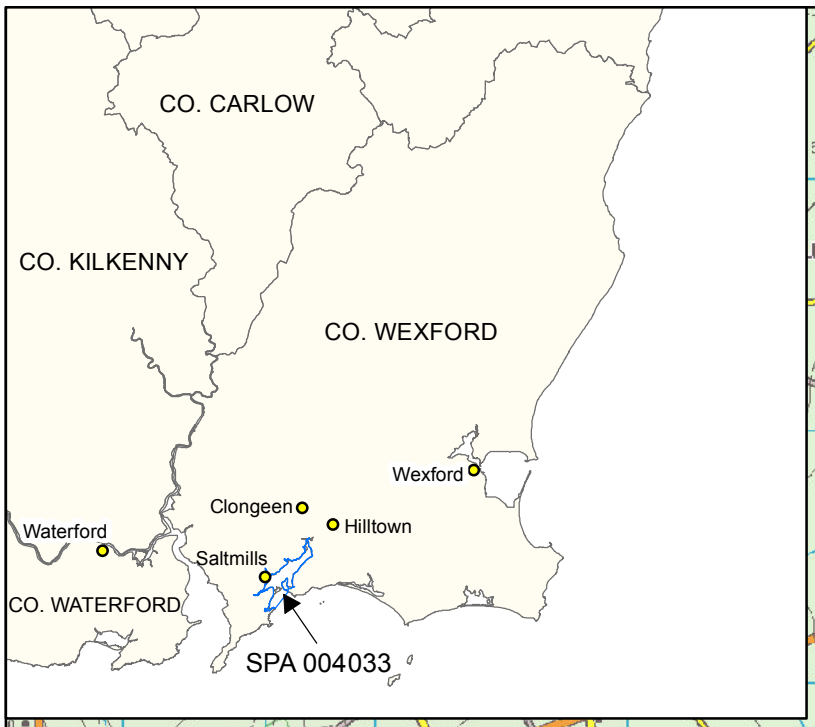
To maintain the favourable conservation condition of Redshank in Bannow Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by Redshank, 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 part five of the conservation objectives supporting document

A999 Wetlands

To maintain the favourable conservation condition of the wetland habitat in Bannow Bay SPA as a resource for the regularly-occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Attribute	Measure	Target	Notes
Wetland habitat area	hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1,364ha, other than that occurring from natural patterns of variation	The wetland habitat area was estimated as 1,364ha using OSI data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document



MAP 1: BANNOW BAY SPA CONSERVATION OBJECTIVES SPA DESIGNATION

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

SITE CODE:
SPA 004033 Version 1.01

0 0.25 0.5 0.75 1 km

N

Map Version 1
Date: Feb 2012

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Department of Arts, Heritage and the Gaeltacht

Legend

SPA 004033

000697

004033

000764

Legend

- SPA 004033
- SAC 000697
- SAC 000764
- OSi Discovery Series County Boundary

An Roinn
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Department of
Arts, Heritage and the Gaeltacht

MAP 2:
BANNOW BAY SPA
CONSERVATION OBJECTIVES
ADJOINING / OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 000697 Version 1.02
SAC 000764 Version 1
SPA 004033 Version 1.01

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Feb 2012

APPENDIX G

SITE SYNOPSIS

Site Name: Tramore Dunes and Backstrand SAC

Site Code: 000671

This composite coastal site lies at the head of Tramore Bay, east of Tramore town in Co. Waterford. The Tramore dunes (Burrow) are the result of a classic inshore process - the growth of a spit of shingle and sand across a shallow bay. Behind the spit lies the Back Strand which dries out at low tide and is connected to the open sea by narrows at Rinneshark. The Burrow has a narrow neck and expands eastwards. Longshore drift is from the west so any loose material accumulates at the tip, which is hooked, and on the opposing spit at Bass Point.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1140] Tidal Mudflats and Sandflats
[1210] Annual Vegetation of Drift Lines
[1220] Perennial Vegetation of Stony Banks
[1310] *Salicornia* Mud
[1330] Atlantic Salt Meadows
[1410] Mediterranean Salt Meadows
[2110] Embryonic Shifting Dunes
[2120] Marram Dunes (White Dunes)
[2130] Fixed Dunes (Grey Dunes)*

The dunes at this site are well developed and contain several important habitats including the priority habitat fixed dunes. Within the dune system there are high ridges and valleys, old stabilised surfaces and new foredunes at shore level. Consequently all the major vegetation types are found, from the strand flora, through mobile embryonic and marram dunes to stable fixed dunes, with saltmarsh on the northern fringe and slacks at Bass Point.

The flora of the fixed dunes is not as species-rich as at other systems, due mainly to the absence of grazing. This has led to the development of a tall, rank dune grassland and in places the development of dune scrub. Nevertheless, most of the characteristic dune species of the south-east are found, including Marram (*Ammophila arenaria*), which is dominant over much of the system, Wild Thyme (*Thymus praecox*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Lady's Bedstraw (*Galium verum*), Rest Harrow (*Ononis repens*), Fairy Flax (*Linum catharticum*) and Red Fescue (*Festuca rubra*). The moss *Tortula ruraliformis,* which is characteristic of fixed dune areas, is common in the dune turf. In some areas there is a shrubby community, with Wild Privet

(*Ligustrum vulgare*) and Dewberry (*Rubus caesius*) being dominant. Bee Orchid (*Ophrys apifera*), a Red Data Book species, has been recorded recently from the fixed dune grassland, and there are isolated patches of Wild Asparagus (*Asparagus officinalis* subsp. *prostratus*), a species which is protected under the Flora (Protection) Order, 1999.

The embryonic dunes at the site occur in mosaic with mobile Marram (*Ammophila arenaria*) dunes. They form a narrow band along the seaward face of Tramore Burrow and make up a small area at Bass Point. At Tramore Burrow they become more developed towards the tip, away from much of the recreational pressure. While Sand Couch (*Elymus farctus*) is a characteristic species for this habitat, Sea Rocket (*Cakile maritima*), Sea-holly (*Eryngium maritimum*), Sea Bindweed (*Calystegia soldanella*) and Marram also occur. Mobile marram dunes are present for most of the length of Tramore strand and also at Bass Point. They are particularly well represented at the tip of Tramore Burrow sand spit. Dune ridges can reach heights of around 25 m. The flora includes Sea-holly, Sea Bindweed, Colt's-foot (*Tussilago farfara*), Smooth Sow-thistle (*Sonchus oleraceus*), Groundsel (*Senecio vulgaris*) and Sea Beet (*Beta vulgaris* subsp. *maritima*).

Saltmarsh is well developed and fairly extensive in the sheltered inner part of the site. It is the lagoon type of saltmarsh, the rarest type found in Ireland. The communities found are characteristic of both Atlantic and Mediterranean saltmarshes. The main species include Thrift (*Armeria maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Lax-flowered Sea-lavender (*Limonium humile*), Sea Plantain (*Plantago maritima*), Sea Aster (*Aster trifolium*), Sea Purslane (*Halimione portulacoides*) and Sea Rush (*Juncus maritimus*). The scarce species Hard-grass (*Parapholis strigosa*) occurs, and a feature of this saltmarsh is the presence of Golden Samphire (*Inula crithmoides*), a species rarely found on saltmarshes in Ireland. Glassworts (*Salicornia* spp.) and other annuals such as Annual Sea-blite (*Suaeda maritima*) occur in channels and pans, and also onto the mudflats. Common Cord-grass (*Spartina anglica*) is frequent on parts of the saltmarshes and on the mudflats.

The intertidal mudflats and sandflats are another important habitat type found here. The macrofauna is well developed, with lugworm (A*renicola marina*), furrow shell (*Scrobicularia plana*), ragworm (*Hediste diversicolor*) and common cockle (*Cerastoderma edule*) being common, and large patches of mussel (*Mytilus edulis*) and periwinkles (*Littorina littorea*) also present. A feature of this habitat is the presence of Eelgrass (*Zostera noltii* and *Z. angustifolia*).

The habitat type 'annual vegetation of driftlines' is represented at the site and the following strandline species occur: Sea Rocket, Prickly Saltwort (*Salsola kali*), oraches (*Atriplex* spp.), Sea-holly and Sea Mayweed (*Matricaria maritima*). The rare species Sea Knotgrass (*Polygonum maritimum*) has been recorded from this habitat.

The beaches at the site are sandy shingle in character and species characteristic of this habitat type, such as Sea Sandwort (*Honkenya peploides*) and Lyme-grass (*Leymus arenarius*), are common. Species which have been recorded from this site and which

are characteristic, but rare or scarce, include Sea-kale (*Crambe maritima*), Danish Scurvygrass (*Cochlearia danica*), Sea Knotgrass and Cottonweed (*Otanthus maritimus*).

Several rare plants have been recorded from Tramore, and some have already been mentioned above. It is the only site in the country where the Red Data Book plant Sea Knotgrass is known, though it is sporadic in appearance. Other Red Data Book species which have been reported include Lesser Centaury (*Centaurium pulchellum*) and Cottonweed (both of which are listed on the Flora (Protection) Order, 1999), Sharp-leaved Fluellen (*Kickxia elatine*), Sea-kale and Spring Vetch (*Vicia lathyroides*).

The Back Strand is an area of great importance for waterfowl on the south coast and is a designated SPA. The following figures are the average counts obtained during three seasons between 1994/95 and 1996/97. Brent Goose (482) occur in numbers which are of international significance. Six further species occur in nationally important numbers: Golden Plover (3,100), Grey Plover (261), Dunlin (1,970), Sanderling (53), Black-tailed Godwit (271) and Bar-tailed Godwit (405). Both Golden Plover and Bar-tailed Godwit are listed on Annex I of the E.U. Birds Directive.

The main threat to the stability of the dune habitats is from recreational pressures, with heavy usage of the site due to its proximity to Tramore, a popular holiday town. Already some large blow-outs and areas of bare sand are present. Driftline and shingle vegetation is also under pressure from heavy usage of the beach area. The intertidal and saltmarsh habitats are not under significant threat, though possible seepage from the nearby landfill site is a potential threat.

Tramore Dunes and Back Strand is a site of major ecological importance for the range of good quality coastal habitats which occur, including fixed dunes, which are listed as a priority habitat on Annex I of the E.U. Habitats Directive. The site has a remarkably rich flora, featuring a number of rare and protected species, and the intertidal area is important for wintering waterfowl.

APPENDIX H

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Tramore Back Strand SPA 004027

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 (2013) Conservation Objectives: Tramore Back Strand SPA 004027. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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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***

004027	Tramore Back Strand SPA
A046	Brent Goose *Branta bernicla hrota*
A140	Golden Plover *Pluvialis apricaria*
A141	Grey Plover *Pluvialis squatarola*
A142	Lapwing *Vanellus vanellus*
A149	Dunlin *Calidris alpina alpina*
A156	Black-tailed Godwit *Limosa limosa*
A157	Bar-tailed Godwit *Limosa lapponica*
A160	Curlew *Numenius arquata*
A999	Wetlands

Please note that this SPA overlaps with Tramore Dunes and Backstrand SAC (000671). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping site 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 :	2013
Title :	Tramore Back Strand SPA (site code 4027) Conservation objectives supporting document V1
Author :	NPWS
Series :	Conservation objectives supporting document

A046 Brent Goose *Branta bernicla hrota*

To maintain the favourable conservation condition of Light-bellied Brent Goose in Tramore Back Strand 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 trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by light-bellied brent goose, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 and 2011/2012 waterbird survey programmes is discussed in part five of the conservation objectives supporting document

A140 Golden Plover *Pluvialis apricaria*

To maintain the favourable conservation condition of Golden Plover in Tramore Back Strand 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 trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 and 2011/2012 waterbird survey programmes is discussed in part five of the conservation objectives supporting document

A141 Grey Plover *Pluvialis squatarola*

To maintain the favourable conservation condition of Grey Plover in Tramore Back Strand 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 trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by grey plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 and 2011/2012 waterbird survey programmes is discussed in part five of the conservation objectives supporting document

A142 Lapwing *Vanellus vanellus*

To maintain the favourable conservation condition of Lapwing in Tramore Back Strand 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 trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by lapwing, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 and 2011/2012 waterbird survey programmes is discussed in part five of the conservation objectives supporting document

A149 Dunlin *Calidris alpina alpina*

To maintain the favourable conservation condition of Dunlin in Tramore Back Strand 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 trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 and 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A156 Black-tailed Godwit *Limosa limosa*

To maintain the favourable conservation condition of Black-tailed Godwit in Tramore Back Strand 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 trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by black-tailed godwit, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 and 2011/2012 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A157 Bar-tailed Godwit *Limosa lapponica*

To maintain the favourable conservation condition of Bar-tailed Godwit in Tramore Back Strand 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 trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 and 2011/2012 waterbird survey programmes is discussed in part five of the conservation objectives supporting document

A160 Curlew *Numenius arquata*

To maintain the favourable conservation condition of Curlew in Tramore Back Strand SPA, which is defined by the following list of attributes and targets:

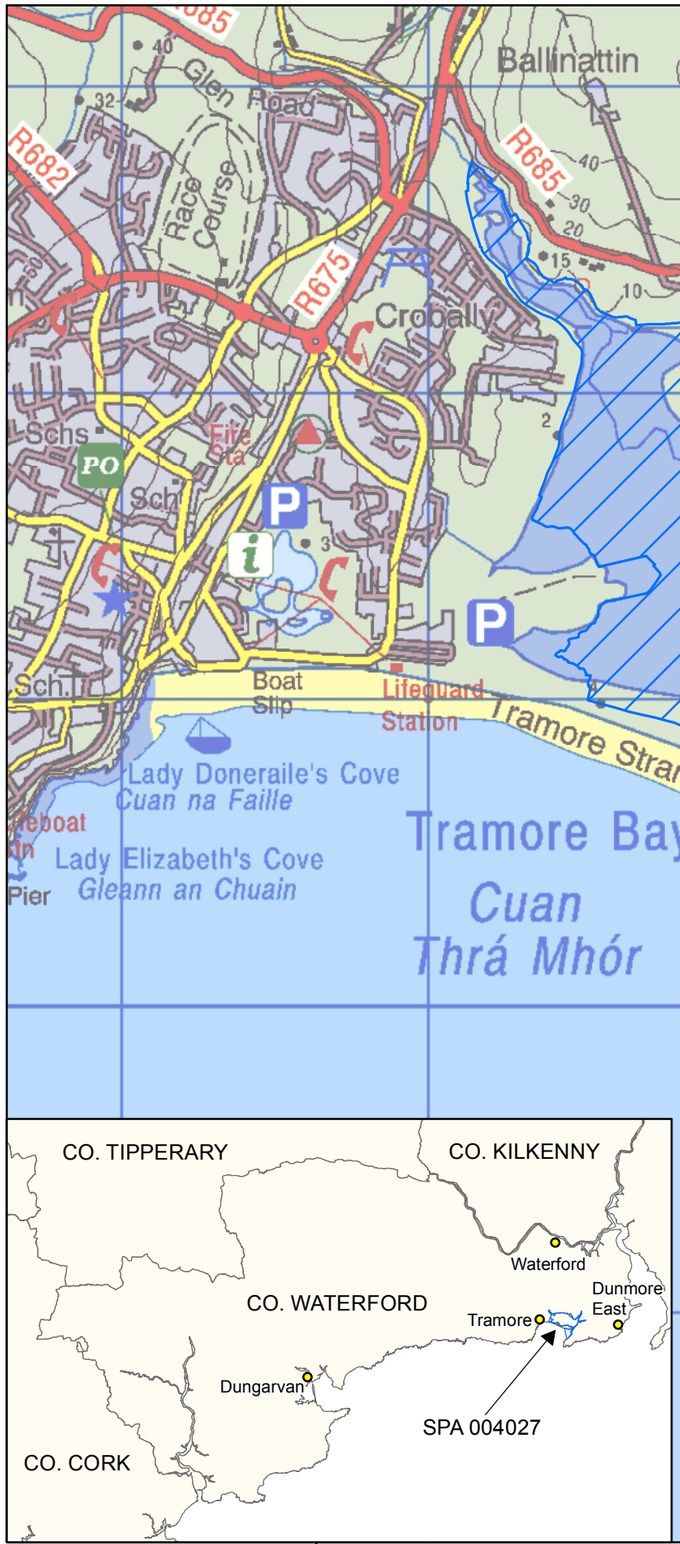
Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by curlew, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 and 2011/2012 waterbird survey programmes is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Tramore Back Strand SPA [004027]

A999 Wetlands

To maintain the favourable conservation condition of wetland habitat in Tramore Back Strand SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 676 hectares, other than that occurring from natural patterns of variation	The wetland habitat area was estimated as 676ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document



MAP 1:
TRAMORE BACK STRAND SPA
CONSERVATION OBJECTIVES
SPA DESIGNATION

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

SITE CODE: SPA 004027; version 1.02
County Waterford

0 0.25 0.5 0.75 1 km

Legend

Tramore Back Strand SPA 004027

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

N

Map Version 1
Date: Aug 2013

SPA 004027

SAC 000671

Legend

- Tramore Back Strand SPA 004027
- Tramore Dunes and Backstrand SAC 000671
- OSi Discovery Series Coastal Boundary

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

MAP 2:
TRAMORE BACK STRAND SPA
CONSERVATION OBJECTIVES
ADJOINING / OVERLAPPING DESIGNATIONS

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

SITE CODE: SPA 004027; version 1.02
SAC 000671; version 3
County Waterford

0 0.25 0.5 0.75 1 km

N

Map Version 1
Date: Aug 2013