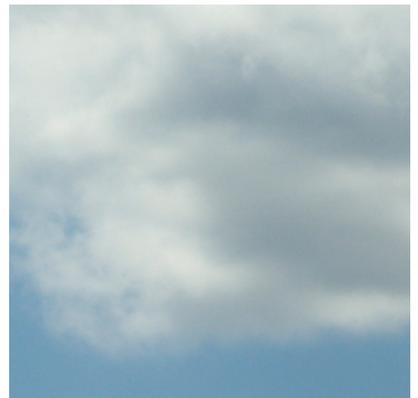
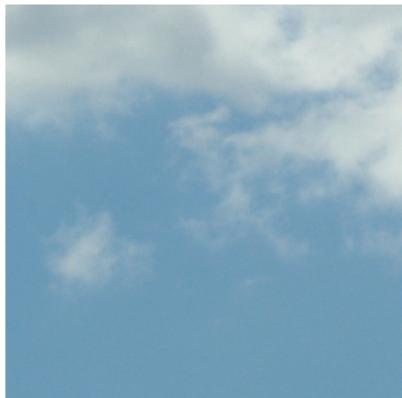
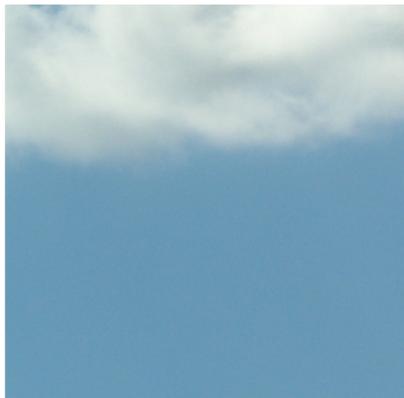
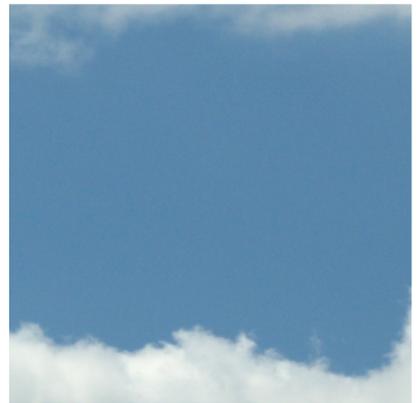
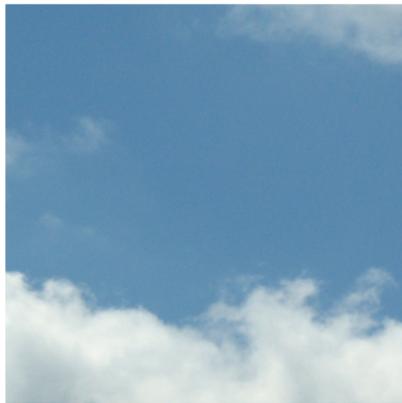
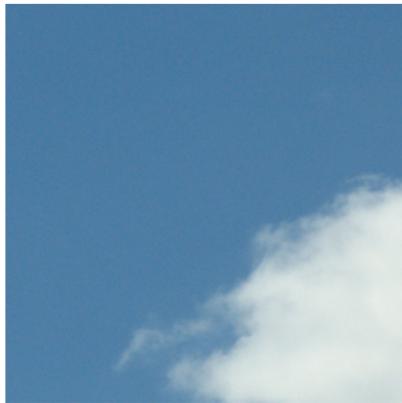
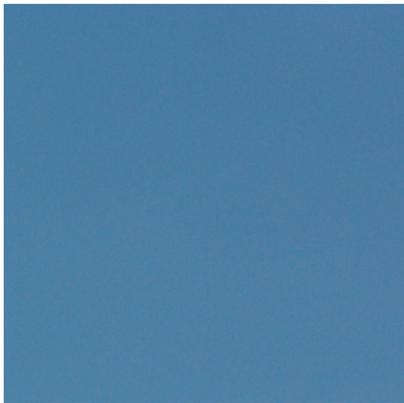


RPS

Greater Carlow Graiguecullen Urban Area

Appropriate Assessment of the Joint Spatial Plan for the Greater Carlow Graiguecullen Urban Area 2012-2018

IBE0633 / October 2012





Appropriate Assessment of the Joint Spatial Plan for the Greater Carlow Graiguecullen Urban Area 2012-2018

Comprising the Carlow Town Development Plan, Graiguecullen Local Area Plan and Carlow Town Environs Local Area Plan

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TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	APPROPRIATE ASSESSMENT OF NATURA 2000 SITES.....	1
1.2	OBJECTIVES OF APPROPRIATE ASSESSMENT	3
1.3	RELATIONSHIP TO STRATEGIC ENVIRONMENTAL ASSESSMENT	3
1.4	JOINT SPATIAL PLAN FOR CARLOW CRAIGUECULLEN URBAN AREA	4
2	REQUIREMENTS OF HABITATS DIRECTIVE ASSESSMENT.....	6
2.1	REGISLATIVE REQUIREMENTS.....	6
2.2	APPROPRIATE ASSESSMENT (AA) GUIDANCE	7
2.3	APPROPRIATE ASSESSMENT CONSULTATION	8
3	METHODOLOGY	9
4	APPROPRIATE ASSESSMENT SCREENING APPRAISAL OF THE JOINT SPATIAL PLAN	10
4.1	STAGE 1 – SCREENING.....	10
4.1.1	<i>Site Location & Assessment Area included in AA</i>	10
4.1.2	<i>Brief Description of the Joint Spatial Plan</i>	10
4.1.3	<i>Identification of Relevant Natura 2000 Sites</i>	13
4.1.4	<i>Assessment of Likely Impacts</i>	24
4.1.5	<i>Assessment of Significance</i>	25
4.1.6	<i>Cumulative Impacts</i>	27
4.1.7	<i>Screening Statement</i>	28
5	STAGE II (APPROPRIATE ASSESSMENT STAGE).....	29
5.1	APPROPRIATE ASSESSMENT STEP ONE – INFORMATION REQUIRED	29
5.2	APPROPRIATE ASSESSMENT STEP TWO – IMPACT PREDICTION.....	29
5.3	APPROPRIATE ASSESSMENT STEP THREE – CONSERVATION OBJECTIVES	30
5.3.1	Predicted Impacts on the Qualifying Interests of Natura 2000 Sites.....	30
5.4	APPROPRIATE ASSESSMENT STEP FOUR – MITIGATION MEASURES	31
5.5	APPROPRIATE ASSESSMENT OF MITIGATION MEASURES	33
6	APPROPRIATE ASSESSMENT CONCLUSION	34

LIST OF TABLES

Table 1.1 Comparison of AA and SEA..... 3
Table 4.1 Description of Natura 2000 Sites Occurring Within the 15km Buffer Zone 15
Table 4.2 Potential Impacts on River Barrow & River Nore SAC from the various proposed Objectives and Policies contained within the Draft Joint Spatial Plan 26

LIST OF FIGURES

Fig. 1.2 Map of Land Area covered by the existing planning policy framework 5
Fig. 4.1 Natura 2000 sites within the assessment area (15km buffer) of the Greater Carlow Graiguecullen Urban Area 14

APPENDICES

Appendix A NPWS Site Synopsis and specific conservation objectives relating to Nore/Barrow SAC (published July 2011)
Appendix B Screening Matrix
Appendix C Appropriate Assessment Screening of 'Proposed Amendments' and subsequent modifications.

1 INTRODUCTION

RPS were commissioned by Carlow Local Authorities and Laois County Council to undertake an “Appropriate Assessment” of the Joint Spatial Plan for the Greater Carlow – Graiguecullen Urban Area 2012-2018, as prepared by Carlow Local Authorities and Laois Local County Council Forward Planning Sections. This report details the assessment of:

- The Carlow Town Development Plan 2012-2018, including areas common to the Joint Spatial Plan for the Greater Carlow – Graiguecullen Urban Area 2012-2018.
- Carlow Town Environs Local Area Plan 2012-2018.
- Graiguecullen Local Area Plan 2012-2018.

This document outlines the Appropriate Assessment process, which by its nature is an iterative process undertaken at each stage of the Plan making process, commencing with an assessment on the draft versions of the various plans, feeding the development of the plans objectives and policies and through to the amendments stage and final versions of the plans. This has led to the production of this process document and as such it may include references to a particular Plan as being ‘Draft’.

1.1 APPROPRIATE ASSESSMENT OF NATURA 2000 SITES

Article 6(3) of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna, known as “The Habitats Directive”, states that any plan or project likely to have significant effects on a Natura 2000 site must undergo the process of Appropriate Assessment.

An Appropriate Assessment (AA) is an assessment of the potential effects of a proposed plan, on its own or in combination with other plans or projects, on one or more Natura 2000 sites (Special Protection Areas (SPA) for birds, and Special Areas of Conservation (SAC) for habitats and species). The findings of the AA must be taken into account by the competent authorities (in this case Carlow and Laois County Councils) in reaching its decision to authorise the Joint Spatial Plan. Proposed plans or projects can only be approved if it has been ascertained that they will not adversely affect the integrity of the Natura 2000 site(s) concerned or, in the case of a negative assessment where there are no alternative solutions, the scheme can only be approved for reasons of overriding public interest. A final statement on whether or not the Joint Spatial Plan, on its own or in combination with other plans or projects, will affect the integrity of Natura 2000 sites is also required, prior to adoption of the plan.

The river Barrow, which flows through the Greater Carlow Graiguecullen Urban Area is part of a protected European site known as a Special Area of Conservation (SAC); other SACs are

located in the wider area. Article 6[3] of the Habitats Directive requires that Plans likely to have a significant effect on a European protected site be subject to an Appropriate Assessment (also known as a Natura Impact Assessment). This assessment process examines what potential effects the Plan may have on the conservation status of European sites. The AA process is carried out in parallel with the plan-making process.

1.2 OBJECTIVES OF APPROPRIATE ASSESSMENT

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures to be addressed in the AA process. Objectives of conducting an appropriate assessment of any plan includes:

- Avoid any negative impacts on Natura 2000 sites by identifying possible impacts early in plan making, and writing the plan in order to avoid such impacts.
- Apply mitigation measures during the AA process to the point where no adverse impacts on the site(s) remain.
- Under a worst-case scenario, a plan may have to undergo an assessment of alternative solutions. Under this stage of the assessment, compensatory measures are required for any remaining adverse effects but they are permitted only if (a) there are no alternative solutions and (b) the plan is required for imperative reasons of overriding public interest.

1.3 RELATIONSHIP TO STRATEGIC ENVIRONMENTAL ASSESSMENT

The AA process specifically aims to ensure that the plan will not have an adverse effect on the integrity of a Natura 2000 Sites (SAC & SPA), whereas the objectives of the Strategic Environmental Assessment (SEA) are broader as they aim to ensure land-use plans contribute to sustainable development by integrating social, environmental and economic considerations into the plan preparation. A comparison between the AA and SEA process is set out in Table 1.1.

Table 1.1 Comparisons of AA and SEA

	APPROPRIATE ASSESSMENT	STRATEGIC ENVIRONMENTAL ASSESSMENT
Aim of process	<i>Maintain the integrity o the Natura 2000 network and its features: SPA for birds, cSAC for habitats and species</i>	<i>Provide for a high level of protection of the environment</i>
Emphasis	<i>Prevent activities that could harm Natura 2000 sites. The assessment is "Protection led" .</i>	<i>Provide information on environmental impacts, consultation, documenting decisions. Assessment is "Baseline led" .</i>
Detail	<i>Detailed focus on a specific sites</i>	<i>Focus on the environment „ rebalancing in favour of the environment“</i>

1.4 JOINT SPATIAL PLAN FOR GREATER CARLOW CRAIGUECULLEN URBAN AREA

A Joint Spatial Plan is a unitary strategy document containing objectives, policies, development standards, zonings and illustrative maps. It is used to steer development, manage change and may also be used as a rationale for funding applications for infrastructural projects or community projects. The Joint Spatial Plan for Greater Carlow Graiguecullen is concerned with charting the future built, environmental, social and economic development within the Greater Carlow Graiguecullen Urban Area. It provides a detailed framework for the management and regulation of spatial development and use of land. Its goal is to retain the unique and special character of the Greater Urban Area, while also fostering positive change and good development. It is concerned with steering development so that it contributes positively to social, economic and environmental well-being, prioritizing changes that are needed and identifying opportunities to enhance the Greater Carlow Graiguecullen Urban Area and the available quality of life. The Joint Spatial Plan is made up of the Carlow Town Development Plan; The Graiguecullen Local Area Plan, and; the Carlow Town Environs Local Area Plan.

The Joint Spatial Plan was put before Carlow Town Council, Laois County Council and Carlow County Council for adoption. The Joint Spatial Plan constitutes a Development Plan for Carlow Town and Local Area Plans for Graiguecullen, and Carlow Town Environs. The relevant land areas associated with these three land-use plans are outlined in Fig. 1.2. The development of the Joint Spatial plan-making and the local area plan-making process were run in parallel along with the related environmental reports (SEA, AA) in order to satisfy the related legislative requirements under the Planning and Development Act 2000-2010. No changes to the administrative boundaries were proposed; however in the interests of strategic planning, efficiency and customer service, the Joint Spatial Plan will be prepared in a collaborative manner.

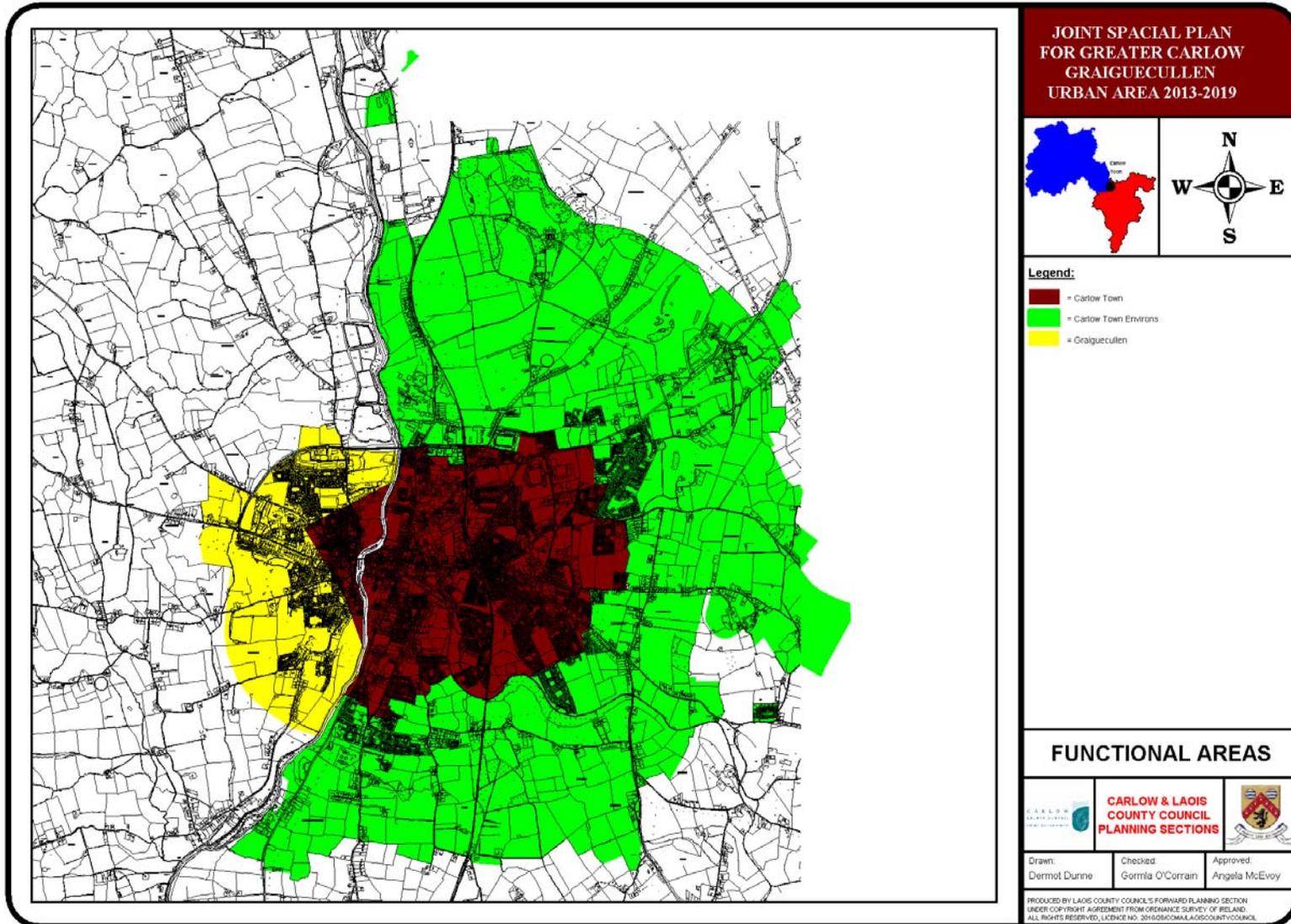


Fig. 1.2 Map of Land Area covered by current Carlow Town Development Plan 2009-2015, Graiguecullen Local Area Plan 2007-2013 and Carlow Town Environs 2008-2014

2 REQUIREMENTS OF HABITATS DIRECTIVE ASSESSMENT

2.1 LEGISLATIVE REQUIREMENTS

The proposal is not directly connected with, or necessary to, the conservation management of any Natura 2000 Sites and therefore, an Appropriate Assessment of the Joint Spatial Plan is required to be undertaken to ensure compliance with the Habitats Directive. The Habitats Directive provides legal protection for habitats and species of European importance. The main aim of the Habitats Directive is “to contribute towards ensuring biodiversity through the conservation of natural habitats of wild fauna and flora in the European territory of the Member States to which the treaty applies” (92/43/EEC). Actions taken in order to fulfil the Directive must be designed to “maintain or restore, at a favourable conservation status, natural habitats and species of wild fauna and flora of Community interest” (92/43/EEC).

The Directive provides for the creation of protected sites, SACs, for a number of habitat types and certain species of flora and fauna. The Directive also seeks to establish Natura 2000, a network of protected areas throughout Europe. SACs, together with SPAs designated under the Birds Directive (79/409/EEC), form the Natura 2000 network. The Directive was incorporated into Irish law by the European Communities (Natural Habitats) Regulations (S.I. No. 94 of 1997) under Regulation 31 (Annex 1.2).

An assessment is required under the Habitats Directive for any plan or project likely to have significant effect on a Natura 2000 site. Article 6, paragraphs 3 and 4 of the Habitats Directive state as follows:

6(3) Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications 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.

6(4) If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure

that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.

This means that, where the implementation of a proposed plan is likely to have a significant effect on a Natura 2000 site, the Competent Authority must ensure that an appropriate assessment is carried out in view of that site's conservation objectives. The proposed plan can only be approved if it has been ascertained that it will not adversely affect the integrity of the Natura 2000 sites concerned or, in the case of a negative assessment and where there are no alternative solutions, the scheme can only be approved for reasons of overriding public interest.

2.2 APPROPRIATE ASSESSMENT (AA) GUIDANCE

This appropriate assessment of the Joint Spatial Plan for the Greater Carlow Graiguecullen Urban Area has been carried out using the following guidance:

- Department of Environment Heritage and Local Government Circular NPW 1/10 and PSSP 2/10 on *Appropriate Assessment under Article 6 of the Habitats Directive – Guidance for Planning Authorities* March 2010.
- *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities*, Department of the Environment, Heritage and Local Government 2009; <http://www.npws.ie/en/media/NPWS/Publications/CodesofPractice/AA%20Guidance.pdf>
- *Managing Natura 2000 Sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC*, European Commission 2000; http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/provision_of_art6_en.pdf
- *Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*; http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission.

http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/guidance_art6_4_en.pdf

- Guidance document on the implementation of the birds and habitats directive in estuaries and coastal zones with particular attention to port development and dredging. http://ec.europa.eu/environment/nature/natura2000/management/docs/guidance_doc

2.3 APPROPRIATE ASSESSMENT CONSULTATION

Consultation letters were sent to the National Parks & Wildlife Service (NPWS) and Inland Fisheries Ireland as part of the AA process. In addition, a meeting was held with the relevant staff members involved in the drafting of the Freshwater Pearl Mussel Sub-Basin Management Plans with NPWS relating to the Nore and Dereen catchments.

Finally consultation with the team involved in the with the drafting of the Joint Spatial Plan was ongoing at every stage of plan development, in particular during the development of objectives and policies contained in the plan as the outcome of the Appropriate Assessment guided development of the objectives and policies.

3 METHODOLOGY

Based on the guidelines outlined in Section 2.2, the assessment process is a four-staged approach as described below. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

Stage 1 *Screening for Appropriate Assessment*

Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3) of the Habitats Directive:

- i) whether a plan or project is directly connected to or necessary for the management of the site, and
- ii) whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site.

If the effects are deemed to be significant, potentially significant, or uncertain, or if the screening process becomes overly complicated, then the process must proceed to Stage 2.

Stage 2 *Appropriate Assessment*

This stage considers whether the plan or project, alone or in combination with other projects or plans, will have adverse effects on the integrity of a Natura 2000 site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then the process must proceed to Stage 4, or the plan or project should be abandoned.

Stage 3 *Alternative Solutions*

This stage examines any alternative solutions or options that could enable the plan or project to proceed without adverse effects on the integrity of a Natura 2000 site. The process must return to Stage 2 as alternatives will require appropriate assessment in order to proceed. Demonstrating that all reasonable alternatives have been considered and assessed, and that the least damaging option has been selected, it is necessary to progress to Stage 4.

Stage 4 *Imperative Reasons of Overriding Public Interest (IROPI)/Derogation*

Stage 4 is the main derogation process of Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project that will have adverse effects on the integrity of a Natura 2000 site to proceed in cases where it has been established that no less damaging alternative solution exists. Compensatory measures must be proposed and assessed. The Commission must be informed of the compensatory measures. Compensatory measures must be practical, implementable, likely to succeed, proportionate and enforceable, and they must be approved by the Minister.

4 APPROPRIATE ASSESSMENT SCREENING APPRAISAL OF THE JOINT SPATIAL PLAN

4.1 STAGE 1 – SCREENING

Screening is a review of all Natura 2000 sites within a study area that could potentially be subjected to impacts associated with the plan. The screening stage involves the following:

- Identification of Site Location & Assessment Area
- Description of plan or project, and local site or plan area characteristics.
- Identification of relevant Natura 2000 sites and compilation of information on their qualifying interests.
- Assessment of likely effects – direct, indirect and cumulative.
- Screening conclusions including recommendations whether or not to undertake Stage II of Appropriate Assessment.

4.1.1 Site Location & Assessment Area included in AA

Carlow town is located 80km from Dublin with nine daily train services and numerous bus services to and from the capital. It is also within easy reach of other mid-sized towns in the Midlands and South East, 40 minutes from Portlaoise, 30 minutes from Kilkenny, 45 minutes from Enniscorthy. Wexford Town and Waterford City are approximately one hour's drive from the town, with Rosslare Port and Waterford Airport located beyond. The Greater Carlow Graiguecullen Urban Area is an important County Town in the South East Region and is the principal centre of economic activity in County Carlow, as outlined in Fig. 1.2. It is an inland town sited on low-lying land, straddling the large River Barrow and a smaller watercourse, the River Burrin and located to the east of the Castlecomer Plateau. The Greater Carlow Graiguecullen Urban Area extends into Laois and is also located close to the Kildare and Kilkenny county bounds; the functional hinterland of the Greater Urban Area extends into these adjoining counties.

In addition to the Greater Carlow Graiguecullen area, a 15km buffer surrounding the urban area was also included in the Appropriate Assessment, as a precautionary approach, in line with best practice and guidance issued by the NPWS. The total assessment area is outlined in Fig. 4.1.

4.1.2 Brief Description of the Joint Spatial Plan

The Joint Spatial Plan is a wide-ranging policy statement dealing with issues such as population and settlement patterns, economic and employment trends, retail, commercial and industrial development; education, healthcare and community facilities; environmental management and heritage protection, infrastructure including transportation, energy and communications; waste water treatment and water supply. Planning has a critical role in

pulling together the various strands of economic development, social inclusion and environmental protection which are essential to sustainable development and the creation of sustainable communities.

The Core Strategy of the Draft Joint Spatial Plan sets out the Councils' vision and strategy for the proper planning and sustainable development of the Greater Carlow Graiguecullen Urban Area. It contains the cross-cutting core objectives that underpin the Joint Spatial Plan, as well as core aims which headline each thematic chapter. The collaborative involvement of three planning authorities in the preparation of this Draft Plan is significant. The Draft Joint Spatial Plan comprising the Carlow Town Development Plan, Graiguecullen and Carlow Town Environs Local Area Plans and has been prepared jointly by Carlow Town Council, Laois County Council and Carlow County Council. The joint approach emphasizes the unitary functioning of the Greater Urban Area instead of the traditional focus on administrative areas. It lends itself to the preparation of a single coordinated development strategy which plays to the strengths of the composite areas and takes account of their environmental sensitivities. In addition, a joint approach lends itself to more integrated, effective and measurable evaluation of the environmental effects of implementing planning policy in the Greater Carlow Graiguecullen Urban Area.

The Joint Spatial Plan is more firmly grounded in national and regional policies than preceding planning policy documents due to changes in Planning and Development (Amendment) Act 2010. The preparation of a Core Strategy set out in Part 2 of the Plan is a new legislative requirement and the following principles make up the core development strategy:

- Consolidate urban area and provide for retail hierarchy including town centre, district centres and neighbourhood centres in the interest of ensuring the vitality and vibrancy of the town centre.
- Deliver development that supports sustainable modes of transport.
- Advance key opportunity sites by preparing development briefs or urban design framework plans.
- Consolidate enterprise and employment development, directing to serviced lands and brown field sites in the interests of efficient use of resources and sustainable transport.
- Consolidate residential development by adopting sequential approach and in light of reduced housing land requirement under 2010 Act and in order to provide for sustainable transport.
- Allocate remaining land to strategic reserve rather than rezoning so that development land may be re-visited as part of the review process relating to the Joint Spatial Plan.

Part 4.1 of the Joint Spatial Plan details objectives and policies relevant for Carlow town, Part 4.2 outlines the objectives and policies relevant for Graiguecullen (Co. Laois) and Part 4.2 outlines the objectives and policies relevant for Carlow town environs.

In order to actualise this vision for the Greater Carlow-Graiguecullen Area, the following cross-cutting core objectives and thematic core aims are outlined in the report:

- Policies from the Southern Development Area (SDA) of the Midlands Regional Settlement Hierarchy relevant to the Joint Spatial Plan (SDA P2- P9);
- Cross-cutting Core Objectives of the Joint Spatial Plan (CO1 to CO15);
- Thematic Core Aims of the Joint Spatial Plan (CA1 to CA11);
- Economic Development and Inward Investment Objectives (ECNO01 to ECNO09);
- Industry and Enterprise Policies of the Joint Spatial Plan (ECN P01 to ECN P10);
- Retail Policies (ECN P11 to ECN P14);
- Commercial Services Policies (ECN P15 to ECN P16 (A));
- Tourism Policies (ECN P17 to ECN P24);
- Public Sector Employment Policy (ECN P25);
- Home-based Economic Activities Policy (ECN P26);
- Live Work Unit Policy (ECN P27);
- Transport Objectives (TRANS O01 to TRANS O07);
- Strategic Transport Policies (TRANS P01 to TRANS P45);
- Physical Infrastructure Objectives (PI O01 to PI O04);
- Physical Infrastructure Policies (PI P01 to PI P31);
- Environmental Management Objectives (ENV O01 to ENV O09);
- Environmental Management Policies (ENV P01 to ENV P53);
- Education and Skills Objectives (E&S O01 to E&S O06);
- Education and Skills Policies (E&S P01 to E&S P06);
- Recreational Amenity and Open Space Objectives (REC O01 to REC O07);
- Recreational Amenity and Open Space Policies (REC P01 to REC P31);
- Sustainable Communities and Social Inclusion Objectives (SOC O01 to SOC O05);
- Sustainable Communities and Social Inclusion Policies (SOC P01 to SOC P33);
- Housing Policies (HOUS P01 to HOUS P25);
- Natural and Built heritage Objectives (HER O01 to HER O14);
- Natural and Built heritage Objectives (HER P01 to HER P43);
- Urban Design and Built Form Objectives (DBF O01 to DBF O09);
- Urban Design and Built Form Policies (DBF P01 to DBF P29);

In relation to the Sub Area Spatial Strategy for i) Carlow Town; ii) Carlow Town Environs, and; iii) Graiguecullen (County Laois),

- Sub Area Spatial Strategy (Carlow Town) Objectives (CTO1 to CTO6) ;
- Sub Area Spatial Strategy (Carlow Town) Policies (CTP1 to CT33);
- Sub Area Spatial Strategy (Graiguecullen, County Laois) Objectives (GL 01 to GL 04);
- Sub Area Spatial Strategy (Graiguecullen, County Laois) Policies (GL P1 to GL P14);
- Sub Area Spatial Strategy (Carlow Town Environs) Objectives (CTE 01 to CTE 05);
- Sub Area Spatial Strategy (Carlow Town Environs) Policies (CTE P01 to CTE P12);

Each of the Policies, Core Objectives, Section Policy and Objectives, Sub Area Spatial Strategy Objectives and Policies were individually assessed as well as the in-combination effects of such Policies and Objectives, to identify any potential impacts to Natura 2000 sites.

4.1.3 Identification of Relevant Natura 2000 Sites

The next step of the Appropriate Assessment Screening Process is to identify the Natura 2000 sites potentially affected by the Joint Spatial Plan. The Habitats Directive contains a list of habitats (Annex I) and species (Annex II) for which SACs must be established by Member States. Similarly, the Birds Directive contains lists of important bird species (Annex I) and other migratory bird species for which SPAs must be established. Those that are known to occur at a site are referred to as 'qualifying interests' and are listed in the Natura 2000 forms which are lodged with the EU Commission by each Member State. A 'qualifying interest' is one of the factors (such as the species or habitat that is present) for which the site merits designation.

Three Natura 2000 sites are located within a precautionary distance of 15 kilometres of the land area covered by the joint spatial plan, including:

- Site Code 000781 Slaney River valley SAC
- Site Code 001757 Holdenstown Bog SAC
- Site Code 002162 River Barrow And River Nore SAC

The location of the Natura 2000 sites relative to the assessment area is illustrated in Fig. 4.1 and details in relation to the qualifying features of the SAC and SPA are described in Table 4.1. The information contained in this table is based on the findings in Ireland's Article 17 Report to the European Commission '*The Status of EU Protected Habitats and Species in Ireland*' (NPWS, 2008). The background documents associated with this report provides the first assessment of the status of the habitats and species that Ireland is required to protect under the Habitats Directive.

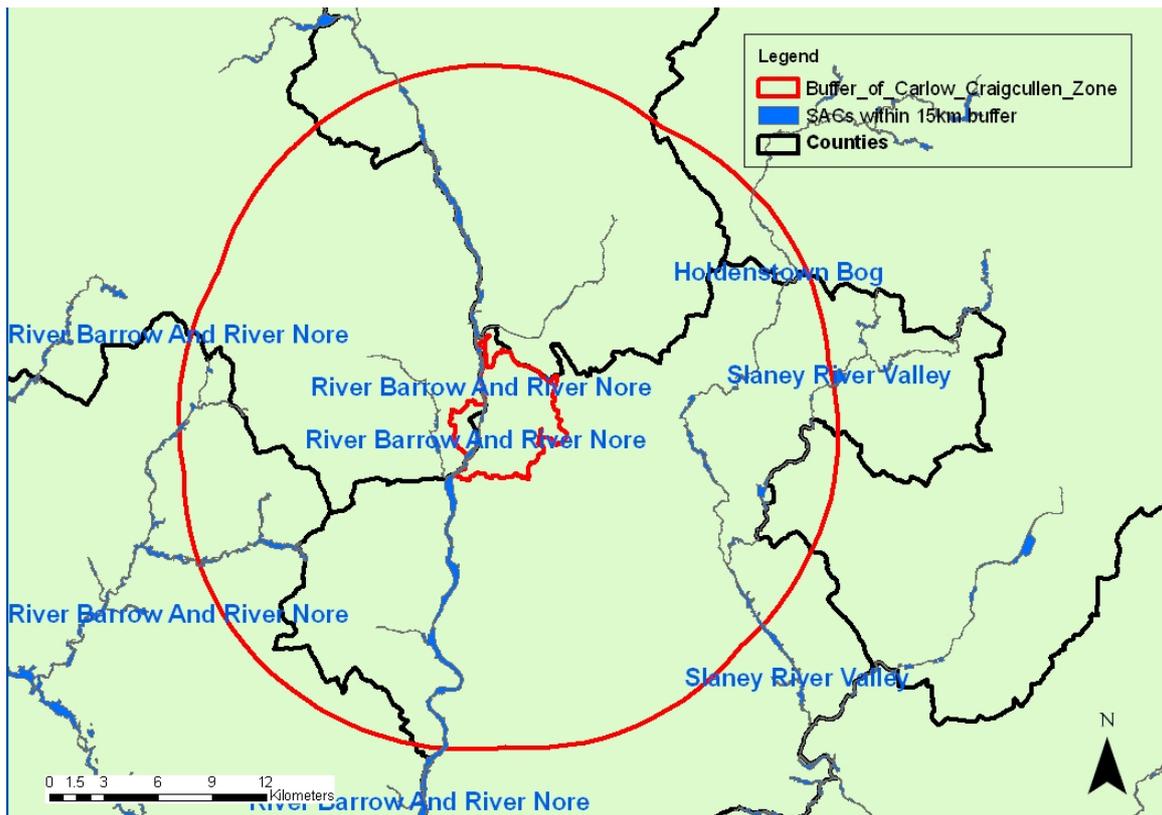


Fig. 4.1 Natura 2000 sites within the assessment area (15km buffer) of the Greater Carlow Graiguecullen Urban Area

A summary of the Site Interest; Conservation Status and Potential Threats are outlined in Table 4.1 for each of the three relevant Natura 2000 sites. A more detailed NPWS site synopsis for each of the three sites is outlined in **Appendix A**, along with the detailed conservation objectives for each of the 3 sites. The conservation objectives for the sites were taken from the July 2011 drafts available on the NPWS website (<http://www.npws.ie>).

In addition to undertaking screening with 25km buffer of the plan area as outlined in best practice guidance, other important SACS in the region were also identified for their relevance to the plan area. For example, the SACs associated with the Freshwater Pearl Mussel catchments of the Nore and Dereen were included in screening. However, as there is no hydrological connection nor any possible pathway between the Freshwater Pearl Mussel catchments and the plan area, both these SACs were initially screened. Following cross-reference of the relevant sub-basin management plans and also following consultation with appropriate scientific staff involved in the drafting of the relevant sub-basin management plans with NPWS, the SACs associated with the Dereen and Nore sub-basin management plans were not deemed relevant to this Appropriate Assessment and therefore are not included further in the assessment.

Table. 4.1 Description of Natura 2000 Sites Occurring Within the 15km Buffer Zone

Natura 2000 Site	Location	Qualifying Interests	Site Sensitivity	Conservation Status ¹	Threats*
Site Code 781-Slaney River Valley SAC	The Greater Carlow Graiguecullen Urban Area is located 9 km from the SAC.	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i>	Surface and groundwater dependent. Highly sensitive to hydrological changes. Sensitive to changes in management.	Bad	The area of this habitat has declined throughout Ireland. The main threats include sub-optimal grazing regimes, drainage, alien invasive species together with the fragmentation of its habitat for agriculture and/or felling for timber.
		Estuaries	Surface and marine water dependent. Moderately sensitive to hydrological change. Moderate sensitivity to pollution. Sensitive to changes in salinity and tidal regime as well as coastal development	Poor	The main threats to this habitat relate to impacts arising from aquaculture, fishing, coastal development and water pollution
		Mudflats and sandflats not covered by seawater at low tide.	Surface and marine water dependent. Moderately sensitive to hydrological change. Moderate sensitivity to pollution. Sensitive to changes in salinity and tidal regime as well as coastal development	Poor	The main serious threats to this habitat arise from aquaculture, fishing, bait dredging, and removal of fauna. Reclamation of land, coastal protection works and invasive species, particularly cord-grass. In addition, there is some concern over the potential impact that hard coastal defence structures may have, in combination with sea-level rise, for the long term extent of this habitat.
		Watercourses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachion</i> vegetation	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution.	Bad	The main threats include: eutrophication, overgrazing, excessive fertilisation, afforestation, and the introduction of invasive alien species.

¹ <http://www.npws.ie/en/PublicationsLiterature/ConservationStatusReport/>

Natura 2000 Site	Location	Qualifying Interests	Site Sensitivity	Conservation Status ¹	Threats*
		Old sessile oak woods with Ilex and Blechnum in British Isles	Sensitive to changes in management.	Bad	The main threats to this habitat include the invasion of alien species and sub-optimal overgrazing.
		Freshwater Pearl Mussel	Surface water dependent. Highly sensitive to hydrological change. Very highly sensitive to pollution.	Bad	The principal threat to this species is poor substrate quality due to increased growth of algal and macrophyte vegetation as a results of severe nutrient enrichment coupled with increased levels of siltation.
		Sea Lamprey	Surface water dependent. Highly sensitive to hydrological change	Poor	The main threats to this species include channel maintenance works, barriers to migration such as weirs, gross pollution and specific pollutants.
		Brook Lamprey	Surface water dependent. Highly sensitive to hydrological change	Good	The main threats to this species include channel maintenance works, barriers to migration such as weirs, gross pollution and specific pollutants.
		River Lamprey	Surface water dependent. Highly sensitive to hydrological change	Good	The main threats to this species include channel maintenance works, barriers to migration such as weirs, gross pollution and specific pollutants.

Natura 2000 Site	Location	Qualifying Interests	Site Sensitivity	Conservation Status ¹	Threats*
		Twaite shad	Surface water dependent. Highly sensitive to hydrological change	Bad	The main threats to this species include channel maintenance works, barriers to migration such as weirs, gross pollution and specific pollutants.
		Atlantic Salmon	Surface water dependent. Highly sensitive to hydrological change	Bad	Numerous threats impact upon this species the most important of which are reduced marine survival (probably as a result of climate change), poor river water quality (resulting from factors such as inadequate sewage treatment, agricultural enrichment, acidification, erosion and siltation), forestry-related pressures and over-fishing.
		Otter	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitive to pollution	Poor	A diverse range of threats and impacts currently affect otters in Ireland. Use of pesticides, fertilization, removal of hedges and copses, removal of scrub, felling of native or mixed woodland, professional fishing (including lobster pots and fyke nets), hunting, trapping, poisoning, poaching, sand and gravel extraction, mechanical removal of peat, urbanised areas, human habitation, continuous urbanization, industrial or commercial areas, discharges, disposal of household waste, disposal of industrial waste, disposal of inert materials, other discharges, routes, autoroutes, bridge, viaduct, water pollution, other forms or mixed forms of pollution, infilling of ditches, dykes, ponds, pools, marshes or pits, drainage, management of aquatic and bank vegetation for drainage purposes, removal of sediments, canalization or modifying structures of inland water course

Natura 2000 Site	Location	Qualifying Interests	Site Sensitivity	Conservation Status ¹	Threats*
Site Code 1757- Holdensotown Bog SAC	The Greater Carlow Graiguecullen Urban Area is located 14.5 km from the SAC.	Transition mires and quaking bogs	Surface water dependent. Highly sensitive to hydrological change. Sensitive to pollution.	Bad	The main threat to this habitat include drainage, infilling, reclamation and pollution
Site Code 2162- River Barrow and River Nore SAC	The Greater Carlow Graiguecullen Urban Area is located directly in part of the SAC.	Desmoulin's whorl snail	Surface water dependent. Highly sensitive to hydrological change.	Poor	The main threats to this species include drainage, infilling and reclamation.
		Freshwater Pearl Mussel	Surface water dependent. Highly sensitive to hydrological change. Very highly sensitive to pollution.	Bad	The principal threat to this species is poor substrate quality due to increased growth of algal and macrophyte vegetation as a result of severe nutrient enrichment coupled with increased levels of siltation.
		White clawed crayfish	Surface water dependent. Highly sensitive to hydrological change. Sensitive to pollution.	Poor	One of the main threats to this species is the introduction of diseases transmitted by introduced American crayfish other threats include eutrophication, channel maintenance, barriers to migration such as weirs, gross pollution and specific pollutants.

Natura 2000 Site	Location	Qualifying Interests	Site Sensitivity	Conservation Status ¹	Threats*
		Sea Lamprey	Surface water dependent. Highly sensitive to hydrological change	Poor	The main threats to this species include channel maintenance works, barriers to migration such as weirs, gross pollution and specific pollutants.
		Brook Lamprey	Surface water dependent. Highly sensitive to hydrological change	Good	The main threats to this species include channel maintenance works, barriers to migration such as weirs, gross pollution and specific pollutants.
		River Lamprey	Surface water dependent. Highly sensitive to hydrological change	Good	The main threats to this species include channel maintenance works, barriers to migration such as weirs, gross pollution and specific pollutants.
		Twaite Shad	Surface water dependent. Highly sensitive to hydrological change	Bad	The main threats to this species include channel maintenance works, barriers to migration such as weirs, gross pollution and specific pollutants.
		Estuaries	Surface and marine water dependent. Moderately sensitive to hydrological change. Moderate sensitivity to pollution. Sensitive to changes in salinity and tidal regime as well as coastal development	Poor	The main threats to this habitat relate to impacts arising from aquaculture, fishing, coastal development and water pollution

Natura 2000 Site	Location	Qualifying Interests	Site Sensitivity	Conservation Status ¹	Threats*
		Mudflats and sandflats not covered by seawater at low tide	Marine water dependent. Highly sensitive to hydrological change	Poor	The most serious threats arise from aquaculture, fishing, bait digging, removal of fauna, reclamation of land, coastal protection works and invasive species, particularly cord-grass (<i>Spartina</i> spp.).
		Salicornia and other annuals colonizing mud and sand	Marine water dependent. Highly sensitive to hydrological change	Poor	The main threats of this habitat include infilling, reclamation and embankment, the use of intertidal areas for agricultural purposes and alien species.
		Atlantic salt meadows (<i>Glauco Puccinellietalia maritimae</i>)	Marine water dependent. Highly sensitive to hydrological change	Poor	The main threats of this habitat include over-grazing by sheep or cattle, erosion, infilling, reclamation and alien species.
		Otter	Surface and marine water dependent. Moderately sensitive to hydrological change. Sensitive to pollution	Poor	A diverse range of threats and impacts currently affect otters in Ireland. Use of pesticides, fertilization, removal of hedges and copses, removal of scrub, felling of native or mixed woodland, professional fishing (including lobster pots and fyke nets), hunting, trapping, poisoning, poaching, sand and gravel extraction, mechanical removal of peat, urbanised areas, human habitation, continuous urbanization, industrial or commercial areas, discharges, disposal of household waste, disposal of industrial waste, disposal of inert materials, other discharges, routes, autoroutes, bridge, viaduct, water pollution, other forms or mixed forms of pollution, infilling of ditches, dykes, ponds, pools, marshes or pits, drainage, management of aquatic and

Natura 2000 Site	Location	Qualifying Interests	Site Sensitivity	Conservation Status ¹	Threats*
					bank vegetation for drainage purposes, removal of sediments, canalization or modifying structures of inland water course
		Mediterranean salt meadows (<i>Juncetalia maritimi</i>)	Marine water dependent. Highly sensitive to hydrological change	Poor	The main threats of this habitat include overgrazing by sheep or cattle, infilling and reclamation.
		Killarney fern	Surface and groundwater dependent. Highly sensitive to hydrological changes. Sensitive to changes in management.	Good	The main threats to this species include pollution, deforestation, and drainage.
		Nore freshwater pearl mussel <i>Margaritifera durrovensis</i>	Surface water dependent. Highly sensitive to hydrological change. Very highly sensitive to pollution.	Bad	The principal threat to this species is poor substrate quality due to increased growth of algal and macrophyte vegetation as a result of severe nutrient enrichment coupled with increased levels of siltation.
		Watercourses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachion</i> vegetation	Surface and groundwater dependent. Highly sensitive to hydrological changes. Highly sensitive to pollution.	Bad	The main threats include: eutrophication, overgrazing, excessive fertilisation, afforestation, and the introduction of invasive alien species.

Natura 2000 Site	Location	Qualifying Interests	Site Sensitivity	Conservation Status ¹	Threats*
		European dry heaths	Sensitive to changes in management.	Poor	The main threats to the habitat include Afforestation, over-burning, over-grazing, under-grazing and bracken invasion
		Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	Surface water dependent. Highly sensitive to hydrological change.	Poor	The main threats to this habitat include the spread of alien species, arterial drainage and agricultural improvement at the river edge.
		Petrifying springs with tufa formation (Cratoneurion)	Groundwater dependent. Highly sensitive to hydrological change.	Bad	The main threats to this habitat include land reclamation, turf cutting, and Drainage.
		Old sessile oak woods with Ilex and Blechnum in British Isles	Sensitive to changes in management.	Bad	The main threats to this habitat include the invasion of alien species and sub-optimal overgrazing.
		Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i>	Surface & groundwater dependent. Highly sensitive to hydrological changes. Sensitive to changes in management.	Bad	The area of this habitat has declined throughout Ireland. The main threats include sub-optimal grazing regimes, drainage, alien invasive species together with the fragmentation of its habitat for agriculture and/or felling for timber.

The urban area associated with Joint Spatial Plan is directly within the River Barrow and River Nore SAC (Site Code 2162), where one of the main threats are changes to water quality in terms of water pollution. The Urban Area is also upstream of the Nore freshwater pearl mussel *Margaritifera durrovensis*. Therefore the River Barrow and River Nore SAC (Site Code 2162) Natura 2000 site was considered relevant for inclusion in the Appropriate Assessment.

However, a review of the qualifying features of Holdenstown Bog SAC (Site Code 1757) and Slaney River Valley SAC (Site Code 781) indicated that there is no likely pathway between pressures within the Greater Carlow Graiguecullen Urban Area and the sensitive habitat and species receptors within Holdenstown Bog and the Slaney River Valley, as outlined below. Holdenstown Bog is located almost 15km up gradient of the urban area and there is no hydraulic or other connectivity between the bog and the Greater Carlow Graiguecullen Urban Area. No objectives or policies detailed in the Draft Joint Spatial Plan for the urban area relate in any way to Holdenstown Bog nor to any activity in or connected to the bog. Therefore, as none of the objectives or policies has potential to impact on the qualifying features of the site, the Holdenstown Bog SAC (Site Code 1757) was screened out and not included further in this Appropriate Assessment.

The upper reaches of the Slaney River Valley is within the 15km buffer and although it is well outside the Greater Carlow Graiguecullen urban area, there is a water abstraction at Rathvilly that forms part of the drinking water supply to the Greater Carlow Graiguecullen urban area. An abstraction licence for this particular abstraction has been in place since 1981. However, as detailed in the Draft Joint Spatial Plan for 2012-2018, no change to the existing licence conditions or additional abstraction from the River Slaney forms part of the Joint Spatial Plan. In fact, the Draft Spatial Plan outlines that any possible future increases in drinking water demand will be met by the recently developed groundwater resources at Springhill and Oakpark. Presently, the groundwater resources provide significant spare capacity for drinking water in Carlow town as one of the borehole has yet to be commissioned. As there is no change or proposals for additional abstraction of water from the River Slaney at Rathvilly associated with the Draft Plan, the focus of this Appropriate Assessment will be on the possibility of future pressures associated with the relevant groundwater resources at Oak Park and Springhill that may arise due to any increased development. For these reasons the Slaney River Valley SAC (Site Code 781) Natura 2000 site was also screened out and will not be included further in this Appropriate Assessment. However, should any amendment to the Draft Plan include changes to the existing abstraction licence, such amendments should be subject to Appropriate Assessment.

Therefore, the River Barrow and River Nore SAC (Site Code 2162) was the main focus of the assessment going forward, with details outlined in the Screening Matrix in Appendix B.

4.1.4 Assessment of Likely Impacts

The specific conservation objectives of the site (River Barrow and River Nore SAC) are available from NPWS as detailed in Appendix A. The most likely potential direct impacts of the proposed objectives and policies of the Joint Spatial Plan are alterations in water quality e.g. deterioration in water quality or water pollution and encroachment of the SAC by development. These impacts are listed as threats to the sensitive and protected species living in the River Barrow such as the Otter, Lamprey, and Crayfish as well as to the Nore freshwater pearl mussel *Margaritifera durrovensism* downstream of the urban area.

Individual elements of the draft Joint Spatial Plan have been identified that may result in impacts on Natura 2000 sites. The elements are outlined below:

- Settlement strategies, including population growth in and around the urban area;
- Increase in tourism activities due to tourist promotion of the greater urban area;
- Increase in recreational demand and facilities associated with the increased population;
- Infrastructural improvements associated with maintenance and improvement of national transport corridors serving Carlow town, in particular the N80;
- Water supply services investment programme
- Wastewater services investment programme
- Industrial and enterprise development associated with Industry and Enterprises Policies
- Flood Risk and Management Strategy for the SERBD.
- Zoning objectives

The features of interest and Conservation Objectives of the River Barrow and River Nore SAC (Site Code 2162) are described in Appendix A. The information requirements and assessment criteria of screening specified in the European guidance on Appropriate Assessment (European Commission Environment Division's *Assessment of plans and projects significantly affecting Natura 2000 sites*, 2001) have served as the basis for the following screening appraisal. Measures which will be implemented to reduce or mitigate impacts of the proposed development on the Natura 2000 sites are provided where applicable.

Indirect impacts on Natura 2000 sites are possible where there are hydrological connections between the Natura 2000 sites and the Draft Joint Spatial Plan area. The draft plan may result in alterations to the hydrological regime or physical environment of sites from abstraction, drainage, flood protection and discharges to watercourses or groundwater resources.

There is potential for contamination of freshwater sites (the River Barrow and River Nore cSAC) through diffuse and point source runoff from development during the construction or operational phases of developments and roads located close to or adjacent to the site. This is particularly relevant to the strategy of turning the town towards the river and the construction of new roads. The water quality in the protected area is not in itself a qualifying interest of the

listed SAC. However, the potential improvements to the water chemistry could have indirect impacts on the qualifying interests of the sites.

Policies that either encourage or support the improvement or construction of various roadways e.g. N80, Northern Relief Road, Inner Relief Road, Western Relief Road, New Multi-modal bridge, Southern Relief Road, Eire Go Road and Eastern Relief Road have the potential for impacts associated with impacts on water quality (such as deterioration to water status, targets or objectives as set in the South-Eastern RBD Management Plan), and alterations to the structure and function of the Natura 2000 site (River Barrow & River Nore SAC) associated with construction works, management of surface water run-off, bridge structure and construction and route of the roadways etc. Sources of contamination from residential, commercial and infrastructural developments, and through other diffuse sources within the wider catchment. Contamination may arise from in all waters through poor working practices, leakages or accidental spillage of materials if efficient pollution control measures are not fully implemented and maintained. Drainage works associated with flood relief schemes also have potential to alter the physical environment and hydrological regime on which the sites integrity depends. This impact on water quality is potentially through contamination with sediments, hydrocarbons, faecal coli forms and other contaminants, alteration in the physical environment and to the hydrological regime. Consequently, there is potential for disturbance of species in Natura 2000 sites arising from the individual elements of the draft Joint Spatial Plan.

The land area associated with the draft Joint Spatial Plan includes a Natura 2000 site within the boundary and an additional Natura 2000 site downstream linked via a hydrological pathway (River Barrow). There is potential for a direct loss, deterioration or fragmentation of habitats arising from land-take requirements. Impacts arise directly through inappropriate siting of development within a Natura 2000 site or immediately adjacent to its boundary, which cause deterioration in the factors that support the favorable conditions of the site. Consequently, there is potential for a significant adverse effect on the integrity of these sites and their conservation objectives.

4.1.5 Assessment of Significance

A precautionary approach was taken in that, with cases of uncertainty; it was assumed the effects could be significant. Examples of significance indicators of impact from Commission Guidance (EC, 2002) as listed below were used in the assessment:

- Loss of habitat area
- Fragmentation (duration or permanence, level in relation to original extent)
- Disturbance (duration or permanence, distance from site)
- Species population density (timescale for replacement)
- Water resource (relative change)
- Water Quality (relative change in key indicators chemical and other elements)

Each of these indicators was assessed for the SAC identified during the previous stages where there is potential for impact. A summary of this assessment is outlined in Table 4.2. As a guide, any measure that had the potential to affect the conservation objectives of a Natura 2000 site, including its structure and function, was considered significant.

Table 4.2 Potential Impacts on River Barrow & River Nore SAC from the various proposed Objectives and Policies contained within the Draft Joint Spatial Plan

Potential Impact	SAC 002162 River Barrow & River Nore
Loss of habitat area & Fragmentation	Potential for direct habitat loss if there is complete removal of a habitat type or fragmentation resulting in the incremental loss of small patches of habitat from within a larger site. Potential for fragmentation also resulting from impediments to the natural movements of species. This is relevant where important corridors for movement or migration are likely to be disrupted such as along the river corridor. Habitat degradation results in the diminishment of habitat quality and a loss of important habitat functions. It can arise from the introduction of invasive species, toxic contamination or physical alteration.
Disturbance	Potential for disturbance to the species supported within the River Barrow and River Nore SAC due to an increase in activity levels from recreation and amenity or from developments within or adjacent to river (designated area). It is particularly important that known sensitive areas, such as nesting sites and foraging areas, are protected.
Species population density	Potential for disturbance due to impacts of other potential impacts. E.g. impacts to physical habitat, in particular to riparian habitat will be detrimental to species density.
Water resource	No direct impact on qualifying features of River Barrow or River Slaney as boreholes have been developed to supplement existing supply so that any future increased requirements for drinking water are met in a sustainable manner, but need to ensure there is no significant impact to groundwater base flow contribution to surface water interaction in the area, associated with increased abstractions from boreholes.
Water quality	Potential for contamination to surface water or groundwater resources This is relevant where the plan could impact on: the hydrological connection to the Natura 2000 site; on water quality via point source or diffuse pollution; or on sub-surface pathways that are not clearly understood. This should be considered on case-by-case bases for each development and will require site-specific hydrological information.

4.1.6 Cumulative Impacts

For Appropriate Assessment, it is required to identify all those elements of other plans/programmes, which have the potential for having significant affects on the Natural 2000 Sites either alone or in combination with each other. In addition an assessment of the impacts from the combination of Objectives and Policies is required. Therefore, an assessment of the 'in combination' effects was also carried out. The scope of the assessment was set at a County level. In reviewing other plans/programmes, the following *assessment questions* were asked:

- Will these other Plans/Programmes lead to the *probability* or the *risk* of having a significant effect on a designated site?
- Are these other plans/programmes likely to undermine the site's conservation objectives?
- Will these other plans/programmes lead to the probability or the risk of having a significant effect on a designated site either;
 - a) in combination with other plans/programmes as outlined, or
 - b) in combination with the Objectives and Policies of the Joint Spatial Plan

The overall in-combination effect is a key part of the screening process as it ensures plans or policies are captured that would not trigger a likely significant effect on their own. In order to identify potential In Combination Effects, the following plans have been considered:

- Laois County Development Plan
- Carlow County Development Plan
- South Eastern River Basin Management Plan 2010
- SERBD Catchment Flood Risk and Management Plan
- Freshwater Pearl Mussel Nore River Basin Management Plan

There is potential for "in-combination" effects with the adjacent County Development Plans and Catchment Flood Risk and Management Plan.

4.1.7 Screening Statement

There is potential for significant impact to water quality and quantity arising from the individual elements of the draft Joint Spatial Plan and the cumulative impacts of other plans and projects. Implicit in the Habitats Directive is the application of the precautionary principle, which is used:

- (i) where there is potential for negative effects and,
- (ii) where due to inconclusive or insufficient data it is not impossible to determine with sufficient certainty the risk in question (EC, 2000b).

It has been concluded that the draft Joint Spatial Plan, alone or in combination with other plans and projects, is likely to have significant adverse impacts upon the River Barrow and River Nore SAC (Natura 2000 site) Consequently, the assessment process must now proceed to Stage 2 – Appropriate Assessment, where the potential impacts are discussed in a more comprehensive manner and detailed mitigation measures are provided which aim to minimise and avoid risks to sensitive receptors.

5 STAGE II (APPROPRIATE ASSESSMENT STAGE)

This stage of the assessment process considers the impacts (whether they are direct, indirect, short term, long term, constructional, operational or cumulative in conjunction with other plans or projects) that the proposed Objectives and Policies contained in the Joint Spatial Plan will have on the integrity of Natura 2000 Site with respect to the conservation objectives of the site and to its structure and function. EC guidance (Managing Natura 2000 Sites) states that the integrity of a site involves its ecological functions and the decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives (EC 2000). This stage of the Appropriate Assessment consists of four main steps, namely;

- **Step One** – *Information required*, where the conservation objectives of the site are reviewed and the aspects of the proposed plan or project which affect these conservation objectives are identified.
- **Step Two** – *Impact Prediction*, where the likely impacts of a project or plan are examined. These include direct/indirect, short/long term, construction/operational/decommissioning, isolated, interactive and cumulative effects.
- **Step Three** – *Conservation Objectives*, where the effects of a project or plan are assessed as to whether they have any adverse effects on the integrity of the site as defined by its conservation objectives.
- **Step Four** – *Mitigation Measures*, where the level of mitigation (top of mitigation hierarchy) is assessed against the adverse effects that the project or plan is likely to cause.

5.1 APPROPRIATE ASSESSMENT STEP ONE – INFORMATION REQUIRED

A detailed description of the River Barrow & River Nore SAC is provided in Appendix A. Key qualifying features for each under consideration regarding potential impacts are also detailed in the Table 4.1 and Appendix A.

5.2 APPROPRIATE ASSESSMENT STEP TWO – IMPACT PREDICTION

Predicting the likely impacts of a plan or project on a Natura 2000 site can be difficult, as the elements that make up the ecological structure and function of a site are dynamic and not easily measured. The potential impacts and effects (short/long term, construction/operational) of the proposed measures are determined.

5.3 APPROPRIATE ASSESSMENT STEP THREE – CONSERVATION OBJECTIVES

5.3.1 Predicted Impacts on the Qualifying Interests of Natura 2000 Sites

Site-specific conservation objectives for The River Barrow and River Nore SAC (site code 002162) are available from the NPWS and the objectives aim to define favourable conservation condition for particular habitats or species at the site. For the River Barrow and River Nore SAC, 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.

The Draft Joint Spatial Plan sets out development objectives, policies and zoning policy for the period 2012 – 2018, which effects all areas of policy including settlement strategy, infrastructure and environmental management. The proposed development is centered on the Greater Urban Area of Carlow Town, located on a Natura 2000 site and they have the potential to directly or indirectly impact on their conservation objectives.

There is potential for indirect impacts on the River Barrow and River Nore cSAC as a result of discharges to the River. There is potential for increased recreational, amenity and tourist use of the Natura 2000 site.

The expansion or increase of infrastructural requirements for the town poses a threat to the River Barrow and Nore cSAC, largely through potential exceedence in wastewater treatment capacity and an associated reduction in water quality. Upgrades to the wastewater treatment plant will be critical to maintaining water quality standards and preventing contamination events. The potential for deterioration in water quality is compounded as there are cumulative impacts on the site from a number of sources, including agricultural run-off, forestry, and sedimentation from peatland areas and from other sources from outside the county. The main channel supports lamprey species, Atlantic salmon and white-clawed crayfish that are negatively impacted by a reduction in water quality and/or increased sedimentation. The channel downstream is particularly sensitive due to the presence of Freshwater pearl mussel.

The requirement for flood defenses may contribute to potential threats to the River Barrow and Nore cSAC site. Engineered solutions to flooding problems may result in a loss of flood plain, alteration to the hydrological regime, or the habitat of protected species. Maintenance works such as dredging can remove valuable habitat for species such as lamprey, as their young live in sediment along the rivers edge. Damage to spawning areas through dredging and maintenance will also affect the integrity of the site by reducing potential for spawning in Atlantic salmon and lamprey. The removal of silt can also negatively impact on alluvial woodlands.

5.4 APPROPRIATE ASSESSMENT STEP FOUR – MITIGATION MEASURES

For the purposes of this report the term “mitigation measures” are considered to be *“those measures which aim to minimise, or even cancel, the negative impacts on a site that are likely to arise as a result of the implementation of a plan or project. These measures are an integral part of the specifications of a plan or project”*. (Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC, January 2007).

The following sets out in summary the mitigation measures and how they might be implemented.

- (i) The Joint Spatial Plan identifies a number of individual objectives and policies (transport improvements, infrastructural developments, housing etc.) for development during the lifetime of the plan. The plan should emphasise that these are dependent upon clear demonstration that there will be no impacts on the integrity of a Natura 2000 site in accordance with Article 6 of the Habitats Directive. The plan should state that an Appropriate Assessment has been carried out at the planning stage of the various developments and reference should be made to its mitigation for Natura 2000 sites.
- (ii) The plan identifies a number of specific transport objectives, such as the N80 (Carlow to Portlaoise) improvements, and development of Southern Relief Road which will require Appropriate Assessment. This should be carried out at the earliest stages in development, beginning at the route selection stage and also at subsequent stages of development to determine if significant adverse impacts are likely. Assessments will become more detailed and specific at each level of the assessment as details of the location, extent, construction and operational impacts of the project emerge. Ensure that any plan or project associated with transportation (roads, rail or other forms), which has the potential to significantly affect a Natura 2000 site, is assessed in accordance with Article 6 of the Habitats Directive in order to avoid adverse impacts on the integrity of that site. Transport infrastructure with existing planning cannot retrospectively be

influenced by AA so all new planning proposals should include AA as part of the process.

- (iii) Where the construction or extension of a water supply scheme has potential to impact on a Natura 2000 site it will require Appropriate Assessment, using hydrogeological data, to clearly demonstrate that there will be no adverse impact on the groundwater supply or groundwater base flow to surface waters, in particular to the River Barrow and River Nore or to any other aspects of the Natura 2000 site.
- (iv) Ensure that all development takes place in tandem with the provision of adequate services such as water supply or wastewater treatment. In addition, any works carried out to upgrade or extend the wastewater treatment plant will also be subject to the Appropriate Assessment process. Where one-off housing is sought, planning should ensure that there will be no direct impact on any site by avoiding encroachment and ensure no indirect impact on any site by protecting groundwater quantity or quality.
- (v) Ensure that any plan or project associated with the provision of new housing, which has the potential to significantly affect a Natura 2000 site, is assessed in accordance with Article 6 of the Habitats Directive in order to avoid adverse impacts on the integrity of that site. All future developments involving encroachment of the SAC or its riparian vegetation should be avoided.
- (vi) Ensure that CFRMP and management measures have the potential to impact negatively on Natura 2000 sites are subject to an Appropriate Assessment.
- (vii) Ensure protection of Natura 2000 site by avoiding development on floodplains and ensure that flood risk assessment policies, plans or projects are compliant with Article 6 of the Habitats Directive and avoid or mitigate negative impacts on Natura 2000 sites.
- (viii) Ensure no encroachment on the Natura 2000 site (River Barrow and River Nore SAC) associated with development, and also that the proposed including provision of pedestrian and cycle paths close to river banks, it is important that a suitable riparian habitat should remain along each watercourse and that lands are not be managed intensively right up to the rivers edge. This allows shading of the water course, provision of leaf litter in to the aquatic ecosystem as well as maintenance of wildlife corridors. In addition, the root structure of mature plants and trees provide an important function in bank stability and assisting in natural flood functions. In addition, any proposal to include lighting along such walkway and cycle paths should be assessed to determine possible impacts to bat species and the potential for disturbance to bat feeding along river corridors.

- (ix) In relation to impacts associated with construction of road and bridge infrastructure within the area relevant to the Joint Spatial Plan, all works should be subject to Project Level Appropriate Assessment as part of the planning process, when details of the design become available.
- (x) Ensure protection of the riparian corridor and implement buffer zone (e.g. 10-30m) where feasible or as determined following consultation with the Inland Fisheries Ireland. This is important especially related to the policy of the town turning to face the river.
- (xi) Protect and maintain migration routes for protected species e.g. salmon and lamprey species.
- (xii) Implement SUDS in adjacent areas of development on new developments to treat and eliminate potential contamination arising from diffuse sources such as construction or storm water runoff.
Any proposed developments that have the potential to directly, indirectly or cumulatively impact on the integrity of the Natura 2000 site will require assessment in accordance with Article 6 of the Habitats Directive.

In terms of specific policies discussed within the Joint Spatial Plan for the Greater Carlow Graiguecullen Urban Area, the following list of policies require mitigation in terms of emphasise that these are dependent upon clear demonstration that there will be no impacts on the integrity of a Natura 2000 site in accordance with Article 6 of the Habitats Directive: CO3; CO10; ECN P13; Trans P03; Trans P06; Trans P07; Trans P23; Trans P28; Trans P40; PL P01; PL P08; PL P13; PL P15; PL P18; ENV P17; E&S P01; REC P20; SOC P33; HOUS P01; HOUS P02; DBF/P02; CTP1, CT25, GL 03, GL P9, GL P10, and CTE P2.

Consultation with the Plan making team and the Appropriate Assessment team resulted in recommendations outlined in the AA being incorporated in to the Joint Spatial Plan for the Carlow Graiguecullen Urban Area.

5.5 APPROPRIATE ASSESSMENT OF MITIGATION MEASURES

These mitigation steps were subsequently assessed but no impacts were identified. As stated in NPWS Guidance Document (2009), the requirement of the AA is not to prove what the impacts and effects will be, but rather to establish beyond reasonable scientific doubt that adverse effects on site integrity will not result. The mitigation outlined in above was designed to achieve the aim of the Appropriate Assessment. Due to the identification of appropriate and sufficient mitigation there is no need to identify alternative solutions and the Appropriate Assessment is complete as it does not need to proceed to Steps 4 or 5.

6 APPROPRIATE ASSESSMENT CONCLUSION

The likely impacts that will arise from the objectives and policies have been examined in the context of a number of factors that could potentially affect the integrity of the Natura 2000 network. On the basis of the findings of this Screening for Appropriate Assessment, it is concluded that the proposed works:

- (i) are not directly connected with or necessary to the management of a Natura 2000 site and
- (ii) will not have significant effects on the qualifying species of the SAC when mitigation measures are adhered to.

Following the implementation of mitigation described in this Appropriate Assessment it is expected that the implementation of the Objectives and Policies of the Joint Spatial Plan 2012-2018 will avoid significant negative impacts to key sensitive receptors (e.g. otter, crayfish, salmon, freshwater pearl mussel and salmon) and other qualifying features of the Natura 2000 sites. Guideline mitigation is detailed here which aims to remove risks in the urban area. This mitigation is incorporated into the Joint Spatial Plan for Greater Carlow Graiguecullen Urban Area.

There should therefore be no requirement for Stage 3 (*Assessment of Alternative Solutions*) and 4 (*Assessment Where Adverse Impacts Remain*), of the appropriate assessment process.

APPENDIX A

NPWS SITE SYNOPSIS & CONSERVATION OBJECTIVES

SITE SYNOPSIS
SITE NAME: SLANEY RIVER VALLEY
SITE CODE: 000781

This site comprises the freshwater stretches of the Slaney as far as the Wicklow Mountains; a number of tributaries the larger of which include the Bann, Boro, Glasha, Clody, Deny, Derreen, Douglas and Camgower Rivers; the estuary at Ferrycarrig and Wexford Harbour. The site flows through the counties of Wicklow, Wexford and Carlow. Towns along the site but not in it are Baltinglass, Hacketstown, Tinahely, Tullow, Bunclody, Camolin, Enniscorthy and Wexford. The river is up to 100 m wide in places and is tidal at the southern end from Edermine Bridge below Enniscorthy. In the upper and central regions almost as far as the confluence with the Deny River the geology consists of granite. Above Kilcarrig Bridge, the

Slaney has cut a gorge into the granite plain. The Deny and Bann Rivers are bounded by a narrow line of uplands which corresponds to schist outcrops. Where these tributaries cut through this belt of hard rocks they have carved deep gorges, more than two miles long at Tinahely and Shillelagh. South of Kildavin the Slaney flows through an area of Ordovician slates and grits.

The site is a candidate SAC selected for alluvial wet woodlands, a priority habitat on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for floating river vegetation, estuaries, tidal mudflats and old oak woodlands, all habitats listed on Annex I of the E.U. Habitats Directive. The site is further selected for the following species listed on Annex II of the same directive - Sea Lamprey, River

Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Twaite Shad, Atlantic Salmon and Otter. Floating river vegetation is found along much of the freshwater stretches within the site. Species present here include Pond Water-crowfoot (***Ranunculus peltatus***), Water-crowfoot (***Ranunculus*** spp.), Canadian Pondweed (*Elodea canadensis*), Broad-leaved Pondweed (***Potamogeton natans***), Water Milfoil (*Myriophyllum* spp.), Common Club-rush (***Scirpus lacustris***), Water-starwort (***Callitriche*** spp.), Hemlock Water-dropwort, Fine-leaved Waterdropwort (***Oenanthe aquatica***), Common Duckweed (***Lemna minor***), Yellow Water-lily (***Nuphar lutea***), Unbranched Bur-reed (***Sparganium ernersum***) and the moss *Fontinalis antipyretica*. Two rare aquatic plant species have been recorded in this site: Short-leaved Water-starwort (*Callitriche truncata*), a very rare, small aquatic herb found nowhere else in Ireland; and Opposite-leaved Pondweed (*Groenlandia densa*), a species that is legally protected under the Flora Protection Order, 1999.

Good examples of wet woodland are found associated with Macmine marshes, along banks of the Slaney and its tributaries and within reed swamps. Grey Willow (***Salix cinerea***) scrub and pockets of wet woodland dominated by Alder (***Alnus glutinosa***) have become established in places. Ash (*Fraxinus excelsior*) and Birch (***Betula pubescens***) are common in the latter and the ground flora is typical of wet woodland with Meadowsweet (***Filipendula ulmaria***), Angelica (*Angelica sylvestris*), Yellow Iris, Horsetail (*Equisetum* spp.) and occasional tussocks of Greater Tussock-sedge (***Carex paniculata***). These woodlands have been described as two types: one is quite eutrophic, is dominated by Willow and is subject to a tidal influence. The other is flushed or spring-fed subject to waterlogging but not to flooding and is dominated by Alder and Ash. Old oak woodlands are best represented at Tomnafinnoge though patches are present throughout the site. At Tomnafinnoge the wood is dominated by mature, widely

spaced Sessile Oak (***Quercus petraea***), which were planted around 1700, with some further planting in 1810. There is now a varied age structure with overmature, mature and young trees; the open canopy permits light to reach the forest floor and encourages natural regeneration of Oak. As well as Oak, the wood includes the occasional Beech (***Fagus sylvatica***), Birch (***Betula*** sp.), Rowan (***Sorbus aucuparia***)

and Scots Pine (***Pinus sylvestris***). The shrub layer is well-developed with Hazel (***Corylus avellana***) and Holly (***Ilex aquifolium***) occurring. The ground layer consists of Great Wood-rush (***Luzula sylvatica***) and Bilberry (***Vaccinium myrtillus***), with some Bracken (***Pteridium aquilinum***) and Brambles (*Rubus fruticosus* agg.). Herbaceous species in the ground layer include Primrose (***Primula vulgaris***), Wood-sorrel (***Oxalis acetosella***), Common Cow-wheat (***Melampyrum pratense***) and Bluebell (***Hyacinthoides non-scripta***). Many of the trees carry an epiphytic flora of mosses, Polypody Fern (***Polypodium vulgare***), and lichens such as ***Usnea comma***, ***Evernia prunastri***, ***Ramalina*** spp. and ***Parnelia*** spp.

Tomnafinnoge Wood is a remnant of the ancient Shillelagh Oak woods, and it appears that woodland has always been present on the site. In the past, the wood was managed as a Hazel coppice with Oak standards, a common form of woodland management in England but not widely practised in Ireland. The importance of the woodland lies in the size of the trees, their capacity to regenerate, their genetic continuity with ancient woodland and their historic interest. The nearest comparable stands are at Abbeyleix, Co. Laois and Portlaw, Co. Waterford. Below Enniscorthy there are several areas of woodland with a mixed canopy of Oak, Beech, Sycamore (*Acer pseudoplatanus*), Ash and generally a good diverse ground flora. Near the mouth of the river at Ferrycarrig is a steep south facing slope covered

with Oak woodland. Holly and Hazel are the main species in the shrub layer and a **species-rich ground flora typical of this type of Oak woodland has abundant ferns - *Dryopteris filix-mas*, *Polystichum setiferum*, *Phyllitis scolopendrium* - and mosses - *Thuidium tamariscinum*, *Mniurites hornum*, *Eurynchium praelongum*.**

North of Bunclody, the river valley still has a number of dry woodlands though these have mostly been managed by the estates with the introduction of Beech and occasional conifers. The steeper sides are covered in a thick scrub from which taller trees protrude. At the southern end of the site, the Red Data Book species Yellow Archangel (*Lamiastrum galeobdolon*) occurs. Three more Red Data Book species have also been recorded from the site: Basil Thyme (*Acinos awensis*), Blue Fleabane (*Erigeron acer*) and Small Cudweed (*Filago minima*). A nationally rare species Summer Snowflake (*Leucojum aestivum*) is also found within the site. Mixed woodlands occur at Carrickduff and Coolaphuca in Bunclody. Oak trees, which make up the greater part of the canopy, were originally planted and at the present time are not regenerating actively. In time, if permitted, the woodland will probably go to Beech. A fair number of Yew (*Taxus baccata*) trees have also reached a large size and these, together with

Holly give to the site the aspect of a south-western Oak wood.

The site is considered to contain a very good example of the extreme upper reaches of an estuary. Tidal reedbeds with wet woodland are present in places. The fringing reed communities support Sea Club-rush (*Scirpus maritimus*), Grey Club-rush (*S. tabernaemontani*) and abundant Common Reed (*Phragmites australis*). Other species occurring are Bulrush (*Typha latifolia*), Reed Canary-grass (*Phalaris arundinacea*) and Branched Bur-reed (*Sparganium erectum*). The reed-swamp is extensive around Macmine, where the river widens and there are islands with swamp and marsh vegetation. Further south of Macmine are expanses of intertidal mudflats and sandflats and shingly shore often fringed with a narrow band of salt marsh and brackish vegetation. Narrow shingle beaches up to 10 m wide occur in places along the river banks and are exposed at low tide. Upslope the shingle is sometimes colonised by Saltmarsh Rush (*Juncus gerardi*), Townsend's Cord-grass (*Spartina townsendii*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Hemlock Water-dropwort (*Oenanthe crocata*) and Himalayan Balsam (*Impatiens glandulifera*).

Wexford Harbour is an extensive, shallow estuary which dries out considerably at low tide exposing large expanses of mudflats and sandflats. The harbour is largely sheltered by the Raven Point to the north and Rosslare Point in the south. Other habitats present within the site include species-rich marsh in which sedges such as *Carex disticha*, *Carex riparia* and *Carex vesicaria* are common. Among the other species found in this habitat are Yellow Iris (*Iris pseudacorus*), Water Mint (*Mentha aquatica*), Purple Loosestrife (*Lythrum salicaria*) and Soft Rush (*Juncus effusus*). Extensive marshes occur to the west of Castlebridge associated with the tidal areas of the River Sow. The site supports populations of several species listed on Annex I of the EU Habitats Directive including the three Lampreys - Sea Lamprey (*Petromyzon marinus*), River Lamprey (*Lampetra fluviatilis*) and Brook Lamprey (*Lampetra planeri*), Otter (*Lutra lutra*), Salmon (*Salmo salar*), small numbers of Freshwater Pearl Mussel (*Margaritifera margaritifera*) and in the tidal stretches, Twait Shad (*Alosa fallax fallax*). A survey of the Derreen River in 1995 estimated the population of Freshwater Pearl Mussel at about 3,000 individuals. This is

a significant population, especially in the context of eastern Ireland. The Slaney is primarily a spring salmon fishery and is regarded as one of the top rivers in Ireland for early spring fishing. The upper Slaney and its tributary headwaters are very important for spawning.

The site supports important numbers of birds in winter. Little Egret are found annually along the river. This bird is only now beginning to gain a foothold in Ireland and the south-east appears to be its stronghold. Nationally important numbers of Black-tailed Godwit, Teal, Tufted Duck, Mute Swan, Little Grebe and Black-headed Gull are found along the estuarine stretch of the river. The mean of the

maximum counts over four winters (1994/98) along the stretch between Enniscorthy and Ferrycarrig is: Little Egret (6), Golden Plover (6), Wigeon (139), Teal (429), Mallard (265), Tufted Duck (171), Lapwing (603), Shelduck (16), Blacktailed Godwit (93), Curlew (81), Red-breasted Merganser (11), Black-headed Gull (3030), Goldeneye (45), Oystercatcher (19), Redshank (65), Lesser Black-backed Gull (727), Herring

Gull (179), Common Gull (67), Grey Heron (39), Mute Swan (259) and Little Grebe (17). Wexford Harbour provides extensive feeding grounds for wading birds and Little Terns, which are listed on Annex I of the E.U. Birds Directive have bred here in the past. The Reed Warbler, which is a scarce breeding species in Ireland, is regularly found in Macmine Marshes but it is not known whether or not it breeds in the site. The Dipper also occurs on the river. This is a declining species nationally.

The site supports many of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger, Irish Hare and Daubenton's Bat. Common Frog (*Rana temporaria*), another Red Data Book species, also occurs within the site. Agriculture is the main landuse. Arable crops are important. Improved grassland and silage account for much of the remainder. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the populations of Annex I animal species within it. Run-off is undoubtedly occurring, as some of the fields slope steeply directly to the river bank. In addition, cattle have access to the site in places. Fishing is a main tourist attraction along stretches of the Slaney and its tributaries and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. Both

commercial and leisure fishing takes place. There are some gravel pits along the river below Bunclody and many of these are active. There is a large landfill site adjacent to the river close to Hacketstown and at Killurin. Boating, bait-digging and fishing occur in parts of Wexford Harbour. Waste water outflows, runoff from intensive agricultural enterprises, a meat factory at Clohamon and a landfill site adjacent to the river and further industrial development upstream in Enniscorthy and in other towns could all have potential adverse impacts on the water quality unless they are carefully managed. The spread of exotic species is reducing the quality of the woodlands.

The site supports populations of several species listed on Annex I of the EU Habitats Directive, and habitats listed on Annex I of this directive, as well as important numbers of wintering wildfowl including some species listed on Annex I of the EU Birds Directive. The presence of wet and broad-leaved woodlands increases the overall habitat diversity and the **occurrence of a number of Red Data Book plant and animal species adds further importance to the Slaney River site.**

07.12.2005

National Parks and Wildlife Service

Conservation Objectives Series

Slaney River Valley SAC 000781



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



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Citation:

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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

000781	Slaney River Valley SAC
1029	Freshwater Pearl Mussel <i>Margaritifera margaritifera</i>
1095	Sea Lamprey <i>Petromyzon marinus</i>
1096	Brook Lamprey <i>Lampetra planeri</i>
1099	River Lamprey <i>Lampetra fluviatilis</i>
1103	Twaite Shad <i>Alosa fallax</i>
1106	Atlantic Salmon <i>Salmo salar</i> (only in fresh water)
1130	Estuaries
1140	Mudflats and sandflats not covered by seawater at low tide
1355	Otter <i>Lutra lutra</i>
1365	Harbour Seal <i>Phoca vitulina</i>
3260	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation
91A0	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles
91E0	* Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)

Please note that this SAC is adjacent to/overlaps with Raven Point Nature Reserve SAC 000710; The Raven SPA 004019; and Wexford Harbour and Slobs SPA 004076. See map 2.

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

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

Title: Comparison of field- and GIS-based assessments of barriers to Atlantic salmon migration: a case study in the Nore Catchment, Republic of Ireland

Year: in press

Author: Gargan, P.G.; Roche, W.K.; Keane, S.; King, J.J.; Cullagh, A.; Mills, P.; O'Keeffe, J.

Series: Journal of Applied Ichthyology

Title: Slaney River Valley SAC (000781). Conservation objectives supporting document - marine habitats and species [Version 1]

Year: 2011

Author: NPWS

Series: Unpublished Report to NPWS

Title: NPWS Rare and Threatened Species Database

Year: 2011

Author: NPWS

Series: Unpublished NPWS Dataset

Title: Slaney River Valley SAC (000781). Conservation objectives supporting document - woodland habitats [Version 1]

Year: 2011

Author: NPWS

Series: Unpublished Report to NPWS

Title: Subtidal Benthic Investigations in Slaney River Valley cSAC (000781) and Wexford Harbour and Slobbs SPA (004076) Co. Wexford

Year: 2010

Author: Aquafact

Series: Unpublished Report to NPWS & MI

Title: Otter tracking study of Roaringwater Bay

Year: 2010

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

Series: Unpublished Draft Report to NPWS

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

Year: 2010

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

Series: Irish Wildlife Manuals No. 46

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

Year: 2010

Author: SSC

Series: Unpublished Report to DCENR

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

Year: 2009

Author: ASU

Series: Unpublished Report to NPWS

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:	Aspects of anadromous Allis shad (<i>Alosa alosa</i> Linnaeus) and Twaite shad (<i>Alosa fallax</i> Lacépède) biology in four Irish Special Areas of Conservation (SACs): status, spawning indications and implications for cons
Year:	2008
Author:	King, J.J.; Roche, W.K.
Series:	Hydrobiologia 602, 145–154
Title:	Water-starworts, <i>Callitriche</i> , of Europe
Year:	2008
Author:	Lansdown, R.V.
Series:	BSBI Handbook, No. 11, London
Title:	Poor water quality constrains the distribution and movements of Twaite shad <i>Alosa fallax fallax</i> (Lacepede, 1803) in the watershed of river Scheldt
Year:	2008
Author:	Maas, J.; Stevens, M. ; Breine, J.
Series:	Hydrobiologia 602, 129 - 143
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:	Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents, Article 17 forms and supporting maps
Year:	2007
Author:	NPWS
Series:	Unpublished Report to NPWS
Title:	A Survey of Juvenile Lamprey Populations in the Corrib and Suir Catchments
Year:	2007
Author:	O'Connor, W.
Series:	Irish Wildlife Manuals No. 26
Title:	Otter Survey of Ireland 2004/2005
Year:	2006
Author:	Bailey, M.; Rochford, J.
Series:	Irish Wildlife Manuals No. 23
Title:	Otters - ecology, behaviour and conservation
Year:	2006
Author:	Kruuk, H.
Series:	Oxford University Press

-
- Title:** Harbour seal population assessment in the Republic of Ireland: August 2003
Year: 2004
Author: Cronin, M.; Duck, C.; Ó Cadhla, O.; Nairn, R.; Strong, D.; O'Keeffe, C.
Series: Irish Wildlife Manuals No. 11
-
- Title:** The status and distribution of lamprey and shad in the Slaney and Munster Blackwater SACs
Year: 2004
Author: King, J.J.; Linnane, S.M.
Series: Irish Wildlife Manuals No. 14
-
- 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 *Callitriche-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:** Pondweeds of Great Britain and Ireland
Year: 2003
Author: Preston, C.D.
Series: BSBI Handbook, No. 8, London
-
- Title:** Reversing the habitat fragmentation of British woodlands
Year: 2002
Author: Peterken, G.
Series: WWF-UK, London
-
- Title:** Aquatic Plants in Britain and Ireland
Year: 2001
Author: Preston, C.D.
Series: Harley Books, Colchester
-
- 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:** The spatial organization of otters (*Lutra lutra*) in Shetland
Year: 1991
Author: Kruuk, H.; Moorhouse, A.
Series: J. Zool, 224: 41-57
-

Title: CORINE Biotopes Database - Ireland

Year: 1989

Author: NPWS

Series: Unpublished NPWS Dataset

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

Title: The distribution of grey and common seals on the coasts of Ireland

Year: 1966

Author: Lockley, R.M.

Series: Irish Naturalists' Journal 15: 136-143

Spatial data sources

Year:	2010
Title:	EPA WFD transitional waterbody data
GIS operations:	Clipped to SAC boundary
Used for:	1130 (map 3)
Year:	Interpolated 2011
Title:	2008 intertidal survey data; 2010 subtidal survey data
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:	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 (map 6)
Year:	Derived 2011
Title:	Internal NPWS files
GIS operations:	Dataset created from spatial references contained in files
Used for:	3260 (map 6)
Year:	2011
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:	1365 (map 7)
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. Expert opinion used as necessary to resolve any issues arising
Used for:	1365 (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 terrestrial side of the river banks data; creation of 20m buffer applied to canal centreline data. These datasets are combined with the derived EPA WDF Waterbodies data. 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:	2010
Title:	EPA WFD Waterbodies data
GIS operations:	Creation of a 20m buffer applied to river and stream centreline data; creation of 80m buffer on the aquatic side of lake data; creation of 10m buffer on the terrestrial side of lake data. These datasets are combined with the derived OSi data. 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)

1029 Freshwater Pearl Mussel *Margaritifera margaritifera*

The status of the freshwater pearl mussel (*Margaritifera margaritifera*) as a qualifying Annex II species for the Slaney River Valley SAC is currently under review. The outcome of this review will determine whether a site-specific conservation objective is set for this species

1095 Sea Lamprey *Petromyzon marinus*

To restore the favourable conservation condition of Sea lamprey in the Slaney River Valley 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. In this site, some barrier modification is required (e.g. Clohamon weir) to permit sea lamprey passage (Gargan et al., in press)
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on Harvey and Cowx (2003)
Juvenile density in fine sediment	Juveniles/m ²	Juvenile density at least 1/m ²	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	m ² and occurrence	No decline in extent and distribution of spawning beds. Improved dispersal of spawning beds into areas upstream of barriers	Attribute and target based on spawning bed mapping by Inland Fisheries Ireland (IFI). Lampreys spawn in clean gravels
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	Target based on studies by Central Fisheries Board (CFB)/IFI; Ecofact for NPWS (e.g. King and Linnane, 2004; O'Connor, 2007)

1096 Brook Lamprey *Lampetra planeri*

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

Attribute	Measure	Target	Notes
Distribution	% of river accessible	Access to all water courses down to first order streams	Artificial barriers can block lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. Barrier modification required to facilitate passage of adult fish within channels (Gargan et al., in press)
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 & Cowx (2003). It is impossible to distinguish between brook and river lamprey juveniles in the field, hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m ²	Mean catchment juvenile density of brook/river lamprey at least 2/m ²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey & Cowx (2003) who state 10/m ² in optimal conditions and more than 2/m ² on a catchment basis
Extent and distribution of spawning habitat	m ² 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
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	Target based on studies by Central Fisheries Board (CFB)/IFI; Ecofact for NPWS (e.g. King and Linnane, 2004; O'Connor, 2007)

1099 River Lamprey *Lampetra fluviatilis*

To restore the favourable conservation condition of River lamprey in the Slaney River Valley 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. Barrier modification required to facilitate passage of adult fish within channels (Gargan et al., in press)
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 & Cowx (2003). It is impossible to distinguish between brook and river lamprey juveniles in the field, hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m ²	Mean catchment juvenile density of brook/river lamprey at least 2/m ²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey & Cowx (2003) who state 10/m ² in optimal conditions and more than 2/m ² on a catchment basis
Extent and distribution of spawning habitat	m ² 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
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	Target based on studies by Central Fisheries Board (CFB)/IFI; Ecofact for NPWS (e.g. King and Linnane, 2004; O'Connor, 2007)

1103 Twaite Shad *Alosa fallax*

To restore the favourable conservation condition of Twaite shad in the Slaney River Valley 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. Barrier modification required to facilitate passage of adult fish within channels (Gargan et al., in press)
Population structure- age classes	Number of age classes	More than one age class present	Regular breeding has not been confirmed in the River Slaney in recent years (King and Roche, 2008)
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	

Conservation objectives for: Slaney River Valley SAC [000781]

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

To restore the favourable conservation condition of Salmon in the Slaney River Valley 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 can block salmon's 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 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 fish counter at Clohamon is used to assess the run of salmon on the Slaney. The Slaney is currently (2011) below its CL for both 1SW salmon (meeting 54%) & MSW salmon (meeting 34%)
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, hydroelectric schemes, predation and sea lice (<i>Lepeophtheirus salmonis</i>)
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
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 Slaney River Valley 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 1,905ha using OSi data and the defined Transitional Water Body area under the Water Framework Directive. See marine supporting document for further information
Community distribution	Hectares	The following community types should be maintained in, or restored to, a natural condition: Mixed sediment community complex; Estuarine muds dominated by polychaetes and crustaceans community complex; and Sand dominated by polychaetes community complex. See map 5	The likely area of sediment communities was derived from a combination of intertidal and subtidal surveys undertaken in 2008 and 2010 (ASU, 2009; 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 the Slaney River Valley 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 1,027ha using OSi data. See marine supporting document for further information
Community distribution	Hectares	The following community types should be maintained in a natural condition: Estuarine muds dominated by polychaetes and crustaceans community complex; and Sand dominated by polychaetes community complex. See map 5	The likely area of sediment communities was derived from a intertidal surveys undertaken in 2008 (ASU, 2009). See marine supporting document for further information

1355 Otter *Lutra lutra*

To restore the favourable conservation condition of Otter in the Slaney River Valley 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 64.7ha above high water mark (HWM); 453.4ha 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 534.7ha	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 264.1km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 0.4ha	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)
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 & O'Neill, 2010). It is important that such commuting routes are not obstructed

1365 Harbour Seal *Phoca vitulina*

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

Attribute	Measure	Target	Notes
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use. See map 7	See marine supporting document for further details
Breeding behaviour	Breeding sites	The breeding sites should be maintained in a natural condition. See map 7	Attribute and target based on background knowledge of Irish breeding populations and review of data from unpublished National Parks & Wildlife Service records. See marine supporting document for further details
Moulting behaviour	Moult haul-out sites	The moult haul-out sites should be maintained in a natural condition. See map 7	Attribute and target based on background knowledge of Irish populations, review of data from Lockley (1966), Cronin et al. (2004) and unpublished National Parks & Wildlife Service records. See marine supporting document for further details
Resting behaviour	Resting haul-out sites	The resting haul-out sites should be maintained in a natural condition. See map 7	Attribute and target based on background knowledge of Irish populations and unpublished National Parks & Wildlife Service records. See marine supporting document for further details
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the harbour seal population at the site. See map 7	See marine supporting document for further details

Conservation objectives for: Slaney River Valley SAC [000781]

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 Slaney River Valley 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. See map 6 for mapped known extent	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 assemblage associated with tidal reaches of large rivers between Enniscorthy and Polladern townland (see map 6). This sub-type is characterised by the presence of the rare and protected species short-leaved water-starwort (<i>Callitriche truncata</i>) and Opposite-leaved pondweed (<i>Groenlandia densa</i>). Other sub-types of the habitat were recorded in two tributaries of the Slaney: <i>Scapanietum undulatae</i> and <i>Pellietum epiphyllae scapanietosum</i> (Derreen River) and <i>Callitricho-Batrachionthe</i> (Derreen and Derry Rivers) (Heuff, 1987). Other examples of these or other sub-types may be present within the SAC
Habitat area	Kilometres	Area stable at 12.6km or increasing, subject to natural processes. See map 6	The full extent of this habitat in this site is currently unknown. The target of 12.6km applies to the tidal sub-type only
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: tidal influence	Daily water level fluctuations - metres	Maintain natural tidal regime	The disturbance associated with the tidal regime is the primary driver of the tidal sub-type and rare associated species (see Lansdown, 2008; Preston, 2003; Preston and Croft, 2001)

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 Slaney River Valley SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Substratum composition: particle size range	Millimetres	For the tidal sub-type, the substratum of the channel must be dominated by particles of sand to gravel, with silt at the river margins	Target applies to tidal sub-type only. The size and distribution of substratum particles is largely determined by the river flow and tidal regime. Short-leaved water-starwort (<i>Callitriche truncata</i>) has been recorded from gravel-dominated substratum in the centre of the channel, as well as muds in marginal inlets and at the rivers' edge (J. Ryan, pers. comm., NPWS Rare and Threatened Species Database, 2011). Opposite-leaved pondweed (<i>Groenlandia densa</i>) is typically found on silts, sometimes sands, while needle spike-rush (<i>Eleocharis acicularis</i>) requires the marginal fine muds
Water quality: nutrients	Milligrammes per litre	The concentration of nutrients in the water column must be sufficiently low to prevent changes in species composition or habitat condition	The Environmental Protection Agency (EPA) do not monitor the tidal stretch of the Slaney. However, the data from upstream of Enniscorthy suggest the water quality for the tidal stretch is at good status (2007-2009). It is likely that the rare species associated with the tidal sub-type are tolerant of some nutrient enrichment, but may be sensitive to severe enrichment (Preston, 2003). Consequently, water quality should reach Water Framework Directive good status, in terms of nutrient standards, and macroinvertebrate and phytobenthos quality elements (see S.I. 272 of 2009)

Conservation objectives for: Slaney River Valley SAC [000781]

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 Slaney River Valley SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation composition: typical species	Occurrence	Typical species of the relevant habitat sub-type reach favourable status	The sub-types of this habitat are poorly understood and their typical species have not yet been defined. Additional typical species and appropriate targets may emerge. The typical species of the tidal sub-type in the Slaney include short-leaved water-starwort (<i>Callitriche truncata</i>), opposite-leaved pondweed (<i>Groenlandia densa</i>), spiked water-milfoil (<i>Myriophyllum spicatum</i>), other pondweeds (<i>Potamogeton</i> spp.), as well as pioneer vegetation of bare mud, e.g. needle spike-rush (<i>Eleocharis acicularis</i>) (NPWS Rare and Threatened Species Database, 2011; NPWS, 1989; J. Ryan, pers. comm.). The tidal stretch also supports important reed beds (including common reed (<i>Phragmites australis</i>), greater pond-sedge (<i>Carex riparia</i>), reed canary-grass (<i>Phalaris arundinacea</i>) and common club-rush (<i>Schoenoplectus lacustris</i>)), marginal swamp vegetation and freshwater marsh. The invasive macrophyte Nuttall's waterweed (<i>Elodea nuttallii</i>) is also known to occur in the tidal stretch of the Slaney (R. Goodwillie, pers. comm.). The typical species may include higher plants, bryophytes, macroalgae and microalgae
Floodplain connectivity: area	Hectares	The area of active floodplain at and upstream of the habitat must be maintained	River connectivity with the floodplain must be maintained. The site of the tidal sub-type in the Slaney River is within an area of floodplain. Floodplain connectivity is particularly important in terms of sediment sorting and nutrient deposition

Conservation objectives for: Slaney River Valley SAC [000781]

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

To restore the favourable conservation condition of old sessile oakwoods with *Ilex* and *Blechnum* in the Slaney River Valley 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 146.17ha for sub-sites surveyed. See map 6	Minimum area, based on 10 sites surveyed by Perrin et al. (2008) - site codes 1, 8, 26, 158, 172, 180, 210, 310, 749 and 988. 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 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 sizes of at least some of the existing woodlands need to be increased in order to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). Topographical constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer	Described in Perrin et al. (2008). 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). 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
Woodland structure: indicators of local distinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-data and other rare or localised species. Perrin and Daly (2010) list sites 1, 26, 158, 172, 180, 310, 749 as potential ancient/long-established woodlands

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

To restore the favourable conservation condition of old sessile oakwoods with *Ilex* and *Blechnum* in the Slaney River Valley SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008)
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including oak (<i>Quercus petraea</i>) and birch (<i>Betula pubescens</i>)	Species reported in Perrin et al. (2008)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common invasive species in this woodland type: beech (<i>Fagus sylvatica</i>), rhododendron (<i>Rhododendron ponticum</i>), cherry laurel (<i>Prunus laurocerasus</i>)

Conservation objectives for: Slaney River Valley SAC [000781]

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) in the Slaney River Valley SAC, which is defined by the following list of attributes and targets:

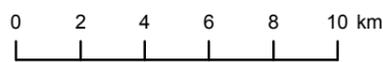
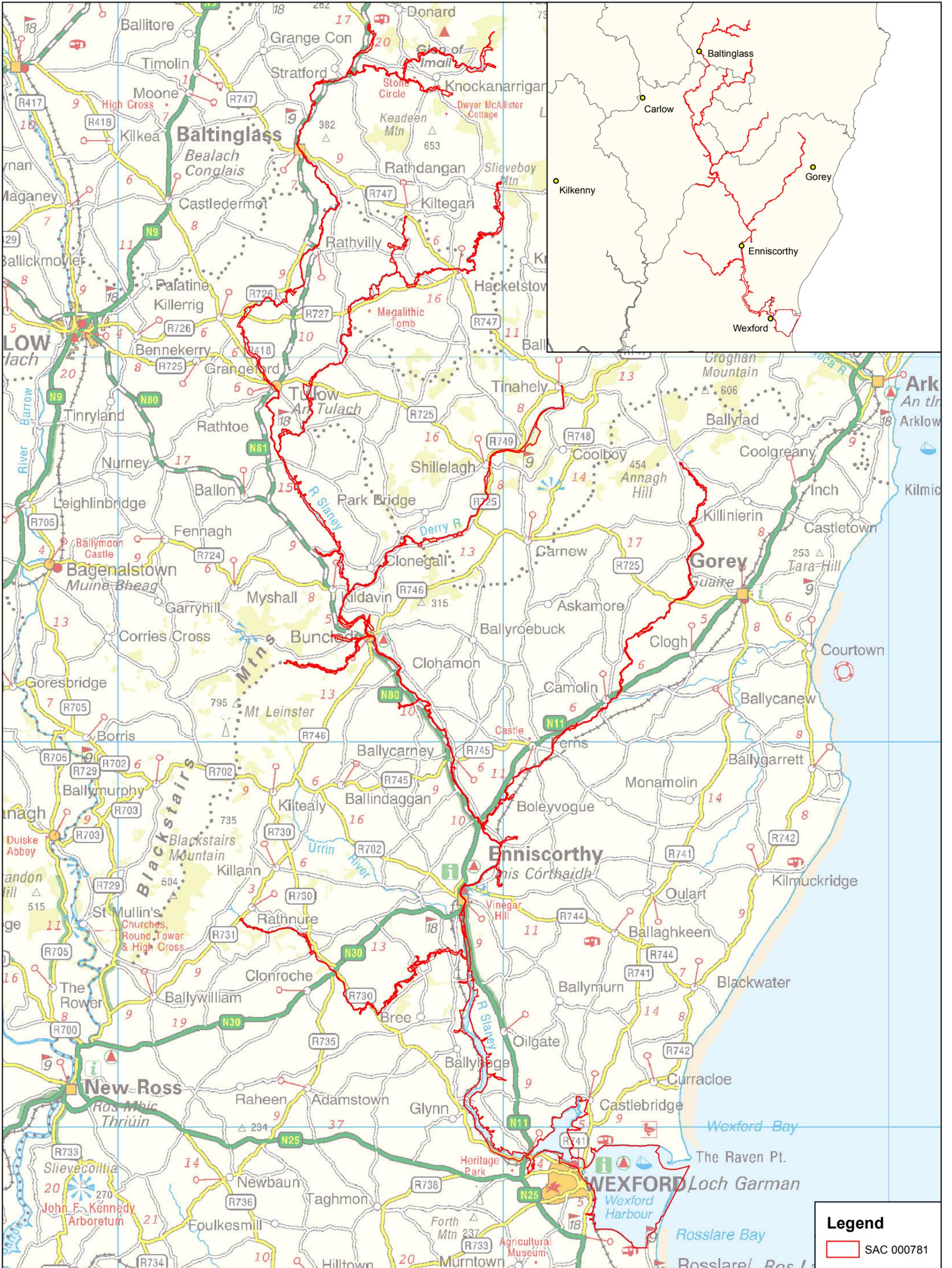
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least 18.7ha for sites surveyed. See map 6	Minimum area, based on 7 sites surveyed by Perrin et al. (2008) - site codes 1, 157, 208, 209, 211, 875, 988. NB further unsurveyed areas maybe present 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 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 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). 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). 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 floodplains
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

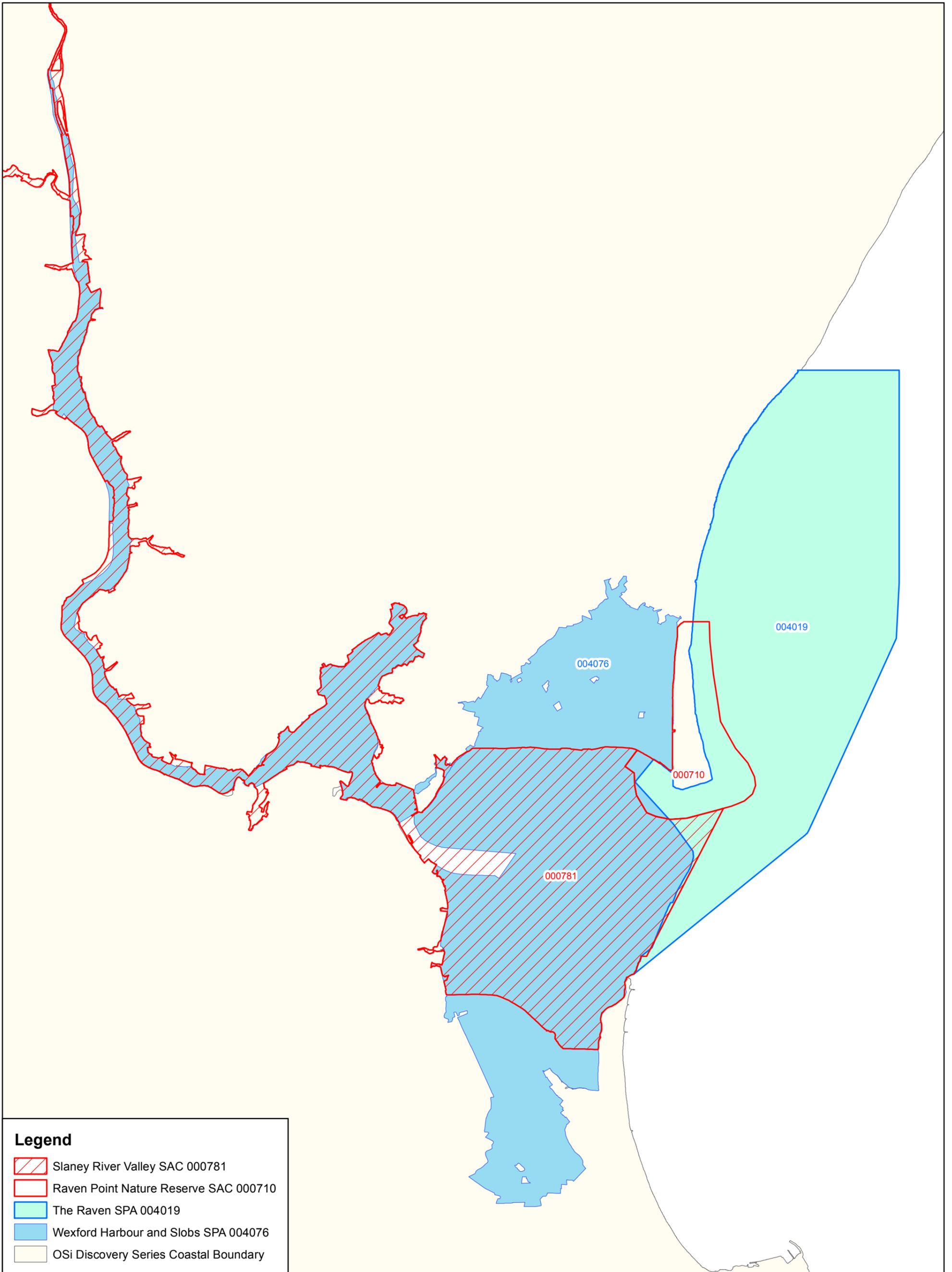
Conservation objectives for: Slaney River Valley SAC [000781]

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) in the Slaney River Valley 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 distinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-data and other rare or localised species. Perrin & Daly (2010) list site 1as containing 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)
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including alder (<i>Alnus glutinosa</i>), willows (<i>Salix</i> spp) and, locally, oak (<i>Quercus robur</i>) and ash (<i>Fraxinus excelsior</i>)	Species reported in Perrin et al. (2008)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common invasive species in this woodland type: sycamore (<i>Acer pseudoplatanus</i>) and Himalayan balsam (<i>Impatiens glandulifera</i>)

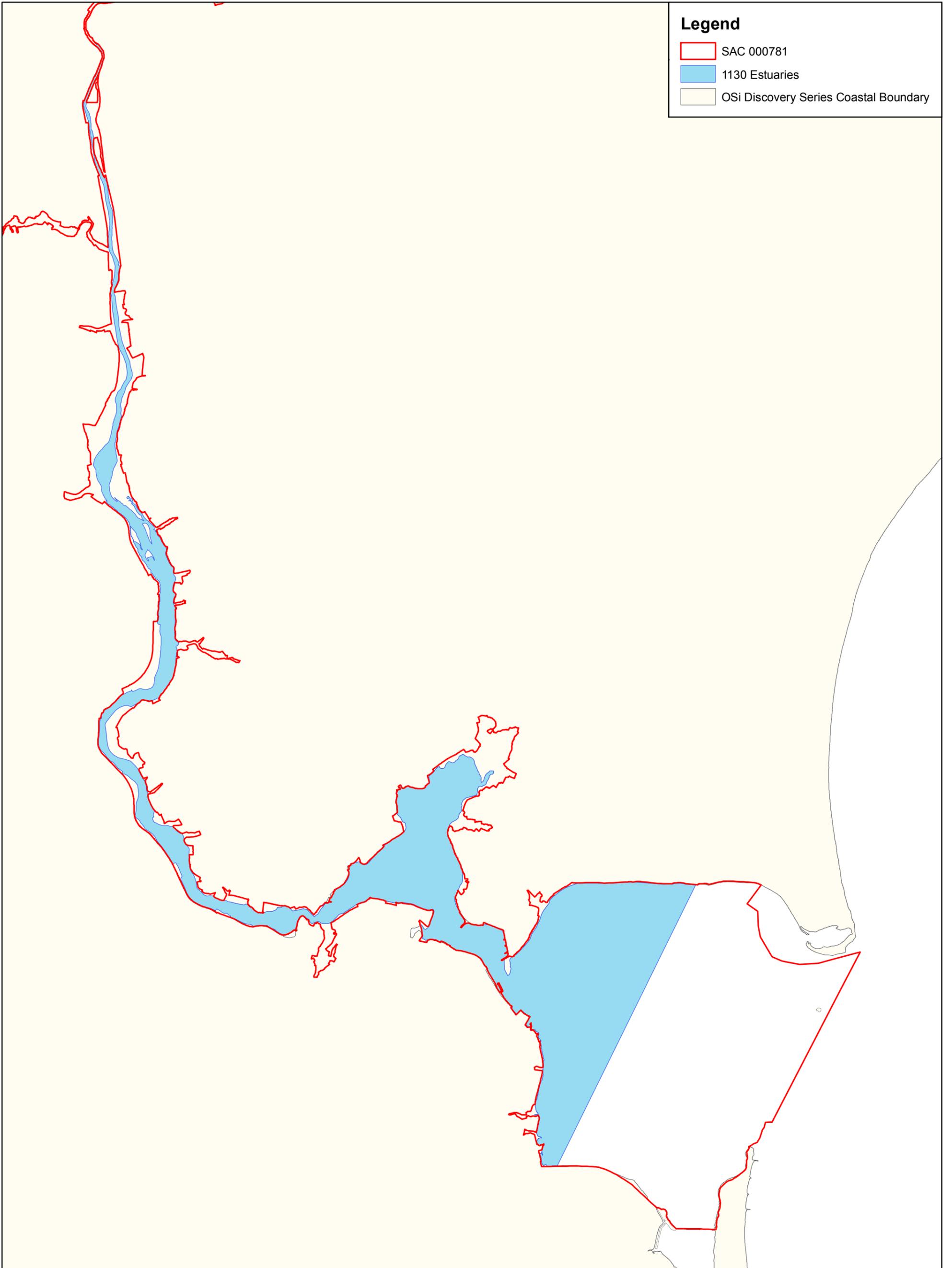




Legend

-  Slaney River Valley SAC 000781
-  Raven Point Nature Reserve SAC 000710
-  The Raven SPA 004019
-  Wexford Harbour and Slobs SPA 004076
-  OSi Discovery Series Coastal Boundary



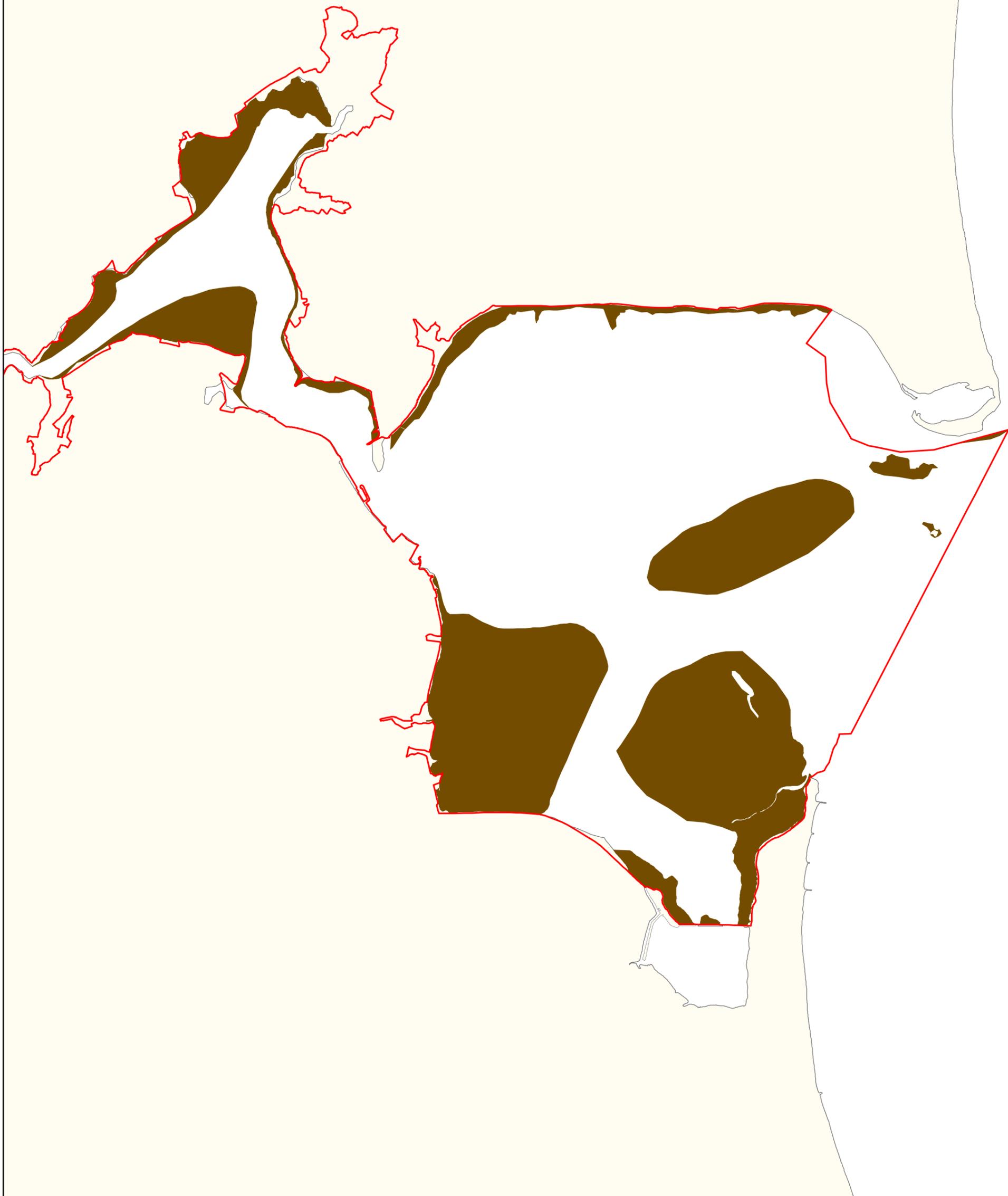


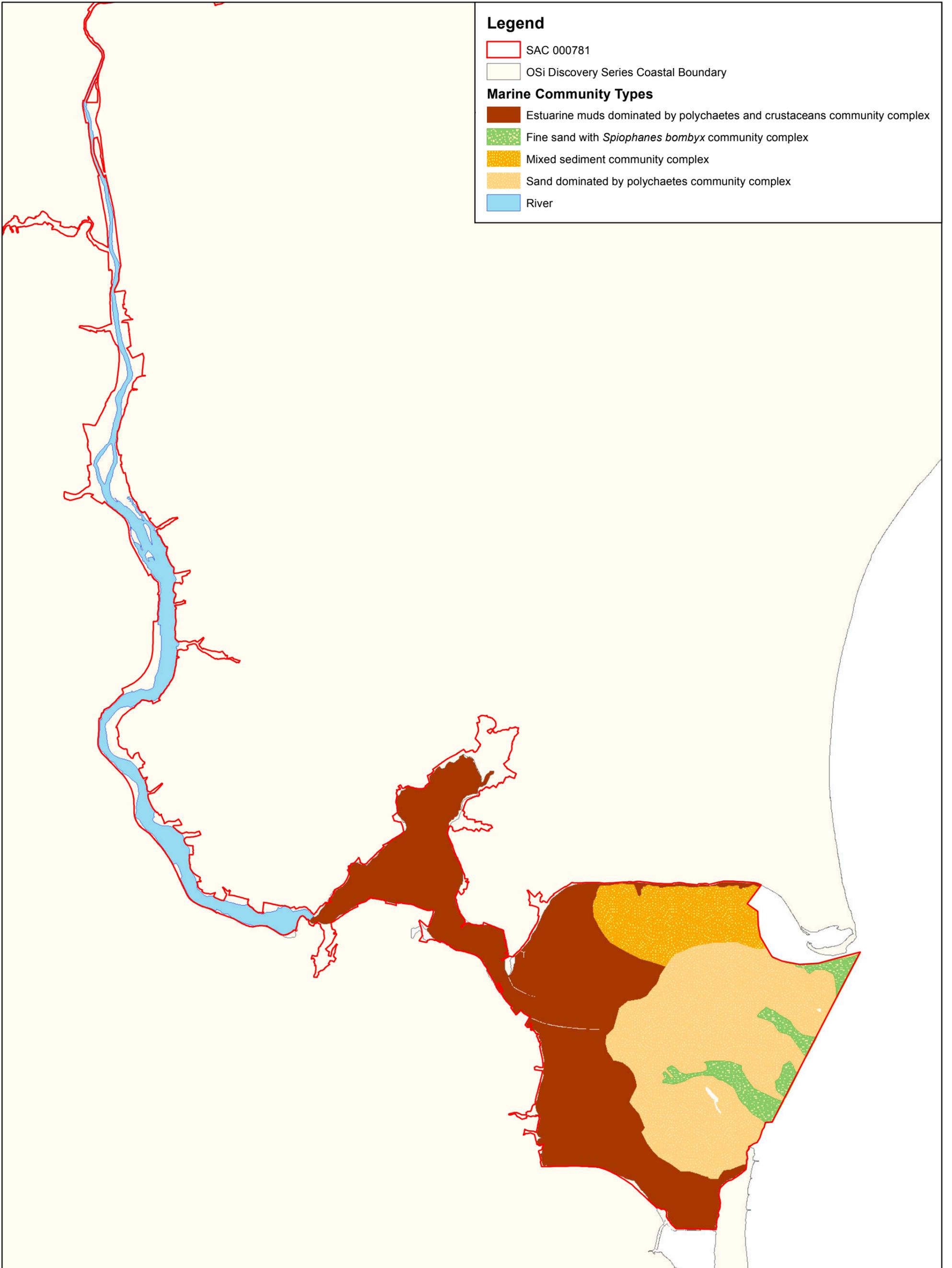
Legend

- SAC 000781
- 1130 Estuaries
- OSi Discovery Series Coastal Boundary

Legend

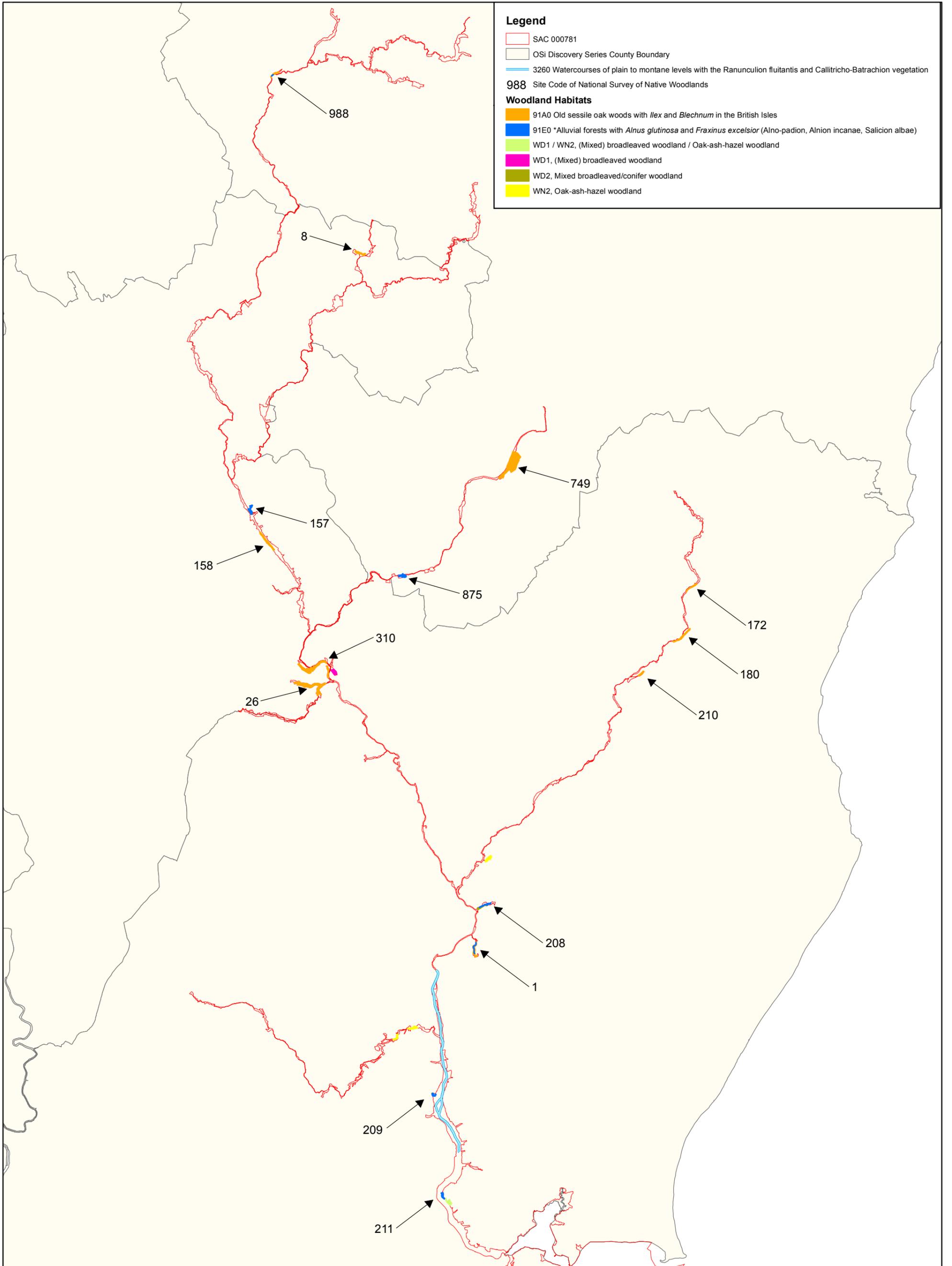
-  SAC 000781
-  1140 Mudflats and sandflats not covered by sea water at low tide
-  OSi Discovery Series Coastal Boundary

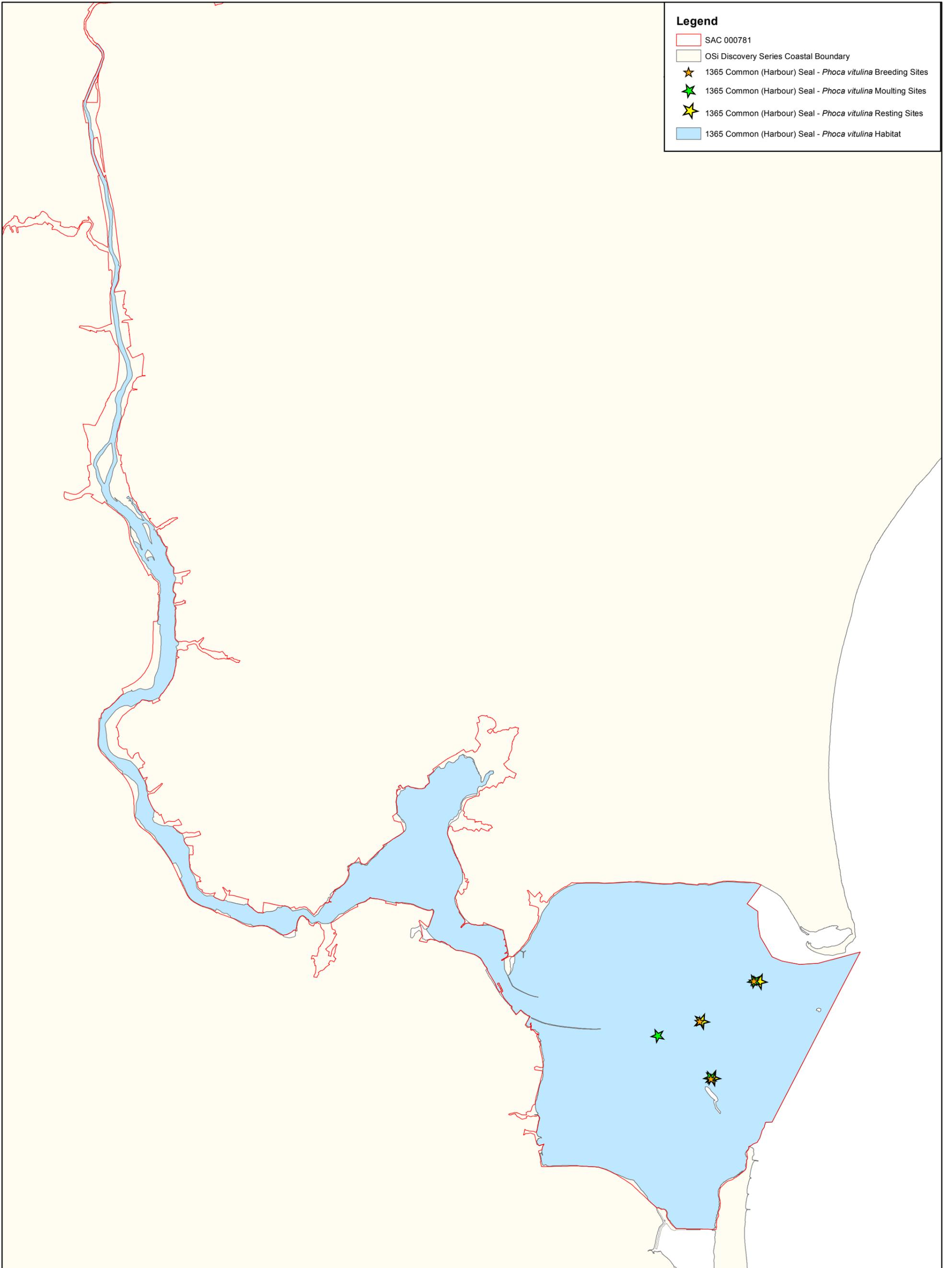




Legend

- SAC 000781
- OSi Discovery Series Coastal Boundary
- Marine Community Types**
- Estuarine muds dominated by polychaetes and crustaceans community complex
- Fine sand with *Spiophanes bombyx* community complex
- Mixed sediment community complex
- Sand dominated by polychaetes community complex
- River





Legend

- SAC 000781
- OSI Discovery Series Coastal Boundary
- ★ 1365 Common (Harbour) Seal - *Phoca vitulina* Breeding Sites
- ★ 1365 Common (Harbour) Seal - *Phoca vitulina* Moulting Sites
- ★ 1365 Common (Harbour) Seal - *Phoca vitulina* Resting Sites
- 1365 Common (Harbour) Seal - *Phoca vitulina* Habitat

SITE SYNOPSIS
SITENAME: HOLDENSTOWN BOG
SITECODE: 001757

Holdenstown bog is situated about 3 km south-east of Baltinglass, Co. Wicklow. It is a small raised bog surrounded by transition mire which has developed in a kettle hole. Holdenstown Bog is a candidate SAC selected for transition mire, a habitat listed on Annex I of the E.U. Habitats Directive. The whole bog is very wet and the surface has a hummock-hollow topography. The hummocks are dominated by Heather (*Calluna vulgaris*), while the hollows have a range of bog mosses (*Sphagnum* spp.). In addition, there is a good diversity of sedges (*Carex* spp.), including the scarce Bog Sedge (*Carex limosa*), the only locality for this species in county Wicklow. Other plants typical of the bog include Cranberry (*Vaccinium oxycoccos*) and Bogbean (*Menyanthes trifoliata*).

The margins of the bog support wet scrub vegetation in which Alder (*Alnus glutinosa*) and Willow (*Salix cinerea* subsp. *oleifolia*) are prevalent. The rest of the bog perimeter is rich in sedges (*Carex nigra*, *C. otrubae*, *C. hirta*), rushes (*Juncus articulatus*, *J. subnodulosus*), as well as a range of wetland herbaceous plants such as Water Mint (*Mentha aquatica*), Marsh-marigold (*Caltha palustris*) and Water Horsetail (*Equisetum fluviatile*).

Holdenstown Bog is of conservation importance as an intact example of transition mire, a habitat listed on Annex I of the E.U. Habitats Directive, and for a range of plant species typical of incipient raised bog development.

26.11.2002



Conservation Objectives for Holdenstown Bog SAC [001757]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- ◆ [7140] Transition mires and quaking bogs

Citation:

NPWS (2011) Conservation objectives for Holdenstown Bog SAC [001757]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: www.npws.ie/protectedsites/conservationmanagementplanning

SITE SYNOPSIS
SITE NAME: RIVER BARROW AND RIVER NORE
SITE CODE: 002162

This site consists of the freshwater stretches of the Barrow/Nore River catchments as far upstream as the Slieve Bloom Mountains and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. The site passes through eight counties – Offaly, Kildare, Laois, Carlow, Kilkenny, Tipperary, Wexford and Waterford.

Major towns along the edge of the site include Mountmellick, Portarlinton, Monasterevin, Stradbally, Athy, Carlow, Leighlinbridge, Graiguenamanagh, New Ross, Inistioge, Thomastown, Callan, Bennettsbridge, Kilkenny and Durrow. The larger of the many tributaries include the Lerr, Fushoge, Mountain, Aughavaud, Owenass, Boherbaun and Stradbally Rivers of the Barrow and the Delour, Dinin, Erkina, Owveg, Munster,

Arrigle and King's Rivers on the Nore. Both rivers rise in the Old Red Sandstone of the Slieve Bloom Mountains before passing through a band of Carboniferous shales and sandstones. The Nore, for a large part of its course, traverses limestone plains and then Old Red Sandstone for a short stretch below Thomastown. Before joining the Barrow it runs over intrusive rocks poor in silica. The upper reaches of the Barrow also runs through limestone. The middle reaches and many of the eastern tributaries, sourced in the Blackstairs Mountains, run through Leinster Granite. The southern end, like the Nore runs over intrusive rocks poor in silica. Waterford Harbour is a deep valley excavated by glacial floodwaters when the sea level was lower than today. The coast shelves quite rapidly along much of the shore.

The site is a candidate SAC selected for alluvial wet woodlands and petrifying springs, priority habitats on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for old oak woodlands, floating river vegetation, estuary, tidal mudflats, *Salicornia* mudflats, Atlantic salt meadows, Mediterranean salt meadows, dry heath and eutrophic tall herbs, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Nore Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon, Otter, Desmoulin's Whorl Snail *Vertigo moulinsiana* and the Killarney Fern. Good examples of Alluvial Forest are seen at Rathsnagadan, Murphy's of the River, in Abbeyleix estate and along other shorter stretches of both the tidal and freshwater elements of the site. Typical species seen include Almond Willow (*Salix triandra*), White Willow (*S. alba*), Grey Willow (*S. cinerea*), Crack Willow (*S. fragilis*), Osier (*S. viminalis*), with Iris (*Iris pseudacorus*), Hemlock Water-dropwort (*Oenanthe crocata*), Angelica (*Angelica sylvestris*), Thin-spiked Wood-sedge (*Carex strigosa*), Pendulous Sedge (*C. pendula*), Meadowsweet (*Filipendula ulmaria*), Valerian (*Valeriana officinalis*) and the Red Data Book species Nettle-leaved Bellflower (*Campanula trachelium*). Three rare invertebrates have been recorded in this habitat at Murphy's of the River. These are: *Neoascia obliqua* (Diptera: Syrphidae), *Tetanocera freyi* (Diptera: Sciomyzidae) and *Dictya umbrarum* (Diptera: Sciomyzidae). A good example of petrifying springs with tufa formations occurs at Dysart Wood along the Nore. This is a rare habitat in Ireland and one listed with priority status on Annex I of the EU Habitats Directive. These hard water springs are characterised by lime encrustations, often associated with small waterfalls. A rich bryophyte flora is typical of the habitat and two diagnostic species, *Cratoneuron commutatum* var. *commutatum* and *Eucladium verticillatum*, have been recorded.

The best examples of old Oak woodlands are seen in the ancient Park Hill woodland in the estate at Abbeyleix; at Kyleadohir, on the Delour, Forest Wood House, Kylecorragh and Brownstown Woods on the Nore; and at Cloghristic Wood, Drummond Wood and Borris Demesne on the Barrow, though other patches occur throughout the site. Abbeyleix Woods is a large tract of mixed deciduous woodland which is one of the only remaining true ancient woodlands in Ireland. Historical records show that Park Hill has been continuously wooded since the sixteenth century and has the most complete written record of any woodland in the country. It supports a variety of woodland habitats and an exceptional diversity of species including 22 native trees, 44 bryophytes and 92 lichens.

It also contains eight indicator species of ancient woodlands. Park Hill is also the site of two rare plants, Nettle-leaved Bellflower and the moss *Leucodon sciuroides*. It has a typical bird fauna including Jay, Long-eared Owl and Raven. A rare invertebrate, *Mitostoma chrysomelas*, occurs in Abbeyleix and only two other sites in the country. Two flies *Chrysogaster virescens* and *Hybomitra muhlfeldi* also occur. The rare Myxomycete fungus, *Licea minima* has been recorded from woodland at Abbeyleix. Oak woodland covers parts of the valley side south of Woodstock and is well developed at Brownsford where the Nore takes several sharp bends. The steep valley side is covered by Oak (*Quercus* spp.), Holly (*Ilex aquifolium*), Hazel (*Corylus avellana*) and Birch (*Betula pubescens*) with

some Beech (*Fagus sylvatica*) and Ash (*Fraxinus excelsior*). All the trees are regenerating through a cover of Bramble (*Rubus fruticosus* agg.), Foxglove (*Digitalis purpurea*) Wood Rush (*Luzula sylvatica*) and Broad Buckler-fern (*Dryopteris dilatata*). On the steeply sloping banks of the River Nore about 5 km west of New Ross, in County Kilkenny, Kylecorragh Woods form a prominent feature in the landscape. This is an excellent example of a relatively undisturbed, relict Oak woodland with a very good tree canopy. The wood is quite damp and there is a rich and varied ground flora. At Brownstown a small, mature Oak-dominant woodland occurs on a steep slope. There is younger woodland to the north and east of it. Regeneration throughout is evident. The understorey is similar to the woods at Brownsford. The ground flora of this woodland is developed on acidic, brown earth type soil and comprises a thick carpet of Bilberry (*Vaccinium myrtillus*), Heather (*Calluna vulgaris*), Hard Fern (*Blechnum spicant*), Cowwheat (*Melampyrum* spp.) and Bracken (*Pteridium aquilinum*). Borris Demesne contains a very good example of a semi-natural broad-leaved woodland in very good condition. There is quite a high degree of natural re-generation of Oak and Ash through the woodland. At the northern end of the estate Oak species predominate.

Drummond Wood, also on the Barrow, consists of three blocks of deciduous woods situated on steep slopes above the river. The deciduous trees are mostly Oak species. The woods have a well established understorey of Holly (*Ilex aquifolium*), and the herb layer is varied, with Brambles abundant. Whitebeam (*Sorbus devoniensis*) has also been recorded.

Eutrophic tall herb vegetation occurs in association with the various areas of alluvial forest and elsewhere where the flood-plain of the river is intact. Characteristic species of the habitat include Meadowsweet (*Filipendula ulmaria*), Purple Loosestrife (*Lythrum salicaria*), Marsh Ragwort (*Senecio aquaticus*), Ground Ivy (*Glechoma hederacea*) and Hedge Bindweed (*Calystegia sepium*). Indian Balsam (*Impatiens glandulifera*), an introduced and invasive species, is abundant in places. Floating River Vegetation is well represented in the Barrow and in the many tributaries of the site. In the Barrow the species found include Water Starworts (*Callitriche* spp.), Canadian Pondweed (*Elodea canadensis*), Bulbous Rush (*Juncus bulbosus*), Milfoil (*Myriophyllum* spp.), *Potamogeton x nitens*, Broad-leaved Pondweed (*P. natans*), Fennel Pondweed (*P. pectinatus*), Perfoliated Pondweed (*P. perfoliatus*) and Crowfoots (*Ranunculus* spp.). The water quality of the Barrow has improved since the vegetation survey was carried out (EPA, 1996).

Dry Heath at the site occurs in pockets along the steep valley sides of the rivers especially in the Barrow Valley and along the Barrow tributaries where they occur in the foothills of the Blackstairs Mountains. The dry heath vegetation along the slopes of the river bank consists of Bracken (*Pteridium aquilinum*) and Gorse (*Ulex europaeus*) species with patches of acidic grassland vegetation. Additional typical species include Heath Bedstraw (*Galium saxatile*), Foxglove (*Digitalis purpurea*), Common Sorrel (*Rumex acetosa*) and Bent Grass (*Agrostis stolonifera*). On the steep slopes above New Ross the Red Data Book species Greater Broomrape (*Orobancha rapum-genistae*) has been recorded. Where rocky outcrops are shown on the maps Bilberry (*Vaccinium myrtillus*) and Wood Rush (*Luzula sylvatica*) are present. At Ballyhack a small area of dry heath is interspersed with patches of lowland dry grassland. These support a number of Clover species including the legally protected Clustered Clover (*Trifolium glomeratum*) – a species known from only one other site in Ireland. This grassland community is especially well developed on the west side of the mud-capped walls by the road. On the east of the cliffs a group of rock-dwelling species occur, i.e. English Stonecrop (*Sedum anglicum*), Sheep's-bit (*Jasione montana*) and Wild Madder (*Rubia peregrina*). These rocks also support good lichen and moss assemblages with *Ramalina subfarinacea* and *Hedwigia ciliata*.

Dry Heath at the site generally grades into wet woodland or wet swamp vegetation lower down the slopes on the river bank. Close to the Blackstairs Mountains, in the foothills associated with the Aughnabriskey, Aughavaud and Mountain Rivers there are small patches of wet heath dominated by Purple Moor-grass (*Molinia caerulea*) with Heather (*Calluna vulgaris*), Tormentil (*Potentilla erecta*), Carnation Sedge (*Carex panicea*) and Bell Heather (*Erica cinerea*). Saltmeadows occur at the southern section of the site in old meadows where the embankment has been breached, along the tidal stretches of in-flowing rivers below Stokestown House, in a narrow band on the channel side of Common Reed (*Phragmites*) beds and in narrow fragmented strips along the open shoreline. In the larger areas of salt meadow, notably at Carrickloney, Ballinlaw Ferry and Rochestown on the west bank; Fisherstown, Alderton and Great Island to Dunbrody on the east bank, the Atlantic and Mediterranean sub types are generally intermixed. At the upper edge of the salt meadow in the narrow ecotonal areas bordering the grasslands where there is significant percolation of salt water, the legally protected species Borrer's Saltmarsh-grass (*Puccinellia fasciculata*) and Meadow Barley (*Hordeum secalinum*) (Flora Protection Order, 1987) are found. The very rare Divided Sedge (*Carex divisa*) is also found. Sea Rush (*Juncus maritimus*) is also present. Other plants recorded and associated with

salt meadows include Sea Aster (*Aster tripolium*), Sea Thrift (*Armeria maritima*), Sea Couch (*Elymus pycnanthus*), Spear-leaved Orache (*Atriplex prostrata*), Lesser Sea-spurrey (*Spergularia marina*), Sea Arrowgrass (*Triglochin maritima*) and Sea Plantain (*Plantago maritima*). *Salicornia* and other annuals colonising mud and sand are found in the creeks of the saltmarshes and at the seaward edges of them. The habitat also occurs in small amounts on some stretches of the shore free of stones.

The estuary and the other Habitats Directive Annex I habitats within it form a large component of the site. Extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present. Good quality intertidal sand and mudflats have developed on a linear shelf on the western side of Waterford Harbour, extending for over 6 km from north to south between Passage East and Creadaun Head, and in places are over 1 km wide. The sediments are mostly firm sands, though grade into muddy sands towards the upper shore. They have a typical macro-invertebrate fauna, characterised by polychaetes and bivalves. Common species include *Arenicola marina*, *Nephtys hombergii*, *Scoloplos armiger*, *Janice conchilega* and *Cerastoderma edule*. The western shore of the harbour is generally stony and backed by low cliffs of glacial drift. At Woodstown there is a sandy beach, now much influenced by recreation pressure and erosion. Behind it a lagoonal marsh has been impounded which runs westwards from Gaultiere Lodge along the course of a slow stream. An extensive reedbed occurs here.

At the edges is a tall fen dominated by sedges (*Carex* spp.), Meadowsweet, Willowherb (*Epilobium* spp.) and rushes (*Juncus* spp.). Wet woodland also occurs. This area supports populations of typical waterbirds including Mallard, Snipe, Sedge Warbler and Water Rail. The dunes which fringe the strand at Duncannon are dominated by Marram grass (*Ammophila arenaria*) towards the sea. Other species present include Wild Sage (*Salvia verbenaca*), a rare Red Data Book species. The rocks around Duncannon ford have a rich flora of seaweeds typical of a moderately exposed shore and the cliffs themselves support a number of coastal species on ledges, including Thrift (*Armeria maritima*), Rock Samphire (*Crithmum maritimum*) and Buck's-horn Plantain (*Plantago coronopus*). Other habitats which occur throughout the site include wet grassland, marsh, reed swamp, improved grassland, arable land, quarries, coniferous plantations, deciduous woodland, scrub and ponds.

Seventeen Red Data Book plant species have been recorded within the site, most in the recent past. These are Killarney Fern (*Trichomanes speciosum*), Divided Sedge (*Carexdivisa*), Clustered Clover (*Trifolium glomeratum*), Basil Thyme (*Acinos arvensis*), Hemp nettle (*Galeopsis angustifolia*), Borrer's Saltmarsh Grass (*Puccinellia fasciculata*), Meadow Barley (*Hordeum secalinum*), Opposite-leaved Pondweed (*Groenlandia densa*), Autumn Crocus (*Colchicum autumnale*), Wild Sage (*Salvia verbenaca*), Nettle-leaved Bellflower (*Campanula trachelium*), Saw-wort (*Serratula tinctoria*), Bird Cherry (*Prunuspadus*), Blue Fleabane (*Erigeron acer*), Fly Orchid (*Ophrys insectifera*), Broomrape (*Orobanche hederaceae*) and Greater Broomrape (*Orobanche rapum-genistae*). Of these the first nine are protected under the Flora Protection Order 1999. Divided Sedge (*Carexdivisa*) was thought to be extinct but has been found in a few locations in the site since 1990. In addition plants which do not have a very wide distribution in the country are found in the site including Thin-spiked Wood-sedge (*Carex strigosa*), Field Garlic (*Allium oleraceum*) and Summer Snowflake (*Leucojum aestivum*). Six rare lichens,

indicators of ancient woodland, are found including *Lobaria laetevirens* and *L.pulmonaria*. The rare moss *Leucodon sciuroides* also occurs. The site is very important for the presence of a number of EU Habitats Directive Annex II animal species including Freshwater Pearl Mussel (*Margaritifera margaritifera* and *M. durrovensis*), Freshwater Crayfish (*Austropotamobius pallipes*), Salmon (*Salmo salar*), Twaite Shad (*Alosa fallax fallax*), three Lamprey species - Sea (*Petromyzon marinus*), Brook (*Lampetra planeri*) and River (*Lampetra fluviatilis*), the marsh snail *Vertigo moulinsiana* and Otter (*Lutra lutra*). This is the only site in the world for the hard water form of the Pearl Mussel *M. m. durrovensis* and one of only a handful of spawning grounds in the country for Twaite Shad. The freshwater stretches of the River Nore main channel is a designated salmonid river. The Barrow/Nore is mainly a grilse fishery though spring salmon fishing is good in the vicinity of Thomastown and Inistioge on the Nore. The upper stretches of the Barrow and Nore, particularly the Owenass River, are very important for spawning.

The site supports many other important animal species. Those which are listed in the Irish Red Data Book include Daubenton's Bat (*Myotis daubentoni*), Badger (*Melesmeles*), Irish Hare (*Lepus timidus hibernicus*) and Frog (*Rana temporaria*). The rare Red Data Book fish species Smelt (*Osmerus eperlanus*) occurs in estuarine stretches of the site. In addition to the Freshwater Pearl Mussel, the site also supports two other freshwater Mussel species, *Anodonta anatina* and *A. cygnea*.

The site is of ornithological importance for a number of E.U. Birds Directive Annex I species including Greenland White-fronted Goose, Whooper Swan, Bewick's Swan, Bartailed Godwit, Peregrine and Kingfisher. Nationally important numbers of Golden Plover and Bar-tailed Godwit are found during the

winter. Wintering flocks of migratory birds are seen in Shanahoe Marsh and the Curragh and Goul Marsh, both in Co. Laois and also along the Barrow Estuary in Waterford Harbour. There is also an extensive autumnal roosting site in the reedbeds of the Barrow Estuary used by Swallows before they leave the country.

Landuse at the site consists mainly of agricultural activities – many intensive, principally grazing and silage production. Slurry is spread over much of this area. Arable crops are also grown. The spreading of slurry and fertiliser poses a threat to the water quality of the salmonid river and to the populations of Habitats Directive Annex II animal species within the site. Many of the woodlands along the rivers belong to old estates and support many non-native species. Little active woodland management occurs. Fishing is a main tourist attraction along stretches of the main rivers and their tributaries and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. There is net fishing in the estuary and a mussel bed also. Other recreational activities such as boating, golfing and walking, particularly along the Barrow towpath are also popular. There is a golf course on the banks of the Nore at Mount Juliet and GAA pitches on the banks at Inistioge and Thomastown. There are active and disused sand and gravel pits throughout the site. Several industrial developments, which discharge into the river, border the site. New Ross is an important shipping port. Shipping to and from Waterford and Belview ports also passes through the estuary.

The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, overgrazing within the woodland areas, and invasion by non-native species, for example Cherry Laurel and Rhododendron (*Rhododendron ponticum*). The water quality of the site remains vulnerable.

Good quality water is necessary to maintain the populations of the Annex II animal species listed above. Good quality is dependent on controlling fertilisation of the grasslands, particularly along the Nore. It also requires that sewage be properly treated before discharge. Drainage activities in the catchment can lead to flash floods which can damage the many Annex II species present. Capital and maintenance dredging within the lower reaches of the system pose a threat to migrating fish species such as lamprey and shad. Land reclamation also poses a threat to the salt meadows and the populations of legally protected species therein.

Overall, the site is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive respectively. Furthermore it is of high conservation value for the populations of bird species that use it. The occurrence of several Red Data Book plant species including three rare plants in the salt meadows and the population of the hard water form of the Pearl Mussel which is limited to a 10 km stretch of the Nore, add further interest to this site.

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

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 <i>Austropotamobius pallipes</i> 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:	<i>Margaritifera durrovensis</i> 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

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- 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 *Callitriche-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/m ²	Juvenile density at least 1/m ²	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	m ² 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 artificial 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/m ²	Mean catchment juvenile density of brook/river lamprey at least 2/m ²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m ² in optimal conditions and more than 2/m ² on a catchment basis
Extent and distribution of spawning habitat	m ² 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/m ²	Mean catchment juvenile density of brook/river lamprey at least 2/m ²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m ² in optimal conditions and more than 2/m ² on a catchment basis
Extent and distribution of spawning habitat	m ² 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

Conservation objectives for: River Barrow and River Nore SAC [002162]

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 salmon's 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 (<i>Lepeophtheirus salmonis</i>)
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 <i>Fabulina fabula</i> 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 <i>Sabellaria alveolata</i> 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 <i>Salicornia</i> mudflat were identified from an examination of aerial photographs, giving a total estimated area of 0.03ha. 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: <i>Spartina anglica</i>	Hectares	No significant expansion of <i>Spartina</i> . 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 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/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: <i>Spartina anglica</i>	Hectares	No significant expansion of <i>Spartina</i> . 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 photographs, 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: <i>Spartina anglica</i>	Hectares	No significant expansion of <i>Spartina</i> . 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 (NO ₃ ⁻) 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 regulate fine 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 (<i>Ulex europaeus</i>) and where rocky outcrops occur bilberry (<i>Vaccinium myrtillus</i>) and woodrush (<i>Luzula sylvatica</i>). Some rock outcrops support English stonecrop (<i>Sedum anglicum</i>), sheep's bit (<i>Jasione montana</i>) and wild madder (<i>Rubia peregrina</i>) 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 (<i>Ulex</i>) 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 characteristic 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 (<i>Pteridium aquilinum</i>)	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 (<i>Orobanche rapum-genistae</i>) and the legally protected clustered clover (<i>Trifolium glomeratum</i>)	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 (<i>Trifolium</i>) species including the legally protected clustered clover, a species known only from one other site in Ireland. Also <i>T. ornithopodioides</i> , <i>T. striatum</i> and <i>Torilus nodosa</i> . 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 version 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 inundation 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 (<i>Impatiens glandulifera</i>), monkeyflower (<i>Mimulus guttatus</i>), Japanese knotweed (<i>Fallopia japonica</i>) and giant hogweed (<i>Heracleum mantegazzianum</i>)	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 further 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 <i>Cratoneurion commutatum</i> and <i>Eucladium verticillatum</i> 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 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) 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 (<i>Quercus petraea</i>) and birch (<i>Betula pubescens</i>)	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 (<i>Fagus sylvatica</i>), rhododendron (<i>Rhododendron ponticum</i>), cherry laurel (<i>Prunus laurocerasus</i>)

Conservation objectives for: River Barrow and River Nore SAC [002162]

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:

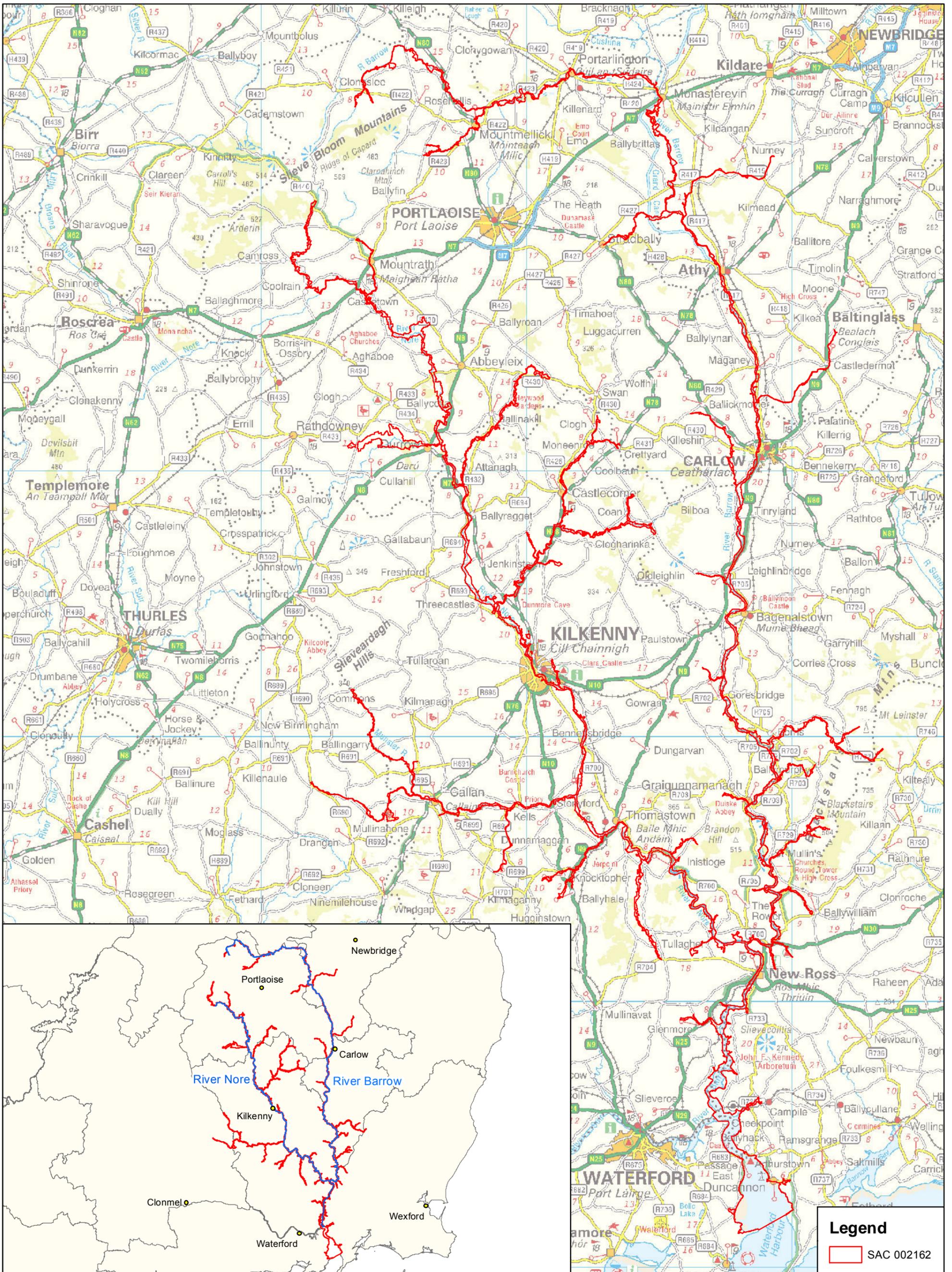
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least 181.54ha for sites surveyed: see map 6	Minimum area, based on 16 sites surveyed by Perrin et al. (2008) - site codes 10, 15, 17, 126, 127, 262, 282, 287, 511, 516, 517, 518, 520, 608, 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

Conservation objectives for: River Barrow and River Nore SAC [002162]

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 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) 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 (<i>Fraxinus excelsior</i>) alder (<i>Alnus glutinosa</i>), willows (<i>Salix</i> spp) and locally, oak (<i>Quercus robur</i>)	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 (<i>Acer pseudoplatanus</i>), beech (<i>Fagus sylvatica</i>), rhododendron (<i>Rhododendron ponticum</i>), cherry laurel (<i>Prunus laurocerasus</i>), dogwood (<i>Cornus sericea</i>), Himalayan honeysuckle (<i>Leycesteria formosa</i>) and Himalayan balsam (<i>Impatiens grandiflora</i>)



Legend

SAC 002162

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

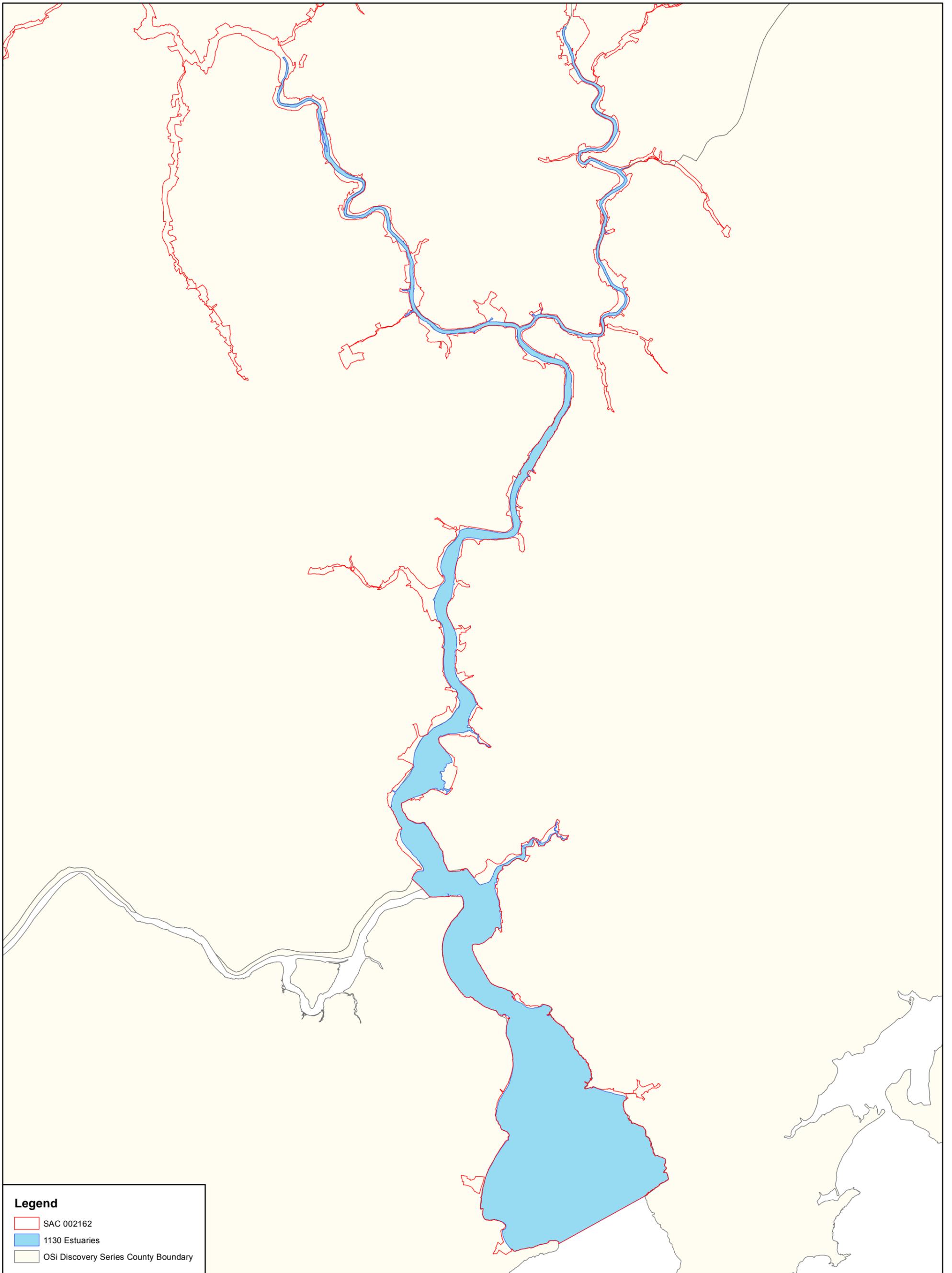
Map to be read in conjunction with the NPWS Conservation Objectives Document.

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

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Map Version 1
Date: April 2011



Legend

- SAC 002162
- 1130 Estuaries
- OSi Discovery Series County Boundary



**MAP 2:
RIVER BARROW AND RIVER NORE
CONSERVATION OBJECTIVES
ESTUARIES**

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

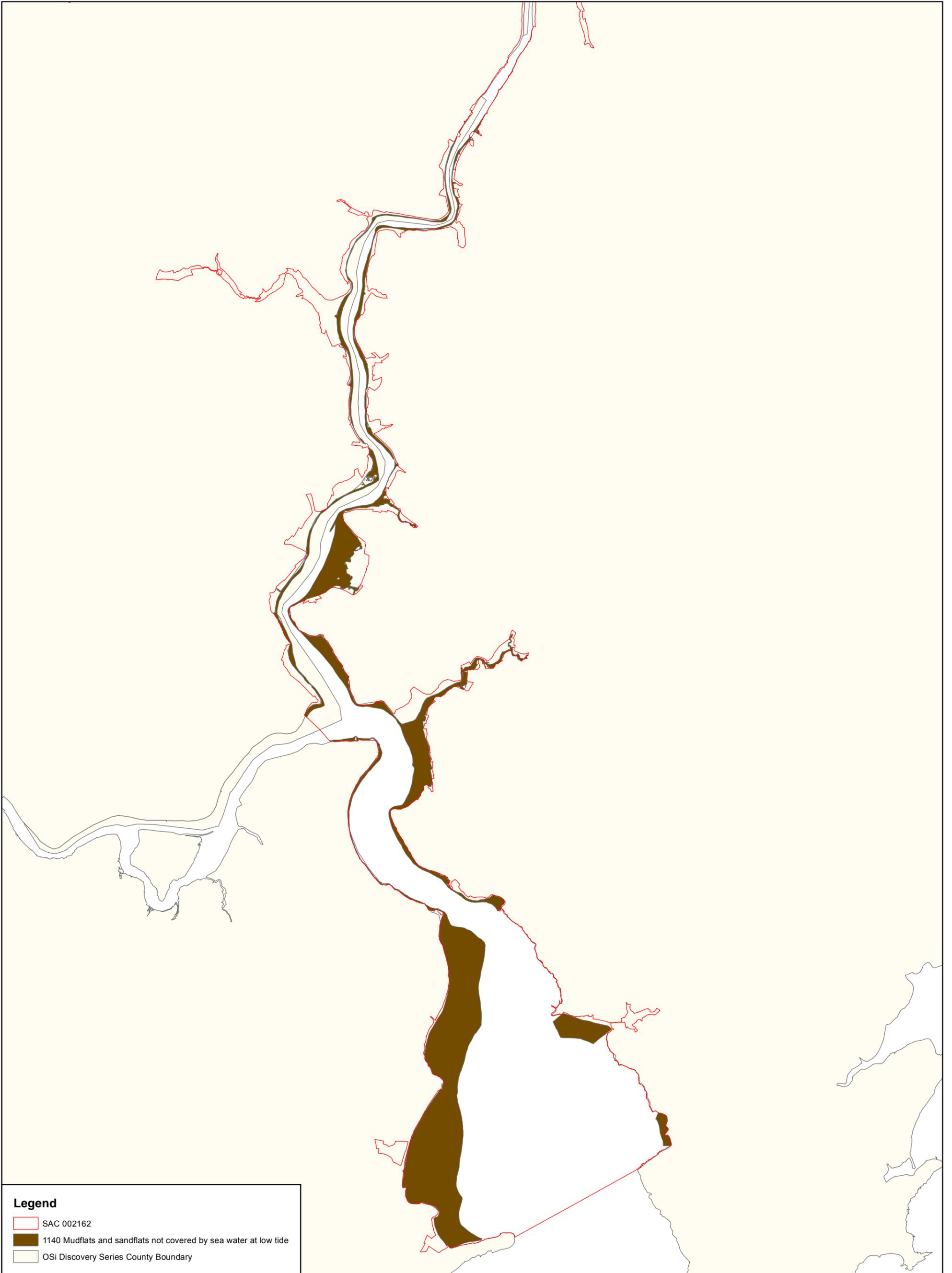
SITE CODE: SAC 002162
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CO. KILKENNY; version 1.1, CO. LAOIS; version 1.07,
CO. OFFALY; version 1.01, CO. TIPPERARY; version 1.01,
CO. WATERFORD; version 1.01, CO. WEXFORD; version 1.01



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Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithithe a déanamh ar theorainneacha na gceantar conharthaithe. Macsamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadúnas Uimh. EN 0059208)

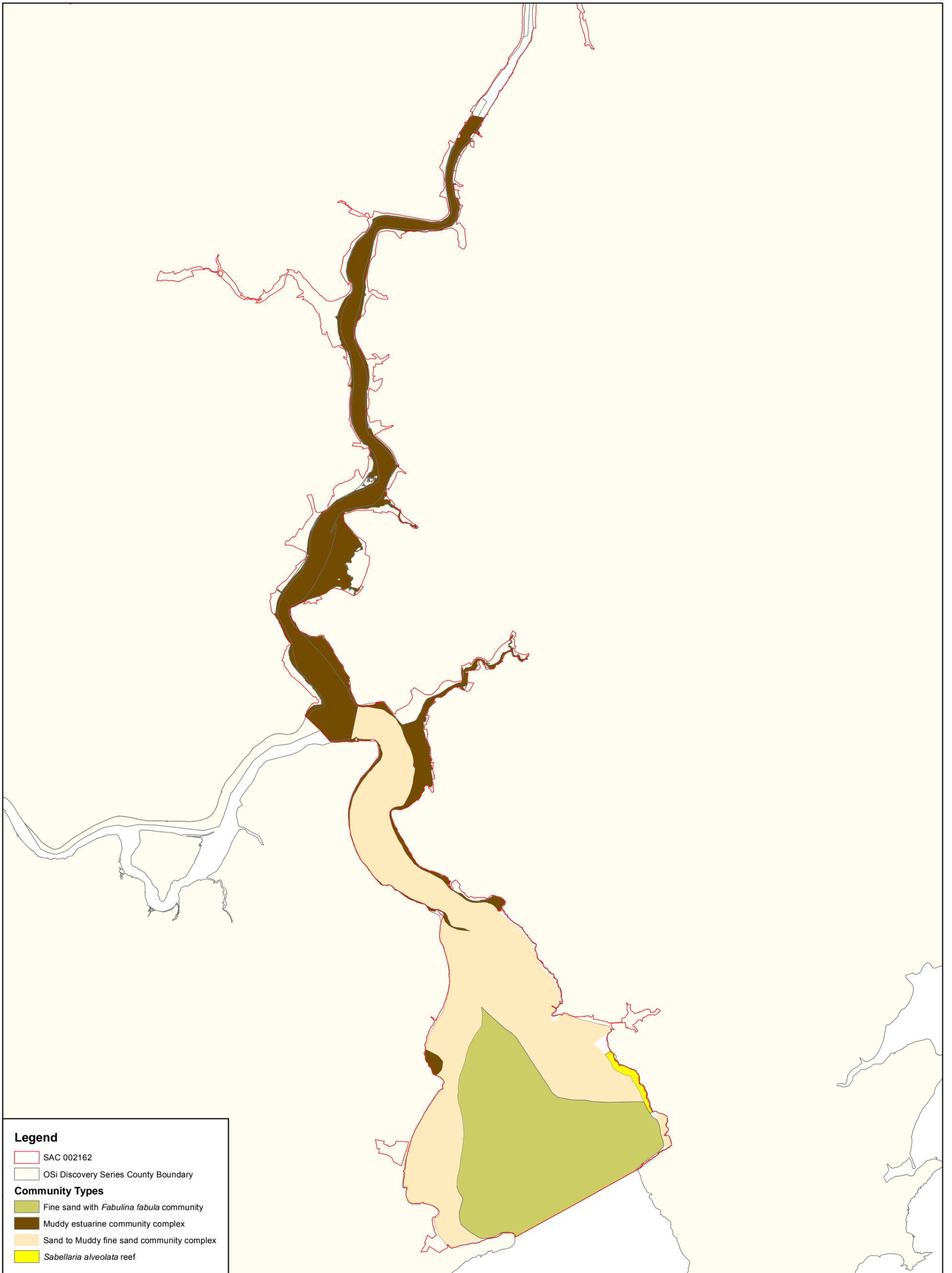


**Map Version 1
Date: April 2011**



Legend

- SAC 002162
- 1140 Mudflats and sandflats not covered by sea water at low tide
- OSi Discovery Series County Boundary



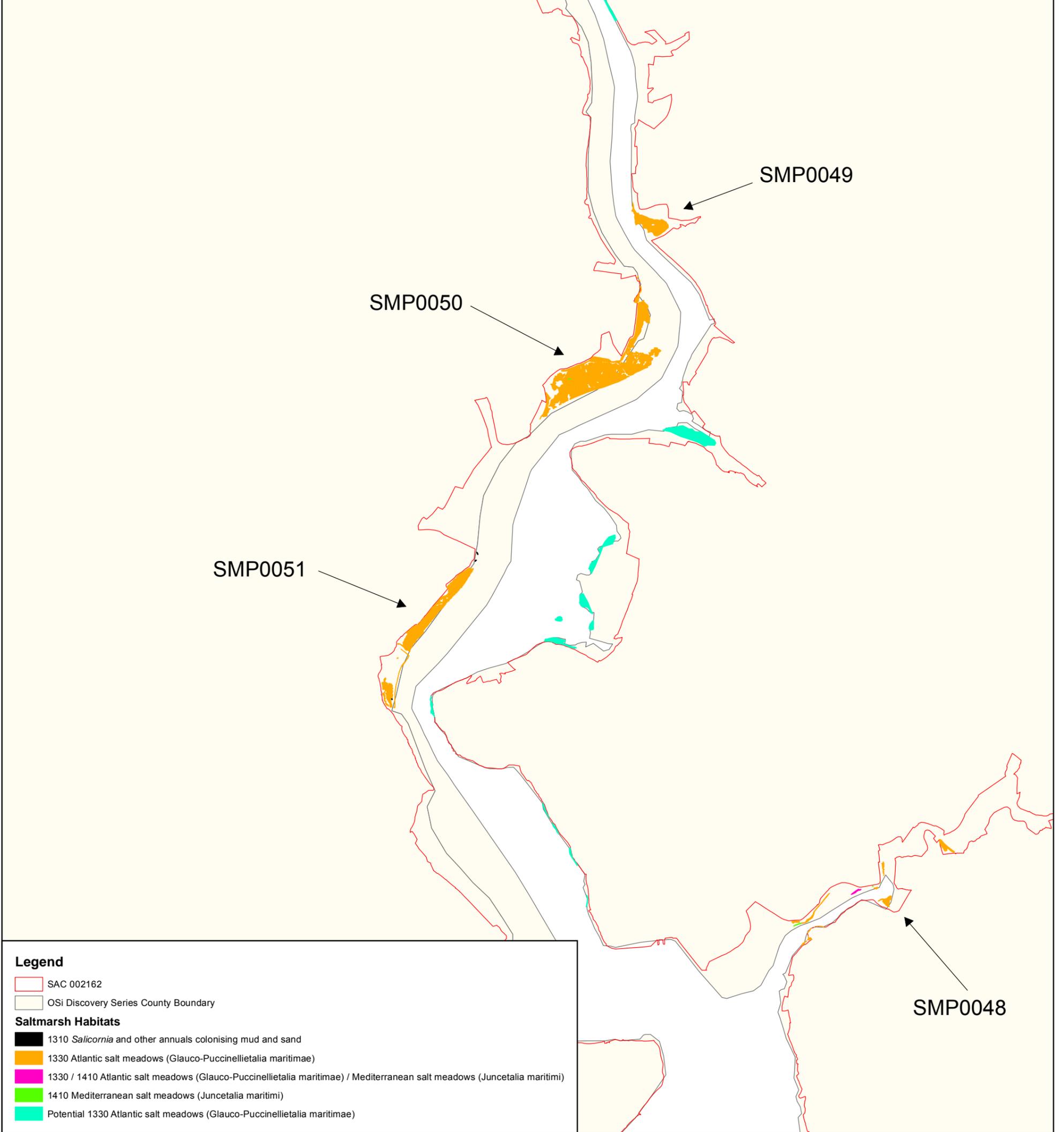
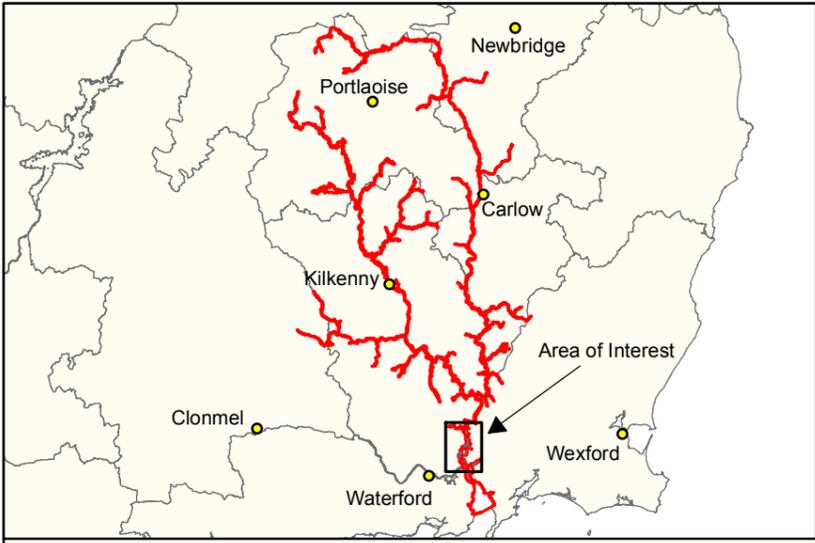
Legend

- 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



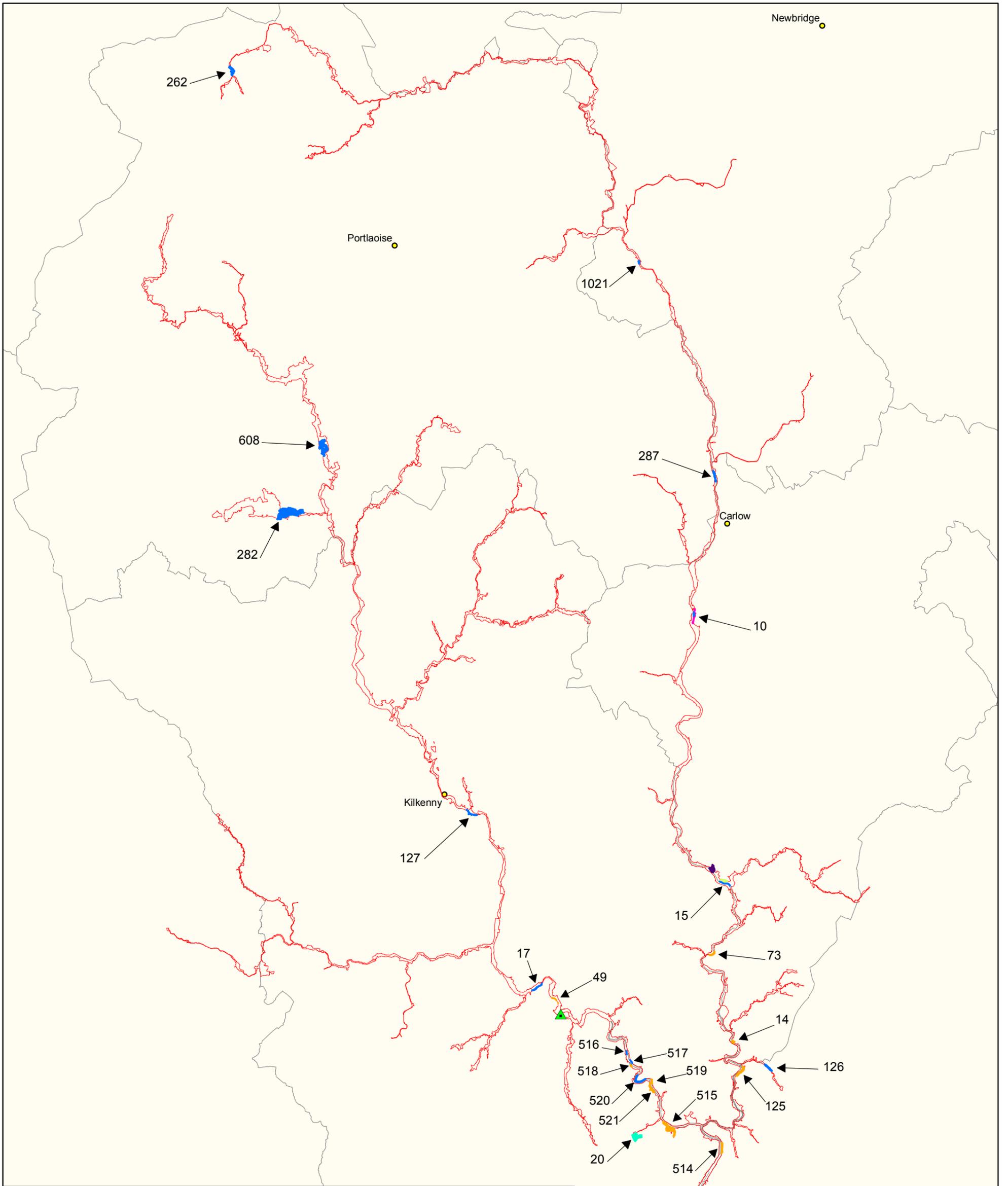


Legend

- 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*)

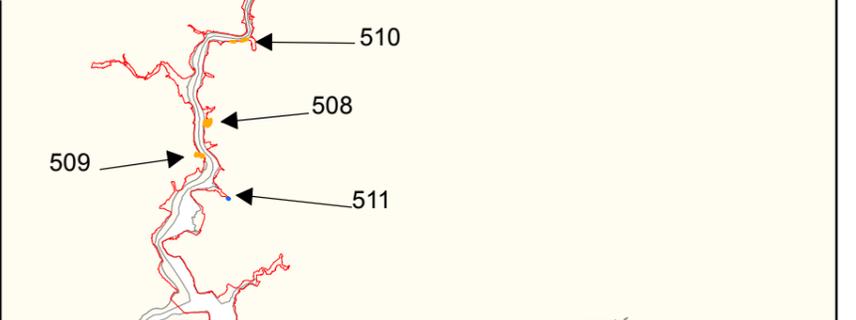


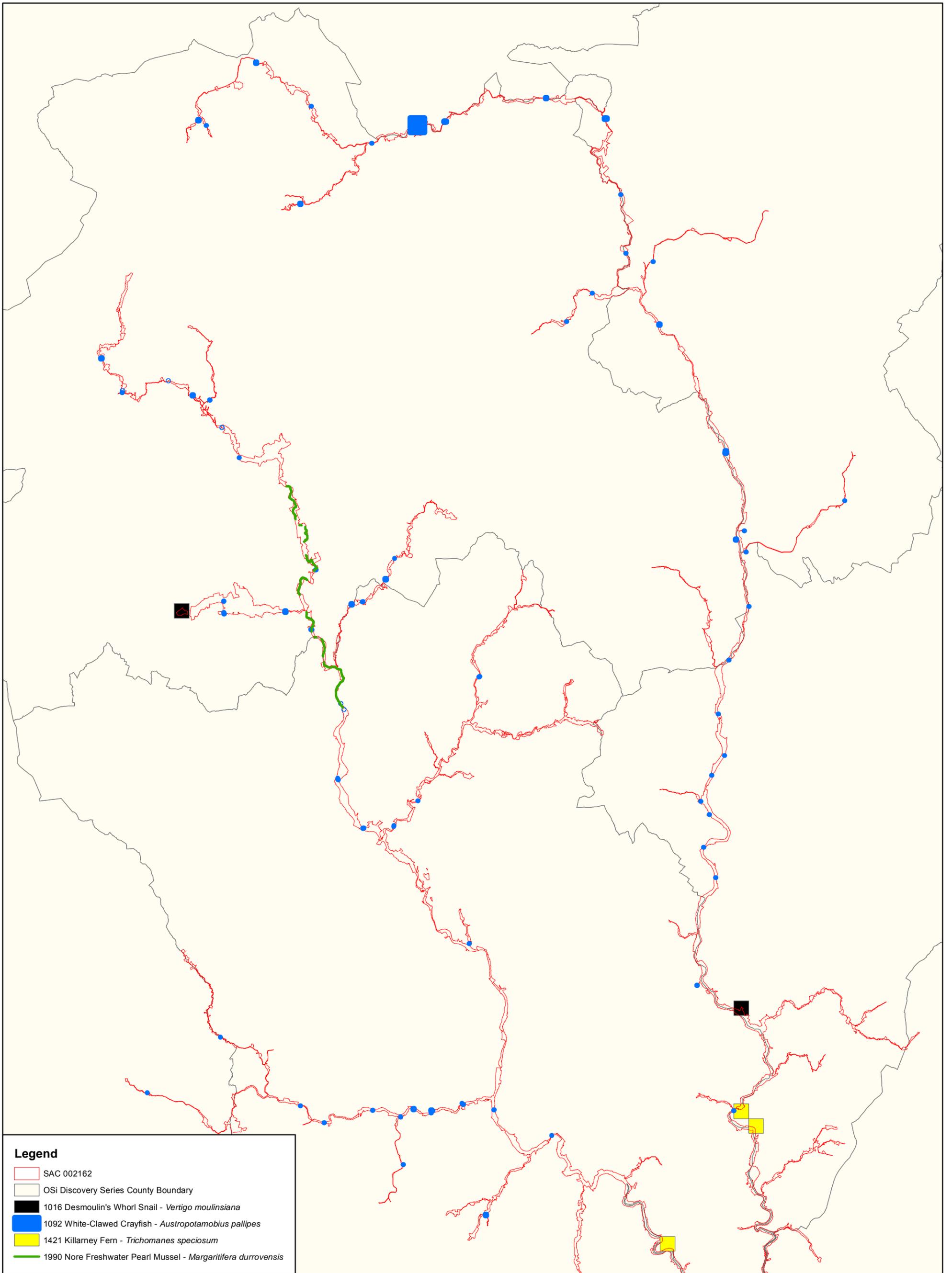
Legend

- 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





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*



**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



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**Map Version 1
Date: April 2011**



An Roinn
Ealaíon, Oidhreacht agus Gaeltachta

Department of
Arts, Heritage and the Gaeltacht

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APPENDIX B

SCREENING MATRIX

SCREENING APPRAISAL

The features of interest and Conservation Objectives of the River Barrow and River Nore Natura 2000 site, along with an analysis of the potential effects the proposed development related to the Strategies and Policies outlined in the Town Plan and LAPs, may have on these sites, are described in this Screening Matrix. The information requirements and assessment criteria of screening specified in the European guidance on Appropriate Assessment (European Commission Environment Division's *Assessment of plans and projects significantly affecting Natura 2000 sites*, 2001) have served as the basis for the following screening appraisal. Measures which will be implemented to reduce or mitigate impacts of the proposed development on the Natura 2000 sites are provided where applicable in the Matrix below.

The draft town plan and LAPs are not directly connected with, or necessary to, the conservation management of the River Barrow and River Nore SAC.

Table 3.2 SCREENING MATRIX – River Barrow And River Nore (SAC) Site Code 002162

<p>Brief description of the project or plan</p>	<p>The Joint Spatial Plan is a wide-ranging policy statement dealing with issues such as population and settlement patterns, economic and employment trends, retail, commercial and industrial development; education, healthcare and community facilities; environmental management and heritage protection, infrastructure including transportation, energy and communications; waste water treatment and water supply.</p> <p>The Core Strategy of the Draft Joint Spatial Plan sets out the Councils' vision and strategy for the proper planning and sustainable development of the Greater Carlow Graiguecullen Urban Area. It contains the cross-cutting core objectives that underpin the Joint Spatial Plan, as well as core aims which headline each thematic chapter.</p>
<p>Brief description of the <i>Natura 2000</i> Site</p>	<p>This site consists of the freshwater stretches of the Barrow and Nore River catchments as far upstream as the Slieve Bloom Mountains and it also includes the tidal elements and estuary as far downstream as Creadun Head in Waterford. The site is a candidate SAC selected for alluvial wet woodlands and petrifying springs, priority habitats on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for old oak woodlands, floating river vegetation, estuary, tidal mudflats, <i>Salicornia</i> mudflats, Atlantic salt meadows, Mediterranean salt meadows, dry heath and eutrophic tall herbs, all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Nore Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon, Otter, <i>Vertigo moulinsiana</i> and the plant Killarney Fern. The estuary and the other Habitats Directive Annex I habitats within it form a large component of the site. The site is very important for the presence of a number of EU Habitats Directive Annex II animal species including Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i> and <i>M. m. durrovensis</i>), Freshwater Crayfish (<i>Austroptamobius pallipes</i>), Salmon (<i>Salmo salar</i>), Twaite Shad (<i>Alosa fallax fallax</i>), three Lamprey species - Sea (<i>Petromyzon marinus</i>), Brook (<i>Lampetra planeri</i>) and River (<i>Lampetra fluviatilis</i>), the marsh snail <i>Vertigo moulinsiana</i> and Otter (<i>Lutra lutra</i>).</p>
<p>Describe the individual elements of the project likely to give rise to impacts on the <i>Natura 2000</i> Site</p>	<p>Good quality water is necessary to maintain the populations of the Annex II animal species listed above. Apart from impacts on water quality, the result of human activity such as land development is an extremely fragmented landscape in terms of the habitats present. The impact of this disturbance and fragmentation is not clear. While disturbance is always a bad thing for biodiversity, in wetland systems the key is hydrology, and infilling and paved surfaces will alter and inhibit flows of water in unpredictable ways that can lead to flooding and pollution</p> <p>Built land: This habitat type consists of man-made or artificial surfaces such as roads, railways and existing buildings and is generally not associated with biodiversity. Floral species are generally absent with the exception of occasional ruderals. Disturbed ground: Human disturbance of habitats can occur through movement of soil and the removal of vegetation. While never preferable to original semi-natural habitat, disturbed ground has the potential to be rich in biodiversity. 'Do-nothing' scenario: In the absence of the town plan and LAPs much fragmentation of habitats will occur since urban development and road projects are already underway.</p> <p>The project comprises the following relevant policies and strategies that may give rise to impacts on water quality or disturbance of habitat: CO3; CO10; ECN P13; Trans P03; Trans P06; Trans P07; Trans P23; Trans P28; Trans P40; PL P01; PL P08; PL P13; PL P15; PL P18; ENV P17; E&S P01; REC P20; SOC P33; HOUS P01; HOUS P02;</p>

Table 3.2 SCREENING MATRIX – River Barrow And River Nore (SAC) Site Code 002162

	DBF/P02; CTP1, CT25, GL 03, GL P9, GL P10, and CTE P2.
<p>Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or project) on the Natura 2000 Site by virtue of:</p> <ul style="list-style-type: none"> - Size and scale - Land-take - Distance from the Natura 2000 Site or key features of the Site - Resource requirements (water abstraction etc.) - Emissions (disposal to land, water or air) - Excavation requirements - Transportation requirements - Duration of construction, operation, etc. 	<p>The management of the SAC is under the remit of NPWS. Nevertheless, non-designated areas can also impact on these sites, particularly the riparian margins of tributaries of the River Barrow. Potential direct impacts include direct encroachment of development along the river bank. Potential indirect impacts may occur through the loss of adjacent habitats, disruption of hydrological flow, decrease in population of key species (otter, crayfish, lamprey, freshwater pearl mussel etc.). Specifically, there are five potential impacts from the Strategies and Policies in the Town Plan and both LAPs.</p> <ol style="list-style-type: none"> 1 Loss of recolonising bare ground and scrub leading to potential further loss of connectivity between semi-natural habitats and permanent disruption of hydrological flow within the natural flood plain of the River. 2 Loss of habitats, including scrub, grassland, recolonising bare ground, oak woodland, riparian vegetation. 4 Loss of biodiversity and pollution of water courses through the construction of buildings. 5 Threat from development pressure within the River Barrow flood plain. <p>Land take is limited and in general new developments proposed are away from the river, in particular in the LAPs. There is no surface water abstraction proposed. The potential for population increase will result in a higher population equivalent loading of wastewater with the plan areas, however, a proposed increase in wastewater treatment capacity of the wastewater treatment facility will negate this pressure and result in a higher quality or improved discharge of wastewater into the River Barrow.</p> <p>The requirement for excavation is associated with the proposed improvement of the N80, completion of the Northern Relief Road including the provision of a new vehicular bridge over the River Barrow. In addition, completion of the Inner Relief Road to the south of the River Burrin and the linking of the Inner Relief Road with the N80 to the east and the Southern Relief Road to the west will result in excavation requirements. The duration of these works will be medium-term (up to one year) but with excavation activities being short-term (weeks).</p> <p>It is proposed that the policies and strategies associated with these proposals are dependent upon clear demonstration that there will be no impact on the integrity of the Natura 2000 site in accordance with Article 6 of the Habitats Directive or significant adverse effects on other environmental receptors.</p>

Table 3.2 SCREENING MATRIX – River Barrow And River Nore (SAC) Site Code 002162

<p>Describe any likely changes to the Site arising as a result of:</p> <ul style="list-style-type: none"> - Reduction of habitat area - Disturbance to key species - Habitat or species fragmentation - Reduction in species density - Changes in key indicators of conservation value (water quality etc) - Climate change 	<p>The Strategies and Policies outlined will not lead to a reduction in key habitat areas, disturbance to key species, habitat or species fragmentation, reduction in species density or changes to key indicators of conservation value if mitigation measures are observed.</p> <p>It is proposed that the policies and strategies associated with these proposals are dependent upon clear demonstration that there will be no impact on the integrity of the Natura 2000 site in accordance with Article 6 of the Habitats Directive or significant adverse effects on other environmental receptors.</p> <p>No new alterations or outfalls to the River Barrow are planned.</p>
<p>Describe any likely impacts on the Natura 2000 Site as a whole in terms of:</p> <ul style="list-style-type: none"> - Interference with the key relationships that define the structure of the Site - Interference with the key relationships that define the function of the Site 	<ol style="list-style-type: none"> 1. The structure and function of the river habitat and flood plains associated with the SAC will not be affected by installation of the radar mast. 2. Disturbance could theoretically occur as a result of run-off from sites during construction works. However, any such negative impacts should be mitigated for at the on-set of the works. <p>It is proposed that the policies and strategies associated with these proposals are dependent upon clear demonstration that there will be no impact on the integrity of the Natura 2000 site in accordance with Article 6 of the Habitats Directive or significant adverse effects on other environmental receptors.</p>
<p>Provide indicators of significance as a result of the identification of effects set out above in terms of:</p> <ul style="list-style-type: none"> - Loss - Fragmentation - Disruption - Disturbance - Change to key elements of the Site (e.g. water quality etc.) 	<p>Possible changes to water quality in the absence of mitigation measures.</p> <p>It is proposed that the policies and strategies associated with these proposals are dependent upon clear demonstration that there will be no impact on the integrity of the Natura 2000 site in accordance with Article 6 of the Habitats Directive or significant adverse effects on other environmental receptors.</p>
<p>Describe from the above those elements of the project or plan, or combination of elements, where the impacts are likely to be significant or where the scale or magnitude of impacts is not known</p>	<p>The assessment indicates that <i>very little potential exists</i> for an impact on the integrity of the site to arise as a result of most of the Strategies and Policies of the Joint Spatial Plan if they are implemented. However, the following Strategies and Policies have been identified as having potential to impacts on the Integrity of the River Barrow and River Nore SAC, in the absence of mitigation being implemented: CO3; CO10; ECN P13; Trans P03; Trans P06; Trans P07; Trans P23; Trans P28; Trans P40; PL P01; PL P08; PL P13; PL P15; PL P18; ENV P17; E&S P01; REC P20; SOC P33; HOUS P01; HOUS P02; DBF/P02; CTP1, CT25, GL 03, GL P9, GL P10, and CTE P2.</p> <p>Impact prediction: There will be no direct loss of habitat within the SAC or impacts to qualifying features as a result of the town plan and LAPs, should mitigation measures be implemented.</p>

APPENDIX C

**APPROPRIATE ASSESSMENT SCREENING OF
DRAFT JOINT SPATIAL PLAN 'PROPOSED AMENDMENTS'**

AND

**MODIFICATIONS TO DRAFT JOINT SPATIAL PLAN
'PROPOSED AMENDMENTS'**

CONCLUSION OF APPROPRIATE ASSESSMENT SCREENING OF THE PROPOSED AMENDMENTS AND MODIFICATIONS OF PROPOSED AMENDMENTS

The likely impacts that will arise from the proposed amendments (such as amendments to objectives, policies, zoning, and maps) as well as the subsequent modifications to some of the amendments have all been examined in the context of a number of factors that could potentially affect the integrity of the Natura 2000 network. On the basis of the findings of this Screening for Appropriate Assessment, it is concluded that the proposed amendments:

- (i) are not directly connected with or necessary to the management of a Natura 2000 site and
- (ii) will not have significant effects on the qualifying species of the SAC when previously identified mitigation measures in the initial Natura Impact Statement are adhered to.

Following the implementation of mitigation described in the original Appropriate Assessment and the implementation of specific Objectives and Policies outlined in the Joint Spatial Plan for Greater Carlow Graiguecullen Urban Area, it is expected that the implementation of the Objectives and Policies of the Draft Joint Spatial Plan 2012-2018 along with the proposed amendments will avoid significant negative impacts to key sensitive receptors (e.g. otter, crayfish, salmon, freshwater pearl mussel and salmon) and other qualifying features of the Natura 2000 sites. There is therefore no requirement for Stage 3 (*Assessment of Alternative Solutions*) and 4 (*Assessment Where Adverse Impacts Remain*), of the appropriate assessment process, related to the proposed amendments.