

# ECOLOGICAL IMPACT ASSESSMENT OF A PROPOSED SUBSTATION AND GRID CONNECTION CO. KILKENNY

**Prepared for:**

HW Planning Ltd.



On behalf of Drumdowney Solar Farm Limited.

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PROPOSED SUBSTATION AND GRID CONNECTION  
CO. KILKENNY**

<b>Document Rev. No.</b>	<b>Details</b>	<b>Contributors</b>	<b>Date</b>
0	For issue	GF	15.12.2025

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## Executive Summary

Ecology Ireland Wildlife Consultants Ltd. were commissioned by HW Planning Ltd., on behalf of Drumdowney Solar Farm Ltd. to undertake an appraisal of the potential impacts of a proposed high voltage (HV) substation and loop-in grid connection to the national electricity transmission grid network.

The development of a HV substation and loop-in grid connection at this location was previously assessed as part of the ecological impact assessment and Natura Impact Statement that accompanied the planning application for the proposed Drumdowney Solar Farm. This application was submitted directly to Kilkenny County Council. The operational lifetime of the solar farm is assumed to be 40 years. However, following the decommissioning of the solar farm, it is envisaged that the substation (and grid connection) will remain in situ as a valuable functioning and operational part of the national electricity transmission grid network managed by the Transmission Systems Operator, EirGrid.

Early in the project development phase, it was identified that the proposed substation and grid connection may constitute 'strategic infrastructure development' having regard to the provisions of the Planning and Development (Strategic Infrastructure) Act 2006 and established case precedent on such matters. The Act provides that applications for permission/approval for specified private and public strategic infrastructure developments be made directly to An Coimisiún Pleanála. They confirmed that the proposed development meets the definition of 'strategic infrastructure development' as defined in the legislation by means of a formal notice dated 24<sup>th</sup> October 2025<sup>1</sup>. The subject application is made pursuant to this determination.

Notwithstanding the necessary dual consent process, a 'one project' approach has been taken in the preparation of the separate applications made to Kilkenny County Council and the subject application to An Coimisiún Pleanála. The various submitted reports considered the full combined development for the purpose of completing a robust assessment. In terms of definition, the use of the term 'proposed development' refers to the subject application before An Coimisiún Pleanála for the substation / grid connection. The use of the term 'solar farm projects' across this report means the project singular comprising the solar panels and support infrastructure, the substation and grid connection elements, and all associated enabling works.

The proposed substation site is located in improved agricultural grassland of relatively low ecological value. No significant effects on designated sites, habitats, flora or fauna have been identified as a result of the proposed development. Furthermore, the Natura Impact Statement (NIS) in support of the Appropriate Assessment process, which accompanies this EclA, objectively concludes that, with the implementation of mitigation measures, no significant effects arising from the wider proposed solar farm project will impact upon any Natura 2000 sites

# 1 Introduction

Ecology Ireland Wildlife Consultants Ltd. (Ecology Ireland) were commissioned by Drumdowney Solar Farm Ltd., to undertake an appraisal of the potential impacts of a proposed Strategic Infrastructure Development (SID) for a proposed high voltage (HV) substation and loop-in grid connection to the national electricity transmission grid network.

The purpose of the proposed development is to transport the electricity generated at the proposed Drumdowney Solar Farm to the national electricity grid via an existing 110kV overhead line which crosses the development site. An application for the Drumdowney Solar Farm was made to Kilkenny County Council on the 28<sup>th</sup> February 2024 (Council Reference: 25/60391). The proposed solar farm development will consist of ground mounted panels on frames, inverter/transformer stations and all ancillary development works including the 33kV UGC Interconnectors. At the time of this assessment, a decision on that planning application was still awaited.

The main objectives of this study were to:

- undertake a desktop review of available ecological data of the study area (*i.e.* substation site, grid connection), including a review of designated nature conservation sites within the wider hinterland of the development site and the completion of a Natura Impact Statement in support of the Appropriate Assessment (AA) process (attached at Appendix 1 of this report);
- complete a baseline ecological field assessment of the study area in order to describe existing flora and fauna;
- evaluate the ecological significance of the study area;
- assess potential impacts on existing ecology that could arise from the proposed development;
- consider mitigation measures to reduce potential negative effect(s) on the existing ecology arising from the proposed development where relevant.

Ecology Ireland also prepared the ecological impact assessment and NIS that accompanied the planning application for Drumdowney Solar Farm. Notwithstanding the necessary dual consent process, a 'one project' approach has been taken in the preparation of the separate applications made to Kilkenny County Council and the subject application to An Coimisiún Pleanála. The various submitted reports considered the full combined development for the purpose of completing a robust assessment. In terms of definition, the use of the term 'proposed development' refers to the subject application before An Coimisiún Pleanála for the substation / grid connection. The use of the term 'solar farm projects' across this report means the project singular comprising the solar panels and support infrastructure, the substation and grid connection elements, and all associated enabling works.

## 1.1 Brief Description of the Site & Project

### 1.1.1 Application Context

Early in the project development phase, it was identified that the proposed substation and grid connection may constitute 'strategic infrastructure development' having regard to the provisions of the Planning and Development (Strategic Infrastructure) Act 2006 and established case precedent on such matters. The Act provides that applications for permission/approval for specified private and public strategic infrastructure

developments be made directly to An Coimisiún Pleanála. They confirmed that the proposed development meets the definition of 'strategic infrastructure development' as defined in the legislation by means of a formal notice dated 24<sup>th</sup> October 2025<sup>1</sup>. The subject application is made pursuant to this determination.

The electricity produced from the Drumdowney Solar Farm will be transported into the proposed substation. The proposed substation will be Gas Insulated Switchgear (GIS) tail fed substation with the associated grid connection comprising loop in / loop out connection into the existing overhead transmission network.

The proposed development comprises of:

1. A 110kV GIS electricity substation with two-storey GIS substation building, single-storey Independent Power Producer (IPP) control room building, HV electrical equipment and associated infrastructure (to include transformer, lightning protection masts, back-up diesel generator, fire/blast wall, telecoms pole, perimeter security fencing, security lighting, water and drainage infrastructure, and temporary construction compound) to connect to and serve a solar farm;
2. Associated loop-in / loop out infrastructure to connect into an existing 110kV overhead transmission line (including underground 110kV cabling, 2 No. new interface towers and decommissioning of ca. 15m of existing 110kV overhead line);
3. Construction and operational access from the public road L34142;
4. All ancillary site development, landscaping and earthworks. The development subject to this application forms part of grid connection and access arrangements which will facilitate the connection of the proposed Drumdowney Solar Farm (Kilkenny County Council Reference 25/60391) to the national grid.

The location of the proposed development in the vicinity of the proposed Drumdowney Solar Farm is shown in Figure 1.1.

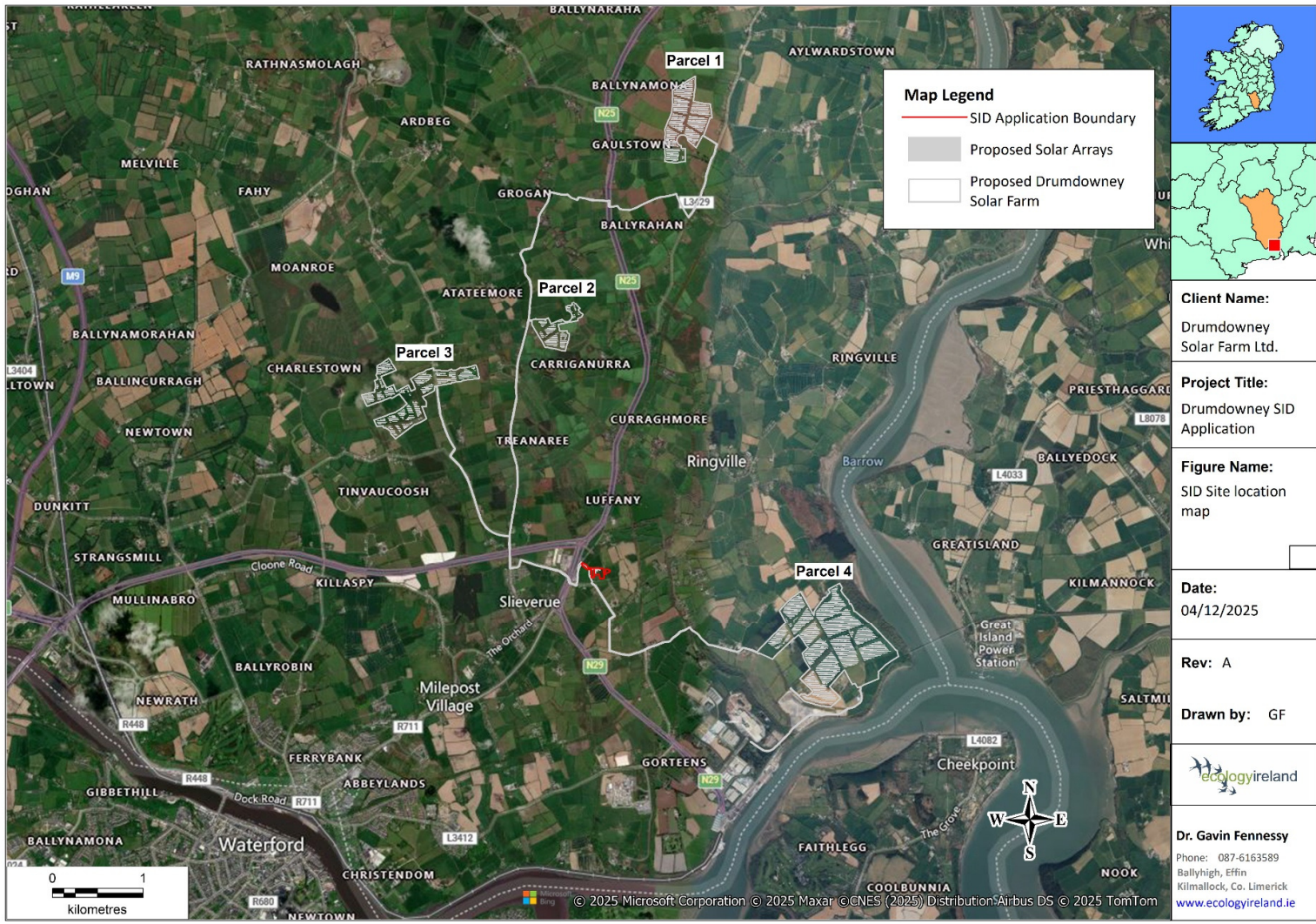


Figure 1-1 Proposed HV substation and grid connection (SID application) and the proposed Drumdowney Solar Farm site.

## 2 Proposed Development

### 2.1 General

The substation will be based on EirGrid design specifications. The substation compound will consist of a two-storey GIS substation building, single-storey IPP Control Room building, HV electrical equipment and associated infrastructure including palisade fences and concrete post and rail fences. The installation of HV electrical equipment will include a transformer with associated equipment along with:

- Lightning Masts (LM);
- Back-Up Diesel Generator;
- Harmonic filters if required by EirGrid;
- Capacitor Bank if required by EirGrid;
- Fire/Blast Wall;
- Telecoms Pole.

The substation compound has a total area of 5,335m<sup>2</sup>.

Earthworks will be undertaken so the compound is level, with a finish compound level of 91.65m.

### 2.2 Site Access

The site will be accessed for both the construction and operational phases by means of a single entrance from the L34142. This existing entrance will be subject to some upgrades, including removal of existing roadside sod and stone ditch to provide new gate as presented under Kilkenny County Council Reference 25/60391. The entrance will be suitably splayed and has been subject to sight line and autotrack analysis, with the latter including modelling of abnormal load delivery for the transformer. Operational sightlines will be maintained by trimming back hedgerows with all necessary land within ownership.

A 4.5 metre wide compacted access track will extend from the entrance to the substation compound. The design includes a temporary construction track to cater for deliveries, which will be decommissioned post the construction phase (and land reinstated), as well as an operational access track. The track will include a geotextile base and filter membrane and 200 mm of Clause 804 sub-base.

### 2.3 Connection to National Grid

In order to connect to the transmission network, it is proposed to connect the 110kV substation into the national grid via a 'loop-in / loop-out' underground 110kV cable grid connection which will connect into the existing 110kV Great Island to Waterford overhead line.

Two new steel lattice interface towers of approximately 16 m in height will form part of the existing overhead line and both towers will connect to the proposed 110kV substation via underground 110kV cables. The interface towers are approximately 15 metres apart, therefore the same length of the existing

110kV Whitegate – Cow’s Cross overhead line will need to be decommissioned. The underground cable is comprised of 3 no. power ducts, 2 no. telecom ducts and 1 no. earth continuity duct. The cables to each interface tower are 68 and 83 metres in length.

This connection method will constitute a new node of the transmission network, connecting the proposed substation and associated solar farm generation to the national electricity grid. The construction method for the interface towers and decommissioning of 110kV overhead lines is set out in the Drumdowney Substation & Grid Connection Construction Methodology prepared by Drumdowney Solar Farm Ltd. (2025).

All works will be carried out in accordance with international best practice and full compliance with health and safety requirements.

## 2.4 Temporary Construction Compound

As outlined in the submitted site layout plans, it is proposed to provide a temporary construction compound west of the proposed substation, accessed from the entrance from the L34142. The temporary compound will include the following facilities at a minimum:

- Adequate canteen space to allow for all workers during the peak period;
- Office space with lighting, heating and internet facilities;
- Toilets and adequate welfare facilities for construction staff in accordance with the relevant statutory Health & Welfare guidelines;
- Parking space for both light and heavy vehicles;

Designated skips and temporary storage areas.

## 2.5 Surface Water Drainage and Water Services

Surface water drainage proposals for the development have been developed to mimic the natural drainage patterns of the site and thereby be in accordance with the best management practices of Sustainable Drainage Systems (SuDS) including those set out in the SuDS Manual (C753) published by CIRIA in 2015. Specifically, this includes the following:

- The compound construction is formed with permeable stone thus mimicking a soakaway scenario. ESB compound stone is single sized for the first 150mm for safety purposes. It then changes to a graded 6F2 material.
- The main areas to be drained includes the roofs and the compound road. These equate to approximately 2359m<sup>2</sup>. The compound road will be drained via series of road gullies.
- Assuming even the most basic of infiltration rates down through the permeable compound stone, the existing greenfield situation is easily maintained.

The surface water generated in the hardstanding and bunded areas will discharge to the soakaway via a Class 1 Full Retention Oil Separator. The electrical transformer in the substation is oil filled equipment and,

as such, is protected with impermeable bunds. Surface water generated in this bund will be pumped out by an oil sensitive pump ensuring that only non-contaminated water enters the site drainage network.

In relation to wastewater, a 5m<sup>3</sup> foul holding tank is proposed as part of the operational development. These tanks are normally used in ESB substations. It will be emptied periodically, with the capacity in excess of modelled holding requirements.

It is proposed to provide the required potable water demand of the station with a bored well on site. The potable water demand within the site will be low as the proposed station is to be unmanned. To avoid issues like stagnation in the water supply line and problems resulting from this, there will be a continual water demand of 24 litres per week from automatically flushing WCs within the station.

## **2.6 Site Restoration and Landscaping**

This will involve the reinstatement of all other excavated materials and associated landscaping works. It will include the replacement of topsoil in disturbed ground areas such as access tracks and the removal of the construction compound and other temporary work areas.

The proposed landscaping provides for the removal of c.87 metres of hedgerow to facilitate the proposed development. Approximately 531 metres of existing hedgerow will be bolstered (Type 1) as part of the development, with an additional 287 linear metres of new hedgerow planting (Type 2) as per the submitted Landscape Mitigation Plan.

## **2.7 Other Planned Works**

It is intended that the proposed 110kV substation and grid connection will service the Drumdowney Solar Farm, which is currently the subject of a planning application to Kilkenny County Council. At the time of writing, the solar farm application is undetermined.

The proposed solar farm will consist of solar panels on ground mounted frames, 27 no. single storey electrical inverter/transformer stations, 5 no. single storey spare parts containers, 3 no. Ring Main Units, 5 no. weather stations, underground electrical ducting and cabling within the development site, private lands and within the L3429, L7523, L7563, L7469, L3407, L3414, L34144, L7466, L3406, L7483, L3415, N25 and N29 public roads to connect solar farm field parcels, security fencing, CCTV, access tracks, 7 no. watercourse/drain deck crossings and 4 no. horizontal directional drill crossings (under the N25 and N29 public roads and the Luffany River), temporary construction compounds, landscaping and all associated ancillary development and drainage works. Construction and operational access will be via 7 no. existing entrances from the L3429, L7469, L7466, L4783 and L34142 which will be subject to entrance upgrade works. Separate construction phase access options are proposed for Parcel 4 via Port of Waterford and the L4783. The operational lifespan of the solar farm will be 40 years.

The solar farm will contribute directly to a carbon dioxide emission reduction of 41,647tonnes per annum or the equivalent of approximately 1,665,917 tonnes of CO<sub>2</sub> over the 40 year lifetime of the project.

### 3 Methods

This section describes the survey methodology employed across the substation and wider proposed solar farm development site. This study involved undertaking a desktop review and a baseline field assessment, which are described in the relevant sections below. The field assessments (including deployment and collection of bat detectors and remote cameras, dedicated bird transects, and habitat and botanical surveys) were undertaken between December 2024 and May 2025. All land parcels including 'Parcel 5' where the substation will be located were included in the field walkovers. The field surveys included additional winter bird surveys in October and November 2025 to supplement the surveys carried out at the site the previous winter.

**Table 3-1 Baseline field assessment details.**

Date	Time	Weather	Ecologist	Task
19/12/2024	09:45 – 14:00	Sunny and clear, Wind F1, Cloud 3/8, Good visibility	Gavin Fennessy	Bird Transect Survey and Non-volant mammal observations
24/02/2025	09:05 - 15:50	Dry, mostly clouded over all day with very brief patches of sun. Wind F2, Cloud 7-8/8, Good visibility	Fiona May Aylward	Bird Transect Survey, Deployment of cameras and bat detectors, casual recording of other ecological constraints
11/03/2025	10:00 – 14:45	Patches of rain and sun, clouded over for most of the day, some breaks in the later afternoon. Wind F3, Cloud 7/ 8, Visibility good	Fiona May Aylward	Botanical survey & habitat mapping, Grid interconnector survey, Deployment of Bat detectors
17/03/2025	09:10 – 16:00	Rain to start the day clearing in the afternoon. Winds picked up in the afternoon. Wind F3, Cloud 5/ 8, Good visibility	Fiona May Aylward	Breeding bird Survey, Habitat surveys
22/04/2025	11:00 – 14:45	Rainy, Cloud 8/8, Wind F2, Moderate visibility	Fiona May Aylward	Collection of cameras and bat detectors, Casual observations
17/05/2025	09:00 – 15:05	Dry and sunny, Wind F1-3, Cloud 2/8, Good visibility	Gavin Fennessy	Breeding bird survey, casual observations of other ecological constraints
22/05/2025	09:10 – 14:30	Dry, Wind F2-3, Cloud 6-7/8, Good visibility	Fiona May Aylward	Habitat mapping and botanical survey and grid interconnector survey
29/10/2025	9:50 - 14:15	Dry, Wind F1-4, Cloud 1/8, Good visibility	Shane Somers	Bird Transect Survey and Point Count
19/11/2025	12:55 - 16:29	Dry, Wind F1-4, Cloud 0-3/8, Good visibility	Shane Somers	Bird Transect Survey and Point Count

Date	Time	Weather	Ecologist	Task
26/11/2025	9:45 - 13:45	Some light rain, Wind F1-3, Poor visibility during early transects improved later on	Shane Somers	Bird Transect Survey and Point Count

### 3.1 Designated Nature Conservation Sites Assessment

Designated nature conservation sites within 15km of the development site were identified through a desktop review. These conservation sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Nature Reserves and other Refuges for Fauna. NHAs are legally protected by the Irish Wildlife Acts (1976 - 2012), but pNHAs are not and only have limited protection through recognition by planning/licensing/forestry authorities and agri-environmental schemes. SACs and SPAs are European designated nature conservation sites that have been designated under the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (2009/147/EC) respectively. SACs and SPAs are collectively known as Natura 2000 sites and are legally protected by Irish law. Nature Reserves and Refuges for Fauna are protected under the Irish Wildlife Acts (1976 - 2012). Many designated sites overlap, *e.g.*, a site can be designated as both a NHA and SAC.

In the subsequent analysis of designated sites, particular attention was made on sites where a potential receptor zone of influence exists with the proposed development site. In other words, designated sites that may have a link to the proposed development site (*e.g.*, through hydrological link, overlapping, proximity) were focused on in this assessment.

A Screening Assessment and subsequent Natura Impact Statement (NIS) was also prepared to consider the potential impacts arising from the development on the relevant Natura 2000 sites; the NIS is available in Appendix A.

### 3.2 Habitat & Flora Assessment

Prior to field surveys, a desktop review of botanical data available for the study area was undertaken. The National Biodiversity Data Centre<sup>1</sup> (NBDC) and Botanical Society of Britain and Ireland<sup>2</sup> (BSBI) online databases were consulted to identify any rare or protected botanical species located within the relevant national 10km (S61) and 2km grid squares (*i.e.*, S61M) encompassing the proposed SID application site.

The habitat and flora assessment were carried out with cognisance of best practice guidance (Smith *et al.* 2011). The survey involved a walkover of the proposed development site where the habitats present were classified to level three using the classification scheme presented in *A Guide to Habitats of Ireland* (Fossitt, 2000). The extent of habitats was recorded on a field map along with notes of species present and their relative abundance described using the DAFOR scale. In addition, any other observations of interest, such as the location of invasive plant species, were recorded using a Garmin eTrex10 GPS handheld unit. Evaluation of the habitats present in terms of their ecological value was assessed using the Biodiversity Evaluation Scheme presented in Appendix B (amended National Roads Authority 2009 scheme to include

<sup>1</sup> <https://maps.biodiversityireland.ie/Map> (accessed 03/02/2022)

<sup>2</sup> <https://bsbi.org/maps> (accessed 03/02/2022)

watercourse/aquatic evaluation elements from Nairn and Fossitt, 2004). The description of impacts and their significance follows the EPA Guidance (EPA 2022, Appendix C).

The conservation status of habitats and botanical species was also considered. The conservation status of habitats and botanical species within Ireland and Europe is indicated by inclusion in one or more of the following: Irish Red Data Book for Vascular Plants (Wyse Jackson *et al.* 2016); Flora (Protection) Order 2022 and the EU Habitats Directive (92/43/EEC).

### 3.3 Fauna Assessment

Prior to field surveys, the NBDC<sup>1</sup> and NPWS<sup>3</sup> online databases were consulted to identify any rare or protected faunal species historically recorded within the relevant national 10km (*i.e.*, S61), and 2km grid squares (*i.e.*, S61M) encompassing the proposed substation development site. In addition to records of rare/protected fauna, the NBDC website hosts the Model of Bat Landscapes for Ireland, which has assessed the relative importance of landscape and habitat associations for bat species across Ireland (see Lundy *et al.* 2011). The landscape resource value for bats in the relevant national 10km square surrounding the development site was therefore assessed.

The field aspect of the fauna assessment involved a series of site walkovers of the study area where direct and/or indirect observations were noted (*e.g.*, nests, breeding sites, droppings, prints) in accordance with standard guidelines (*e.g.*, Hundt 2012, Bang & Dahlstrom 2004, JNCC 2004, Sutherland 1996). Across the wider development area four mammal trail cameras (Browning Dark Ops 940 HD) and passive bat detectors (Wildlife Acoustics SM4BAT, SMMini) were installed during the field surveys in order to collect further information on the mammal species present. Trail cameras were deployed in February/March 2025 (Table 2.1; Figure 2-1) and in parallel passive bat detectors were deployed across the wider solar farm project site (Figure 2-1).

Detailed winter and breeding season bird surveys were conducted at the site to record the usage of the site. A series dedicated bird surveys (see Bibby *et al.* 2000) were completed between December 2024 and November 2025 (See Table 2.1 above for the survey effort detail). The bird surveys across the solar farm project site were carried out using a series of transects and point counts.

These are standardised sampling methodologies capable of providing repeatable counts of numbers of each species observed using a site. Each transect was 1km in length. The route of these transect walks is shown in Figure 2-2. These transects were again used for a breeding bird survey carried out from mid-March to May 2025. On each transect survey the number of each species seen/heard during the transect surveys were recorded in three defined distance bands from the observer (*i.e.* 0m-25m, 25m-100m, >100m). An additional Point Count location was used to record birds specifically at the proposed substation location. All birds seen or heard were recorded over a ten-minute period (<50m, >50m). Care was taken to minimise double-counting individuals in general, with counts focused on adult birds only where possible in line with standard transect survey practices (*e.g.* Countryside Bird Survey). During all transect surveys, notes were taken of any observations of particular interest, *e.g.* raptor foraging, particular species flying over *etc.* Transect locations are shown in Figure 2-2 below. Additional winter season transect surveys and

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<sup>3</sup> <https://www.npws.ie/maps-and-data/habitat-and-species-data> (accessed 03/02/2022)

point counts were undertaken between October and November (inclusive) 2025, in response to the RFI from the Planning Authority. These surveys prioritised observations at Parcel 4 during the high water period in order to maximise the opportunities for observing waterbirds on the site as many waterbirds move to terrestrial grounds for foraging when coastal and estuarine grounds are covered by water at high tide.

The conservation status of faunal species was also considered in respect of the following: Irish Wildlife Acts (1976 - 2012); EU Birds Directive (2009/147/EC) Annex I list<sup>4</sup>; EU Habitats Directive (92/43/EEC); Birds of Conservation Concern in Ireland (BoCCI) Red, Amber and Green lists<sup>5</sup> (see Gilbert *et al.* 2021)); Red List of Terrestrial Mammals (Marnell *et al.*, 2019); Irish Red List for Butterfly (Regan *et al.* 2010); Irish Red List for Damselflies & Dragonflies (Nelson *et al.* 2011); Irish Red List for Amphibians, Reptiles & Freshwater Fish (King *et al.* 2011); Regional Red List of Irish Bees (Fitzpatrick *et al.* 2006). The description of impacts and their significance follows the EPA Guidance (EPA 2022, Appendix C).

### 3.4 Overall Ecological Site Evaluation & Impact Assessment

An overall ecological evaluation of the proposed development site follows the criteria set out in Appendix B (amended NRA 2009 & Nairn & Fossitt 2004). The description and evaluation of potential and residual impacts associated with the proposed development on the existing ecology of the study site and surrounding area follows guidelines published by the EPA (2022; Appendix C).



**Plate 2-1 Grassland in Parcel 4 looking towards the Suir Estuary.**

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<sup>4</sup> Annex I bird species are afforded additional protection through the designation of Special Protection Areas (SPAs) in EU countries in addition to existing National legislation.

<sup>5</sup> BoCCI Red-listed species are of high conservation concern, Amber-listed species are of medium conservation concern and Green-listed species are of no conservation concern.

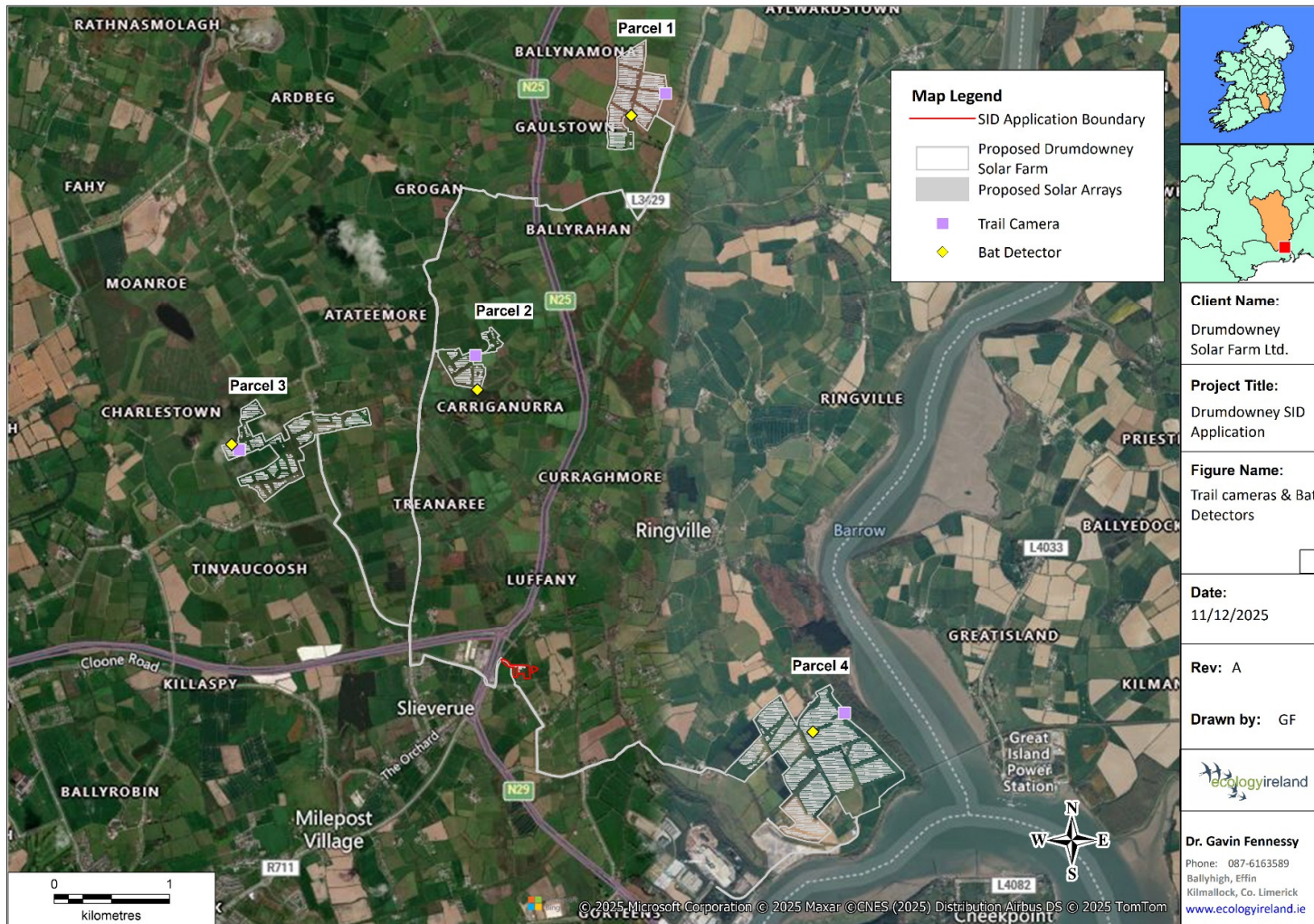


Figure 2-1 Trail camera and bat detector deployment locations.

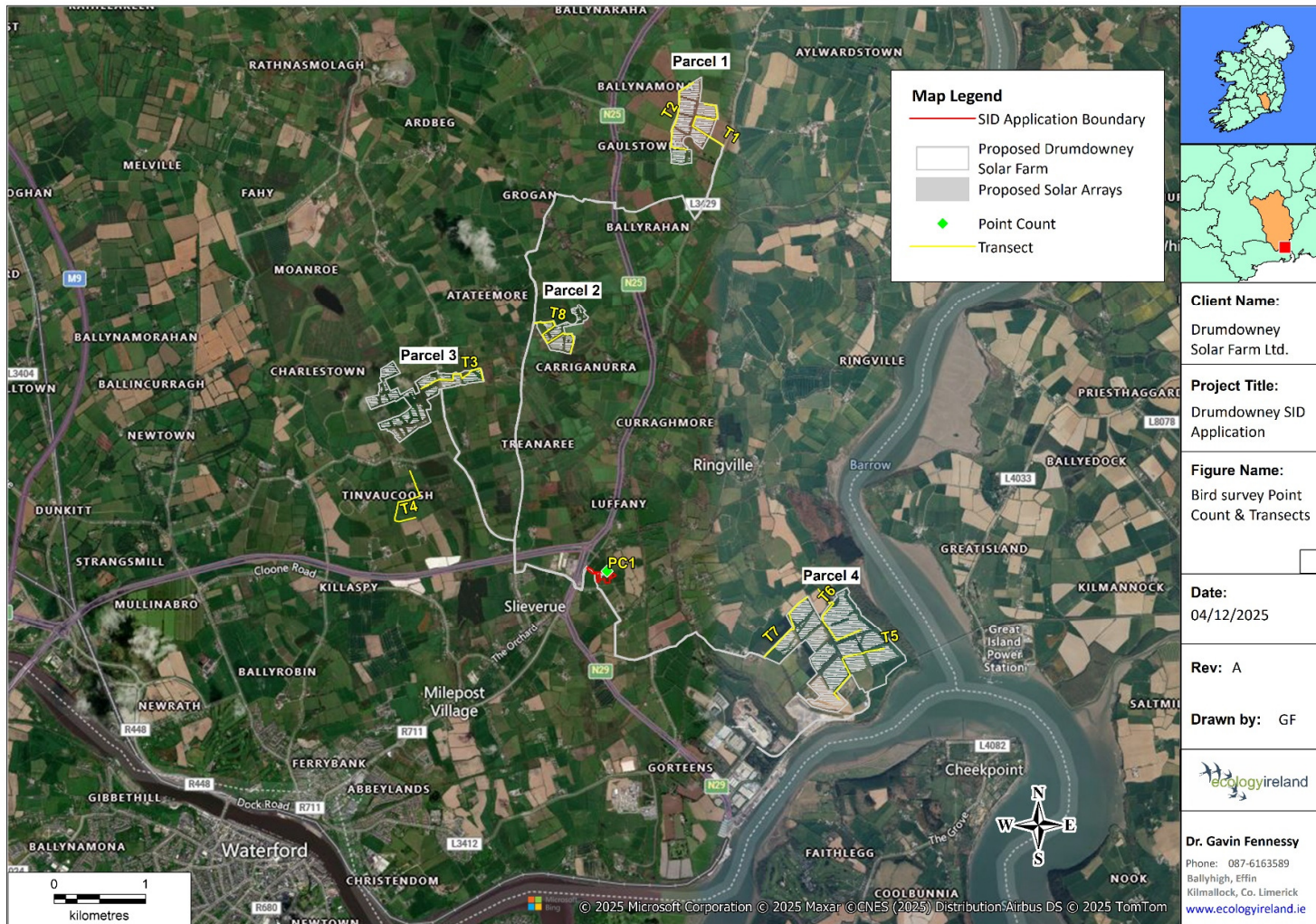


Figure 2-2 Bird survey transects and point count location

## 4 Ecology in the Existing Environment

### 4.1 European Designated Nature Conservation Sites

#### **Proposed Development Site**

The proposed SID site is not located within or closely adjacent to any designated sites. The location of the European designated sites in the wider hinterland is shown in Figure 4.1 and nationally designated sites in the wider area are shown in Figure 4.2.

There are a total of 4 European sites located within 15km of the proposed substation development site. The closest of these sites are the River Barrow & River Nore SAC (002162; 2.4km) and Lower River Suir SAC (002137; 2.7km; Table 4.1). Both of these estuarine sites are adjacent to Parcel 4 of the proposed Drumdowney Solar Farm (Figure 4.1). No other European designated site is located within 12.5km of the application boundary. The location of the designated sites in the wider hinterland is shown in Figure 1-4 and Figure 1-5.

There are a total of three SACs and one SPA located within 15km of the application site boundary (Table 4.1).

**Table 4.1 Designated sites located in the wider hinterland of the site and their distance from the site boundary.**

Site Name	Site Code	Minimum Distance (km)
<i>European sites</i>		
River Barrow & River Nore SAC	002162	2.4
Lower River Suir SAC	002137	2.7
Tramore Dunes & Backstrand SAC	000671	12.9
Tramore Back Strand SPA	004027	12.9
<i>Nationally designated sites (no NHAs within 15km)</i>		
Barrow River Estuary pNHA	000698	2.2
Lough Cullin pNHA	000406	3.0
King's Channel pNHA	001702	3.6
Grannyferry pNHA	000833	5.2
Ballyhack pNHA	000695	7.6
Waterford Harbour pNHA	000787	7.9
Ballykelly Marsh pNHA	000744	8.5
Belle Lake pNHA	000659	10.3
Duncannon Sandhills pNHA	001736	11.0
Oaklands Wood pNHA	000774	11.7
Tramore Dunes & Backstrand pNHA	000671	12.9
Boley Fen pNHA	000699	13.5

Site Name	Site Code	Minimum Distance (km)
Brownstown Wood pNHA	000827	13.8
Lower River Suir pNHA	000399	14.0
Kylecorragh Wood pNHA	000842	14.7

The proposed development is located in the Suir Catchment with the Blackwater (Kilmacow)\_SC\_010 subcatchment. The site is not located close to any EPA mapped watercourse. The headwaters of the Rathpatrick Stream are located >300m west of the site and the Rathdowney Lower Stream is located >350m east of the application site. Both of these watercourses are tributaries of the Lower Suir.

The proposed SID application is intrinsically linked with the proposed Drumdowney Solar Farm development. Although the proposed substation development is itself located distantly from the European sites and there is no clear hydrological pathway by which water-quality mediated effects are likely to result in significant effects on the Lower River Suir SAC or the River Barrow \* River Nore SAC, the overall project includes the proposed wind farm development which has been assessed as requiring a Natura Impact Statement:

*“The proposed development site is located in close proximity to the Natura 2000 sites River Barrow & River Nore SAC and Lower River Suir SAC and there is a hydrological connection to these European designated sites. Significant effects including water-quality mediated effects and construction phase disturbance/displacement effects cannot be discounted without the implementation of appropriate mitigation, design and environmental controls. Therefore, it cannot be concluded, that the proposed project, individually or in combination with other plans or projects, will not have a significant effect on these Natura 2000 sites, without the consideration and analysis of further information. Therefore Stage 2 NIS (AA) is required.”*

Therefore, in this case the overall project, including the substation and solar farm development are assessed to have elements that could in the absence of adequate environmental controls and mitigation measures result in significant effects on European designated sites in the wider receiving environment.

Table 4.2 presents the qualifying and special conservation interests of the designated sites located within 15km of the application site.

There is no hydrological link between the SID application site and the more distant SAC sites (all but the River Barrow & River Nore SAC and Lower River Suir SAC) located >12.5km from the proposed solar farm. Given the distances involved and the lack of a hydrological pathway it is concluded that there is no likelihood of any significant effects on these distant SACs.

Given the distances involved there is no likelihood of any direct disturbance effects on any of the faunal species at the more distant European designated sites. Ex-situ disturbance impacts (*i.e.*, where highly mobile species from the designated sites may occur at the development site to forage or

commute) must also be considered. This effect is only applicable to designated sites where such fauna are relevant (*e.g.* birds, bats), and where the development site supports habitats of ecological interest for the fauna in question. The SPA sites located in the wider hinterland are all relatively distant from application site: Tramore Back Strand SPA (12.9km), Bannow Bay SPA (16km), Seas off Wexford SPA (17.1km) and River Nore SPA (19.4km). The first two of these European sites are designated for wintering bird species, the River Nore SPA is designated for the conservation of breeding Kingfisher, *Alcedo atthis*, and the Seas off Wexford SPA is designated for seabird species.

The site walkovers of the wider project site carried out during the overwintering period did not record any regular use of the application lands by any of the SCI species of these SPA sites located in the wider hinterland area, apart from small flocks ( $\leq 20$  individuals) of gulls (Black-headed Gulls, Herring Gulls and Lesser Black-backed Gulls), which are SCIs of the Seas off Wexford SPA, occasionally foraging/roosting on improved agricultural grassland in Parcels 1, 3 and 4. These gull species are large and mobile, and hence are expected to feed widely in the area. The surrounding area contains large areas of similar grassland habitat so the development of these areas is not thought to significantly impact the gull species. Additionally, it is expected that the gulls are likely to continue using these areas within the site to forage once the construction is complete, particularly due to the fact that there will be less disturbance from people, machinery and animals once the panels are in place compared to the disturbance levels experienced when the land is actively managed as agricultural land.

While wader species, such as Curlew, Golden Plover or Lapwing, are SCIs of Bannow Bay SPA and Tramore Back Strand SPA and could be displaced by the erection of solar panels- no flocks of wading bird species were recorded at rest in any of the lands within the Project study area. There is no evidence that these lands are of value for any ex-situ foraging or roosting for species associated with the SPAs in the wider receiving environment. Relatively modest numbers of wading birds were recorded in the estuaries adjoining Parcel 4 but no field-feeding flocks of any of these species were observed. It is concluded that there is no likelihood of any significant ex-situ disturbance/displacement effects of birds associated with the distant SPAs in the wider receiving environment.

A Natura Impact Statement (NIS) has been prepared and accompanies the planning application, to provide scientific examination of the overall project to enable the competent authority to undertake an AA. The NIS examines potential effects to Natura 2000 sites screened in as part of this Screening for Appropriate Assessment; River Barrow & River Nore SAC and Lower River Suir SAC.

Best practice measures and sensitive design and mitigation measures have been identified to ensure that potential pollutant sources are not released from the proposed development to the receiving environment and that the potential for disturbance and displacement effects on QI/SCI species is minimised such that there is no risk of adverse effects on these Qualifying Features of Natura 2000 sites within this project's Zol. The NIS concludes that the proposed development will not adversely affect the integrity of Natura 2000 sites, and there is no reasonable scientific doubt in relation to this conclusion.

Table 3-2 Natura 2000 Sites within 15km of the proposed development

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
River Barrow and River Nore SAC (002162)	<p>The conservation objectives of this site relate to maintaining or restoring the favourable conservation condition of the following qualifying interests;</p> <ul style="list-style-type: none"> <li>• Estuaries [1130]</li> <li>• Mudflats and sandflats not covered by seawater at low tide [1140]</li> <li>• Reefs [1170]</li> <li>• Salicornia and other annuals colonising mud and sand [1310]</li> <li>• Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</li> <li>• Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</li> <li>• Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</li> <li>• European dry heaths [4030]</li> <li>• Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]</li> <li>• Petrifying springs with tufa formation (Cratoneurion) [7220]</li> <li>• Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</li> <li>• Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</li> <li>• Desmoulin's Whorl Snail <i>Vertigo moulinsiana</i> [1016]</li> <li>• Freshwater Pearl Mussel <i>Margaritifera margaritifera</i> [1029]</li> <li>• White-clawed Crayfish <i>Austropotamobius pallipes</i> [1092]</li> <li>• Sea Lamprey <i>Petromyzon marinus</i> [1095]</li> <li>• Brook Lamprey <i>Lampetra planeri</i> [1096]</li> <li>• River Lamprey <i>Lampetra fluviatilis</i> [1099]</li> <li>• Twaité Shad <i>Alosa fallax fallax</i> [1103]</li> <li>• Salmon <i>Salmo salar</i> [1106]</li> <li>• Otter <i>Lutra lutra</i> [1355]</li> <li>• Killarney Fern <i>Trichomanes speciosum</i> [1421]</li> <li>• Nore Freshwater Pearl Mussel, <i>Margaritifera durrovensis</i></li> </ul> <p>(After NPWS 2025)</p>	2.4km from the SID application site
Lower River Suir SAC (002137)	<p>The conservation objectives of this site relate to maintaining or restoring the favourable conservation condition of the following qualifying interests;</p> <ul style="list-style-type: none"> <li>• Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</li> <li>• Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</li> <li>• Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]</li> <li>• Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</li> <li>• Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</li> <li>• <i>Taxus baccata</i> woods of the British Isles [91J0]</li> <li>• Freshwater Pearl Mussel <i>Margaritifera margaritifera</i> [1029]</li> <li>• White-clawed Crayfish <i>Austropotamobius pallipes</i> [1092]</li> <li>• Sea Lamprey <i>Petromyzon marinus</i> [1095]</li> <li>• Brook Lamprey <i>Lampetra planeri</i> [1096]</li> </ul>	2.7km from the SID application site

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
	<ul style="list-style-type: none"> <li>• River Lamprey <i>Lampetra fluviatilis</i> [1099]</li> <li>• Twaité Shad <i>Alosa fallax fallax</i> [1103]</li> <li>• Salmon <i>Salmo salar</i> 1106]</li> <li>• Otter <i>Lutra lutra</i> [1355]</li> </ul> <p>(After NPWS 2017)</p>	
Tramore Dunes and Backstrand SAC (000671)	<p>The conservation objectives of this site relate to maintaining or restoring the favourable conservation condition of the following qualifying interests;</p> <ul style="list-style-type: none"> <li>• Mudflats and sandflats not covered by seawater at low tide [1140]</li> <li>• Annual vegetation of drift lines [1210]</li> <li>• Perennial vegetation of stony banks [1220]</li> <li>• Salicornia and other annuals colonising mud and sand [1310]</li> <li>• Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</li> <li>• Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</li> <li>• Embryonic shifting dunes [2110]</li> <li>• Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]</li> <li>• Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]</li> </ul> <p>(After NPWS 2013a)</p>	12.9km from the SID application site
Tramore Back Strand SPA (004027)	<p>The conservation objectives of this site relate to maintaining or restoring the favourable conservation condition of the following Special conservation interests;</p> <ul style="list-style-type: none"> <li>• Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]</li> <li>• Golden Plover <i>Pluvialis apricaria</i> [A140]</li> <li>• Grey Plover <i>Pluvialis squatarola</i> [A141]</li> <li>• Lapwing <i>Vanellus vanellus</i> [A142]</li> <li>• Dunlin <i>Calidris alpina</i> [A149]</li> <li>• Black-tailed Godwit <i>Limosa limosa</i> [A156]</li> <li>• Bar-tailed Godwit <i>Limosa lapponica</i> [A157]</li> <li>• Curlew <i>Numenius arquata</i> [A160]</li> <li>• Wetland and Waterbirds [A999]</li> </ul> <p>(After NPWS 2013b)</p>	12.9km from the SID application site

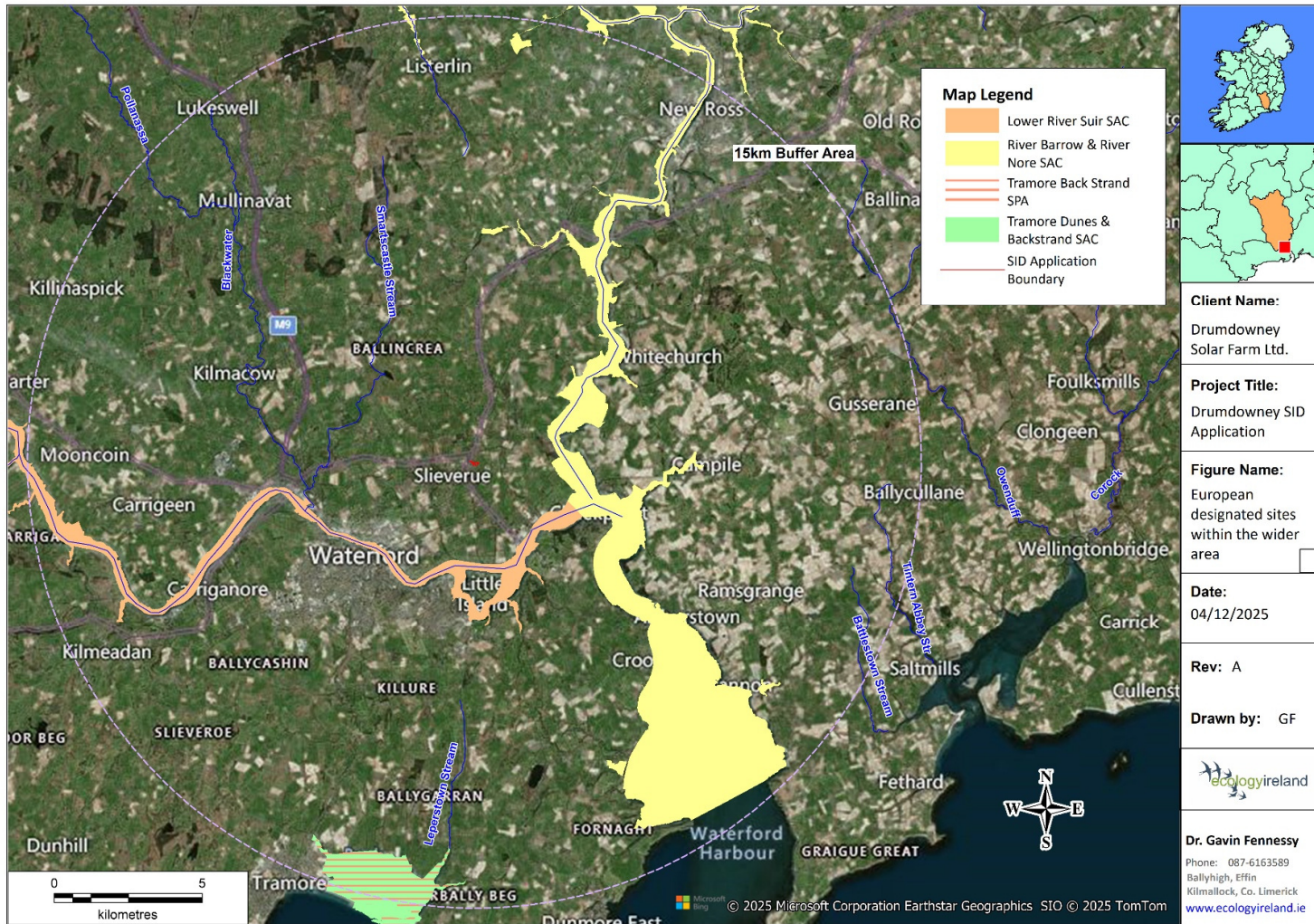


Figure 4.1 European designated sites in wider receiving area.

#### 4.1.1 Other designated sites

There are a total of 15 pNHAs located within 15km of the application site (Table 4.1). There are no NHAs within 15km of the proposed SID application site (see Figure 4.2). Table 4.3 summarises the conservation features of each of the pNHA sites located within 15km of the application site. The closest of these pNHA sites is the Barrow River Estuary pNHA (000698; 2.2km).

There is one Ramsar sites within 15km of the project site; Tramore Backstrand (Site No. 835). Tramore Backstrand is within Tramore Dunes and Backstrand SAC and Tramore Backstrand SPA.

There are also several Important Bird and Biodiversity Areas (IBAs) in the wider environment of the proposed development site, primarily associated with the south coast. These include Dunmore East, Tramore Backstrand, and Bannow Bay. Additional IBAs include the Northeast Celtic Sea and the Mid Waterford marine extension, located at the mouth of Waterford Harbour.

**Table 4.3 Site Synopses of the Nationally Designated Sites within 15km of the Application Site.**

Site Name & Code	Description	Minimum Distance from Site (km)
Barrow River Estuary pNHA (000698)	The Barrow River Estuary pNHA forms part of the River Barrow and River Nore SAC. This site comprises the lower and upper tidal reaches of the river Barrow before it enters Waterford Harbour. It extends from St. Mullins in Co. Carlow to Cheek Point in Co. Waterford (approximately 20-25 kilometres) and includes both sides of the river. This site is important because environmental factors have allowed plant communities to develop here that are found nowhere else in the country. Three legally protected plant species are found, and another Rare species ( <i>Carex divisa</i> ) has its only known Irish station here. The presence of Rare, Red Data Book fish and of Peregrine Falcon is also notable.	2.2km
Lough Cullin pNHA (000406)	Lough Cullin pNHA is located in south Kilkenny, 6km north of Waterford. Streams enter the basin from the NW, NE and SE and cause considerable flooding in most winters. The outflow is sluggish towards Dunkitt and the Suir though here and elsewhere there has been work to deepen the channel.  The main interest of the site lies in its flowering plants some of which are rare in the Kilkenny and Waterford region. There is also a high population of snipe in winter as well as smaller numbers of curlew, lapwing and mallard. In summer sedge warbler and reed bunting breed.	3.0km
King's Channel pNHA (001702)	The King's Channel pNHA forms part of the Lower River Suir SAC. King's Channel is an offshoot of the Suir Estuary below Waterford which surrounds the triangular Little Island. It is relatively deep and at low water retains a broad channel between mudbanks. The channel itself is not of significant interest except to a few cormorant and other seabirds but the southern shore is lined in places by a flat saltmarsh.	3.6km
Grannyferry pNHA (000833)	Grannyferry pNHA consists of reedswamp, marshes and wet fields with a salt influence which declines from south to north. Small numbers of Mallard and Water Rail occur within the area and in summer there are, most probably, Sedge Warbler and Reed Bunting nesting.	5.2km
Kilbarry Bog pNHA (001700)	Kilbarry Bog pNHA is located on the southern outskirts of Waterford City; it lies on either side of the former Great Southern Railway line, parts of which are today used as a foot path and cycle way. The site is drained by the St John's River in the north, whilst there is a flow of water into the site from the hills to the south-east. This wetland is not, in fact, a bog in the true sense, but rather comprises an area of reed swamp, freshwater marsh, wet grassland and scrub. Parts of the site are known as Ballynakill Marsh.	6.4km

Site Name & Code	Description	Minimum Distance from Site (km)
	Kilbarry Bog is a site of conservation importance for a variety of reasons: it is the only remaining wetland of its type of significance in the vicinity of Waterford City; it supports a variety of wetland vegetation types and plant species; it is the site of records for the scarce Summer Snowflake; it supports a good diversity of birds, including an important breeding population of Reed Warbler; a range scarce invertebrate species has been recorded from the site.	
Ballyhack pNHA (000695)	Ballyhack pNHA forms part of the River Barrow and River Nore SAC. The site is situated at the mouth of the River Suir, 1km west of Arthurstown in Co.Wexford. Old Red Sandstone underlies this hillside site and a number of interesting plant communities grow among the rock outcrops.  A small area of dry heath, a habitat listed on Annex I of the EU Habitats Directive, which is dominated by Gorse ( <i>Ulex europaeus</i> ), occurs on the site. Ballyhack encompasses, in a small area, a variety of habitats which are not frequent in south-east Ireland. The site is also rich in species and contains one of only two stations known for the Clustered Clover in the country.	7.6km
Waterford Harbour pNHA (000787)	Waterford Harbour pNHA forms part of the River Barrow and River Nore SAC. This site is of conservation importance for the extensive and good quality intertidal sand and mudflats, a habitat listed under Annex I of the EU Habitats Directive. The intertidal habitats are used by important numbers of wading birds during winter, as well as by small numbers of wildfowl.	7.9km
Ballykelly Marsh pNHA (000744)	Ballykelly Marsh pNHA combines an arable field with a high quality wetland site. The arable field contains a rare arable weed community including the protected flora species <i>Fuckria elatine</i> . Adjacent to this field is a small species rich lake and fen area. Such small wetlands are characteristic of the South-East of Ireland but are decreasing rapidly due to drainage and land reclamation.	8.5km
Belle Lake pNHA (000659)	Belle Lake pNHA is an attractive lake which lies at about 50m above sea level, 7 km south east of Waterford city. The water of the lake is clear and quite rich in calcium. A wide variety of other aquatic plants also grow in the lake including at least 4 species of Pondweed ( <i>Potamogeton</i> spp.). There are patches of tall emergent swamp on the east shore, and a thick zone of reed swamp on the less steeply sloping, more sheltered, muddy shore typical of the west of the lake. This reed fringe is continuous with a large reedbed to the south of the lake which has occasional Willows ( <i>Salix</i> spp.) throughout, and an Alder ( <i>Alnus glutinosa</i> ) and Willow woodland at its western end. The inclusion of a small Ash ( <i>Fraxinus excelsior</i> ) and Oak ( <i>Quercus</i> sp.) woodland on the northeastern shore adds to the diversity of habitats represented on site. As for any substantial lake and reedbed this is an important site for birds. In particular the lake is used by regionally important numbers of Whooper swan.	10.3km
Duncannon Sandhills pNHA (001738)	Duncannon Sandhills pNHA forms part of the River Barrow and River Nore SAC. The Duncannon Sandhills site comprises Duncannon Strand and the freshwater marsh in the valley to the east in Shanacloon Townland. 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. The dunes which fringe the strand are dominated by Marram grass ( <i>Ammophila arenaria</i> ) towards the sea. The marsh to the east is situated in a narrow valley and is dominated by Common Reed ( <i>Phragmites australis</i> ) which gives way to areas of Soft Rush ( <i>Juncus effusus</i> ) and Tufted Hair-grass ( <i>Deschampsia cespitosa</i> ).	11.0km
Oaklands Wood pNHA (000774)	Oaklands Wood pNHA is a mixed coniferous and deciduous wood located approximately 2 km south of New Ross. The site is of interest as it is a representative area of broadleaved woodland and associated flora.	11.7km
Tramore Dunes And Backstrand pNHA (000671)	Tramore Dunes And Backstrand pNHA forms part of Tramore Dunes and Backstrand SAC and Tramore Back Strand SPA. Tramore Back Strand SPA is located approximately 2 km east of Tramore town in County Waterford. It comprises a medium-sized estuary sheltered from the open sea by a long shingle spit, with high dunes. The area known as the Back Strand empties almost completely at low tide; it is connected to the outer bay and sea by narrows at Rinnashark. The site is of high ornithological importance for wintering waterfowl, with one species occurring in internationally important	12.9km

Site Name & Code	Description	Minimum Distance from Site (km)
	numbers and a further seven species having populations of national importance. The regular occurrence of Little Egret, Golden Plover and Bar-tailed Godwit is of particular note as these three species are listed on Annex I of the E.U. Birds Directive. Tramore Back Strand is also a Ramsar Convention site.	
Boley Fen pNHA (000699)	Boley Fen is located at Rathumney, approximately 5 km east of Campile. It comprises of intermediate fen with wet grassland and tall sedge ( <i>Carex</i> spp.) communities with encroaching scrub, mainly willows ( <i>Salix</i> spp.). Areas of the site have been afforested.	13.5km
Brownstown Wood pNHA (000827)	Brownstown Wood pNHA is a beautiful tract of deciduous Oak woodland situated on a low hill, 7km west of New Ross in County Kilkenny. This woodland is very unusual in that the canopy consists almost exclusively of Oak ( <i>Quercus</i> sp.). This site also includes some areas of scrub where natural regeneration of Ash and Oak is occurring on previously clear felled woodland.  Because intact oak woodland is such a rare habitat in Ireland, this site is of regional importance.	13.8km
Lower River Suir (Coolfinn, Portlaw) pNHA (000399)	Lower River Suir (Coolfinn, Portlaw) pNHA overlaps with the Lower River Suir SAC. The Coolfinn Marshes are situated about half way between Waterford city and Carrick-on-Suir. The site is primarily composed of pastoral farmland. The site is a wildfowl sanctuary. The site supports nationally important numbers of overwintering Greylag Geese (av. max. 435) which graze the agricultural grasslands. Other species recorded in significant numbers include Whooper Swan, Teal, Tufted Duck, Golden Plover, Lapwing and Curlew.	14.0km
Kylecorragh Wood pNHA (000842)	Kylecorragh Wood pNHA part of the River Barrow and River Nore SAC. The site is situated on the steeply sloping banks of the River Nore, 5km west of New Ross, County Kilkenny. Apart from some damage from clear felling at the east of the site, this woodland has retained much of its natural character and contains a good diversity of species. This type of woodland, with a high canopy composed almost entirely of Oak ( <i>Quercus</i> spp.) is very rare in Ireland and is therefore of great scientific interest. Ecologically, it is also important because it is one of the few remaining examples of this habitat in the country.	14.7km

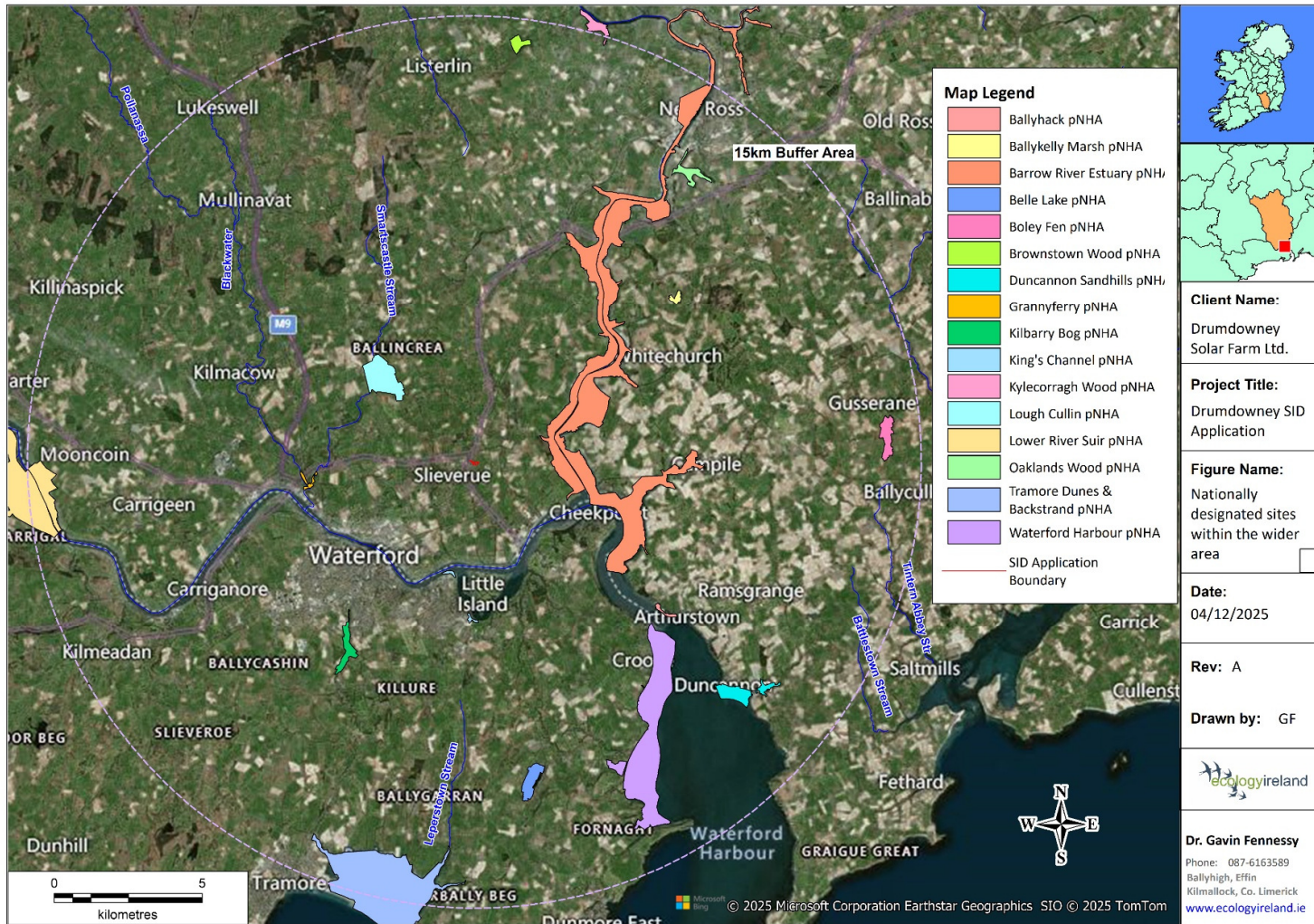


Figure 4.2 Nationally designated sites in wider area.

## 4.2 Habitats & Flora in the Existing Environment

### 4.2.1 Desktop Review

Table 4.4 presents the historical recorded of rare and protected flowering plants recorded in S61 10km Grid Square.

Four FPO (2022) species have been recorded historically from this area: Chives, *Allium schoenoprasum*, Divided Sedge, *Carex divisa*, Meadow Barley, *Hordeum secalinum* and Borrer's Saltmarsh-grass, *Puccinellia fasciculata*. All of these species are associated with coastal or seasonally-flooded habitats.

No legally protected bryophyte species were recorded on the NPWS FPO Bryophyte mapping service for the 10 km grid square S61 and no non-native invasive species have been recorded in the tetrad (S61M) which overlaps the proposed substation site.

### 4.2.2 Habitats & Flora in the Existing Environment

The SID application site is dominated by improved agricultural grassland habitat (GA1). The site is made up of several cattle grazed and silage fields bounded by hedgerow (WL1). Figure 4.3 illustrates the habitats within the application site. The sward was tightly grazed and species-poor, dominated by *Lolium perenne*, with some *Trifolium repens* and scattered *Taraxacum officinale*. Hedgerows (WL1) occur along field boundaries, though these are fragmented and in poor structural condition in some areas. Remaining sections include Hawthorn, Bramble and occasional Sycamore, *Acer pseudoplatanus* saplings.

No Annex I habitats or rare, protected or invasive plant species are present within the application site. The habitats present are considered of local importance (lower value).

**Table 4.4 Records of threatened and protected botanical species held by the NBDC database for the 10km (S61).**

Common name	Scientific name	Conservation status
Autumn Lady's-tresses	<i>Spiranthes spiralis</i>	Threatened: Near threatened
Borrer's Saltmarsh-grass*	<i>Puccinellia fasciculata</i>	Flora Protection Order 2022; Wildlife Acts Schedule A (Vascular Plants); Threatened: Near threatened
Chives*	<i>Allium schoenoprasum</i>	Flora Protection Order 2022; Wildlife Acts Schedule A (Vascular Plants); Threatened: Vulnerable
Common Cudweed	<i>Filago vulgaris</i>	Threatened: Vulnerable
Common Gromwell	<i>Lithospermum officinale</i>	Threatened: Near threatened
Corn Marigold	<i>Glebionis segetum</i>	Threatened: Near threatened
Devon Whitebeam	<i>Sorbus devoniensis</i>	Threatened: Endangered
Divided Sedge*	<i>Carex divisa</i>	Flora Protection Order 2022; Wildlife Acts Schedule A (Vascular Plants); Threatened: Endangered
Fragrant Agrimony	<i>Agrimonia procera</i>	Threatened: Near threatened
Green Field-speedwell	<i>Veronica agrestis</i>	Threatened: Near threatened
Irish Spleenwort	<i>Asplenium onopteris</i>	Threatened: Vulnerable
Irish Whitebeam	<i>Sorbus hibernica</i>	Threatened: Vulnerable
Knotted Hedge-parsley	<i>Torilis nodosa</i>	Threatened: Near threatened
Least Bur-reed	<i>Sparganium natans</i>	Threatened: Near threatened
Marsh-mallow	<i>Althaea officinalis</i>	Threatened: Near threatened
Meadow Barley*	<i>Hordeum secalinum</i>	Flora Protection Order 2022; Wildlife Acts Schedule A (Vascular Plants); Threatened: Vulnerable
Milk Thistle	<i>Silybum marianum</i>	Threatened: Near threatened
Narrow-fruited Cornsalad	<i>Valerianella dentata</i>	Threatened: Vulnerable
Northern Dead-nettle	<i>Lamium confertum</i>	Threatened: Near threatened
Pale Flax	<i>Linum bienne</i>	Threatened: Near threatened
Prickly Poppy	<i>Papaver argemone</i>	Threatened: Vulnerable
Rough Chervil	<i>Chaerophyllum temulum</i>	Threatened: Vulnerable
Slender Thistle	<i>Carduus tenuiflorus</i>	Threatened: Near threatened
Tubular Water-dropwort	<i>Oenanthe fistulosa</i>	Threatened: Near threatened
Vervain	<i>Verbena officinalis</i>	Threatened: Near threatened
Weasel's-snout	<i>Misopates orontium</i>	Threatened: Endangered

\* Botanical species protected under the Flora (Protection) Order 2022.



Figure 4.3 Habitats within the SID application site.

## 4.3 Fauna in the Existing Environment

### 4.3.1 Birds

#### 4.3.1.1 Desktop Study

Table 4.5 summarises the bird species that have been recorded historically within the 2km tetrads that encompass the wider project area (SID application and proposed Drumdowney Solar Farm). A total of 63 species have been recorded in this wider area, representing a fairly broad species assemblage. The table also shows the 2km Grid Squares in which each of the species has been recorded. Species recorded widely included typical farmland and woodland bird species.

Three species have been recorded in the tetrad in which the proposed SID application site is located including the recent colonising species, Great Spotted Woodpecker, *Dendrocopos major* and two birds of prey, Kestrel, *Falco tinnunculus* and Buzzard, *Buteo buteo*. Kestrel is currently Red-listed having undergone a significant population decline in recent decades (Gilbert *et al.* 2021).

Nine of the species recorded in the wider project area are currently Red-listed (Gilbert *et al.* 2021): Grey Wagtail, *Motacilla cinerea*, Kestrel, Meadow Pipit, *Anthus pratensis*, Oystercatcher, *Haematopus ostralegus*, Redwing, *Turdus iliacus*, Snipe, *Gallinago gallinago*, Stock Dove, *Columba oenas*, Woodcock, *Scolopax rusticola* and Yellowhammer, *Emberiza citrinella*. A further 17 of the species recorded historically across the wider project area are Amber-listed species of medium conservation concern, representing the range of habitats present locally with several waterbirds (e.g. Cormorant, *Phalacrocorax carbo*, Kingfisher) as well as resident (e.g. House Sparrow, *Passer domesticus*, Goldcrest, *Regulus regulus*) and migrant (e.g. Swallow, *Hirundo rustica*, Linnet, *Linaria cannabina*) farmland/woodland species.

**Table 4.5 Bird species recorded in the tetrads that overlap the wider project area study site (NBDC).**

Common Name	Scientific Name	Grid Square
Black-headed Gull <sup>^</sup>	<i>Chroicocephalus ridibundus</i>	S61P, S61S
Blackbird	<i>Turdus merula</i>	S61P, S61R, S61S
Blackcap	<i>Sylvia atricapilla</i>	S61R
Blue Tit	<i>Cyanistes caeruleus</i>	S61P, S61R, S61S
Bullfinch	<i>Pyrrhula pyrrhula</i>	S61I, S61J, S61P, S61S
Buzzard	<i>Buteo buteo</i>	S61I, S61M, S61R
Cattle Egret	<i>Bubulcus ibis</i>	S61S
Chaffinch	<i>Fringilla coelebs</i>	S61P, S61R, S61S
Chiffchaff	<i>Phylloscopus collybita</i>	S61J, S61R, S61S
Coal Tit	<i>Periparus ater</i>	S61P, S61R, S61S
Collared Dove	<i>Streptopelia decaocto</i>	S61S
Cormorant <sup>^</sup>	<i>Phalacrocorax carbo</i>	S61S
Curlew	<i>Numenius arquata</i>	S61R, S61S
Dunnock	<i>Prunella modularis</i>	S61P, S61R, S61S
Fieldfare	<i>Turdus pilaris</i>	S61P, S61S
Goldcrest <sup>^</sup>	<i>Regulus regulus</i>	S61P, S61R, S61S
Goldfinch	<i>Carduelis carduelis</i>	S61P, S61R, S61S
Great Spotted Woodpecker	<i>Dendrocopos major</i>	S61H, S61M, S61R, S61S
Great Tit	<i>Parus major</i>	S61P, S61R, S61S
Greenfinch <sup>^</sup>	<i>Chloris chloris</i>	S61P, S61R, S61S
Greenshank	<i>Tringa nebularia</i>	S61S
Grey Heron	<i>Ardea cinerea</i>	S61H, S61R, S61S
Grey Wagtail*	<i>Motacilla cinerea</i>	S61S
Hen Harrier <sup>^</sup>	<i>Circus cyaneus</i>	S61H
Herring Gull <sup>^</sup>	<i>Larus argentatus</i>	S61R, S61S
Hooded Crow	<i>Corvus cornix</i>	S61P, S61R, S61S
House Martin <sup>^</sup>	<i>Delichon urbicum</i>	S61R
House Sparrow <sup>^</sup>	<i>Passer domesticus</i>	S61J, S61P, S61R, S61S
Jackdaw	<i>Coloeus monedula</i>	S61P, S61R, S61S
Jay	<i>Garrulus glandarius</i>	S61R, S61S
Kestrel*	<i>Falco tinnunculus</i>	S61M, S62K
Kingfisher <sup>^</sup>	<i>Alcedo atthis</i>	S61S
Linnet <sup>^</sup>	<i>Linaria cannabina</i>	S61P, S61S
Little Egret	<i>Egretta garzetta</i>	S61S
Long-tailed Tit	<i>Aegithalos caudatus</i>	S61P, S61S
Magpie	<i>Pica pica</i>	S61P, S61R, S61S
Mallard <sup>^</sup>	<i>Anas platyrhynchos</i>	S61S
Meadow Pipit*	<i>Anthus pratensis</i>	S61S
Mistle Thrush	<i>Turdus viscivorus</i>	S61P, S61R, S61S
Moorhen	<i>Gallinula chloropus</i>	S61R

Common Name	Scientific Name	Grid Square
Oystercatcher*	<i>Haematopus ostralegus</i>	S61S
Pheasant	<i>Phasianus colchicus</i>	S61P, S61R, S61S
Pied Wagtail	<i>Motacilla alba</i>	S61P, S61R, S61S
Raven	<i>Corvus corax</i>	S61I
Redwing*	<i>Turdus iliacus</i>	S61P
Robin	<i>Erithacus rubecula</i>	S61I, S61P, S61R, S61S
Rock Dove	<i>Columba livia</i>	S61P, S61S
Rook	<i>Corvus frugilegus</i>	S61P, S61R, S61S
Shelduck^	<i>Tadorna tadorna</i>	S61R, S61S
Short-eared Owl^	<i>Asio flammeus</i>	S61R
Siskin	<i>Spinus spinus</i>	S61I
Snipe*	<i>Gallinago gallinago</i>	S61S
Song Thrush	<i>Turdus philomelos</i>	S61R, S61S
Starling^	<i>Sturnus vulgaris</i>	S61I, S61P, S61R, S61S
Stock Dove*	<i>Columba oenas</i>	S61S
Stonechat	<i>Saxicola rubicola</i>	S61S
Swallow^	<i>Hirundo rustica</i>	S61H, S61I, S61R, S61S
Wheatear^	<i>Oenanthe oenanthe</i>	S61S
Willow Warbler^	<i>Phylloscopus trochilus</i>	S61R, S61S
Woodcock*	<i>Scolopax rusticola</i>	S61S
Woodpigeon	<i>Columba palumbus</i>	S61I, S61P, S61R, S61S
Wren	<i>Troglodytes troglodytes</i>	S61P, S61R, S61S
Yellowhammer*	<i>Emberiza citrinella</i>	S61I, S61S

^ Amber-listed \* Red-listed (Gilbert *et al.* 2021)

#### 4.3.1.2 Field survey

The Point Count in Parcel 5 (SID application site) was surveyed in a breeding season and two consecutive winter seasons. A total of 15 bird species were recorded at PC1 in the winter period (Table 4.6) with observations of two Red-listed bird species: the migrant thrush species, Redwing, *Turdus iliacus* and Snipe, *Gallinago gallinago*.

**Table 4.6 Bird species recorded at PC1 in the winter period with the peak count within 50m shown. Birds only recorded >50m from the observer shown as 'P' for present.**

Common Name	Scientific Name	PC1
Blackbird	<i>Turdus merula</i>	1
Buzzard	<i>Buteo buteo</i>	1
Chaffinch	<i>Fringilla coelebs</i>	2
Hooded Crow	<i>Corvus corax</i>	P
Jackdaw	<i>Corvus monedula</i>	5
Lesser Black-backed Gull^	<i>Larus fuscus</i>	8
Magpie	<i>Pica pica</i>	P

Common Name	Scientific Name	PC1
Redwing*	<i>Turdus iliacus</i>	2
Robin	<i>Erithacus rubecula</i>	1
Rook	<i>Corvus frugilegus</i>	4
Skylark^	<i>Alauda arvensis</i>	1
Snipe*	<i>Gallinago gallinago</i>	2
Starling^	<i>Sturnus vulgaris</i>	1
Woodpigeon	<i>Columba palumbus</i>	6
Wren	<i>Troglodytes troglodytes</i>	1

^ Amber-listed \* Red-listed (Gilbert *et al.* 2021)

Across the wider project area (SID site and proposed Drumdowney Solar Farm) a total of seven 1km transects were surveyed in the 2024-2025 overwintering period, plus an additional Point Count within the proposed substation site. Seven transects were surveyed in the 2025-2026 overwintering period as well, though T4 was dropped and an additional transect route was added (T8), in response to the changes in the areas under panels and the RFI. A total of 48 species were recorded across this wider project study area during the winter season surveys (Table 4.7).

The bird species recorded in this wider area represent a fairly typical farmland/woodland bird community with the most abundant species including Rook, *Corvus frugilegus*, Woodpigeon, *Columba palumbus* and Starling. Five of the species recorded are Red-listed: Redwing, Kestrel, Meadow Pipit, Snipe, and Woodcock, *Scolopax rusticola*. Redwing were recorded on three of the survey transects, while Kestrel was present on two of the survey transects. A small number of day-roosting Snipe were flushed on the transects (T3, T4, T5 & T6) and the point count. Meadow Pipit was observed on four transects (T2, T3, T5 & T8) during the additional 2025-2026 surveys. Three Woodcock were flushed from a drain on T8. Ten of the species encountered are currently Amber-listed: Black-headed Gull, *Chroicocephalus ridibundus*, Cormorant, *Phalacrocorax carbo*, Greenfinch, *Chloris chloris*, Goldcrest, *Regulus regulus*, Herring Gull, *Larus argentatus*, Linnets, *Linaria cannabina*, Lesser Black-backed Gull, *Larus fuscus*, Mallard, *Anas platyrhynchos*, Skylark, *Alauda arvensis*, and Starling, *Sturnus vulgaris*.

Most of the species recorded are common locally and nationally. Several species are winter migrants including Fieldfare, *Turdus pilaris* and Redwing. There were a small number of records of waterbirds such as Cormorant, associated with the estuary near Parcel 4. There was one sighting of field feeding/roosting Black-headed Gulls in a field at the northern end of Parcel 4 on December 19<sup>th</sup> 2024. A flock of Herring Gulls were observed feeding/roosting in the western portion of Parcel 3, from T3, on the 29<sup>th</sup> of October 2025. A flock of approximately twenty Black-headed gulls was observed foraging in the southernmost field on T2 on the 19<sup>th</sup> of November 2025. A mixed flock of 18 gulls including Greater Black-backed Gulls, Herring Gulls and Black Headed Gulls, was observed foraging and loafing on the southern and northern portions of Parcel 4 during poor weather on the 26<sup>th</sup> of November 2025. Apart from these occasional sightings of small flocks of gulls there was no evidence of the fields being used by waterbirds to feed or roost.

The species diversity recorded on transect ranged from 15-28 species with the greatest diversity recorded on Transect 2 in Parcel 1 which consisted of a combination of improved agricultural grassland and winter stubble.

**Table 4.7 Peak counts of each species recorded during the winter season surveys of the wider project study area. 'P' indicates that the species was only recorded >100m from the transect.**

Common Name	Scientific Name	T1	T2	T3	T4	T5	T6	T7	T8	PC1
Blackbird	<i>Turdus merula</i>	2	1	3	3	3	3	3	4	1
Black-headed Gull^	<i>Chroicocephalus ridibundus</i>	P	20	P		3		8		
Blue Tit	<i>Cyanistes caeruleus</i>	1	1			1	1		1	
Bullfinch	<i>Pyrrhula pyrrhula</i>			2	2			1		
Buzzard	<i>Buteo buteo</i>	1	1	1			1			1
Chaffinch	<i>Fringilla coelebs</i>	3	2	2	2	2	3	3	1	2
Coal Tit	<i>Parus ater</i>			1					1	
Collared Dove	<i>Streptopelia decaocto</i>					1				
Cormorant^	<i>Phalacrocorax carbo</i>					P				
Curlew	<i>Numenius arquata</i>						1			
Dunnock	<i>Prunella modularis</i>	1			1	1	1	1	1	
Fieldfare	<i>Turdus pilaris</i>	5	30			1				
Goldcrest^	<i>Regulus regulus</i>			1			2		2	
Goldfinch	<i>Carduelis carduelis</i>	3				2		2		
Greater Black-Backed Gull	<i>Larus marinus</i>					4	1			
Great Spotted Woodpecker	<i>Dendrocopos major</i>			1						
Great Tit	<i>Parus major</i>		1	1	1		1	1	1	
Greenfinch^	<i>Chloris chloris</i>							1		
Grey Heron	<i>Ardea cinerea</i>					1				
Herring Gull^	<i>Larus argentatus</i>			P		10	3	4		
Hooded Crow	<i>Corvus corax</i>	6	4	5	2	2	5	4		P
Jackdaw	<i>Corvus monedula</i>	5	3		3	2	2	4		5
Jay	<i>Garrulus glandarius</i>		1							
Kestrel*	<i>Falco tinnunculus</i>		P	1						
Lesser Black-backed Gull^	<i>Larus fuscus</i>	P	2							8
Linnet^	<i>Linaria cannabina</i>	100	2						20	
Little Egret	<i>Egretta garzetta</i>						1			
Long-tailed Tit	<i>Aegithalos caudatus</i>			1	2		1			
Magpie	<i>Pica pica</i>	3	1	1			1	2	1	P
Mallard^	<i>Anas platyrhynchos</i>			1						
Meadow Pipit*	<i>Anthus pratensis</i>		2	2		1			6	
Mistle Thrush	<i>Turdus viscivorus</i>					1				
Pheasant	<i>Phasianus colchicus</i>	2	1					6	3	
Pied Wagtail	<i>Motacilla alba</i>		1			1				

Common Name	Scientific Name	T1	T2	T3	T4	T5	T6	T7	T8	PC1
Raven	<i>Corvus corax</i>		1				1	P		
Redpoll (Lesser)	<i>Acanthus cabaret</i>	1								
Redwing*	<i>Turdus iliacus</i>	7	10				5			2
Robin	<i>Erithacus rubecula</i>	1	2	2	1	3	2	2	1	1
Rook	<i>Corvus frugilegus</i>	21	18	50	29	121	25	14	1	4
Skylark^	<i>Alauda arvensis</i>	60	60				1	1		1
Snipe*	<i>Gallinago gallinago</i>			2	3	1	1		1	2
Song Thrush	<i>Turdus philomelos</i>	1	6	1		1	1	P	3	
Sparrowhawk	<i>Accipiter nisus</i>						1			
Starling^	<i>Sturnus vulgaris</i>	5	40	25	2	30	50	20	5	1
Stonechat	<i>Saxicola rubicola</i>	20	1	2		1			1	
Woodcock*	<i>Scolopax rusticola</i>								3	
Woodpigeon	<i>Columba palumbus</i>	20	7	5	10	14	15	20	12	6
Wren	<i>Troglodytes troglodytes</i>	1	1	2	1	3	1	1	1	1

^ Amber-listed \* Red-listed (Gilbert *et al.* 2021)

In the breeding season there was a total of 14 bird species recorded at PC1 (Table 4.8). No Red-listed species were recorded during the breeding season survey at Land Parcel 5 (substation site). Numbers and diversity of species present was relatively low.

**Table 4.8 Bird species recorded at PC1 in the winter period with the peak count within 50m shown. Birds only recorded >50m from the observer shown as 'P' for present.**

Common Name	Scientific Name	PC1
Blackbird	<i>Turdus merula</i>	1
Blue Tit	<i>Cyanistes caeruleus</i>	1
Chaffinch	<i>Fringilla coelebs</i>	2
Dunnock	<i>Prunella modularis</i>	1
Goldfinch	<i>Carduelis carduelis</i>	4
Hooded Crow	<i>Corvus cornix</i>	1
Jackdaw	<i>Corvus monedula</i>	1
Magpie	<i>Pica pica</i>	1
Pheasant	<i>Phasianus colchicus</i>	P
Robin	<i>Erithacus rubecula</i>	1
Rook	<i>Corvus frugilegus</i>	3
Swallow^	<i>Hirundo rustica</i>	3
Willow Warbler^	<i>Phylloscopus trochilus</i>	2
Wren	<i>Troglodytes troglodytes</i>	2

In the wider project area, a total of 43 species were recorded during the breeding season surveys (Table 4.9). Most of the species are common birds of farmland and woodland. The breeding season bird community included a number of summer migrants including Swallow, *Hirundo rustica*, Chiffchaff,

*Phylloscopus collybita* and Whitethroat, *Sylvia communis*. Overwintering Redwing were still present during the March walkover survey. The species diversity on transect ranged from 17-25 species. However, the species diversity on Transect 5 was influenced by distant (>100m) records of six species, mostly waterbirds associated with the Suir Estuary.

Two Red-listed species were recorded: Redwing and Kestrel, with a further 8 Amber-listed species observed. A single Kestrel was recorded on Transect 1 (Parcel 1) on one of the survey occasions. A small number of Redwing, as mentioned above, were still present in small numbers on the first breeding season survey visit.

As in the winter season, the most abundant species recorded were Rook and Woodpigeon. Apart from occasional observations of small flocks of foraging birds such as Black-headed Gull, Herring Gull, and Greater and Lesser Black-backed Gull there were very few records of waterbirds on transect. Some waterbirds were seen or heard at distance on the transects near the estuary (Parcel 4) and a pair of Mallard was observed flying towards the watercourses west of Parcel 3.

**Table 4.9 Peak counts of each species recorded during the breeding season surveys (2025). 'P' indicates that the species was only recorded >100m from the transect (or >50m from the Point Count location).**

Common Name	Scientific Name	T1	T2	T3	T5	T6	T7	T8	PC1
Blackbird	<i>Turdus merula</i>	2	2	2	1	2	2	2	1
Blackcap	<i>Sylvia atricapilla</i>			2		1			
Black-headed Gull^	<i>Chroicocephalus ridibundus</i>				P		P		
Blue Tit	<i>Cyanistes caeruleus</i>	1	1	2		2		1	1
Bullfinch	<i>Pyrrhula pyrrhula</i>			1					
Buzzard	<i>Buteo buteo</i>		P			P		1	
Chaffinch	<i>Fringilla coelebs</i>	2	3	4	2	3	1	3	2
Chiffchaff	<i>Phylloscopus collybita</i>	P		1		P			
Coal Tit	<i>Periparus ater</i>			2		1			
Cormorant^	<i>Phalacrocorax carbo</i>				P				
Dunnock	<i>Prunella modularis</i>		1	1				1	1
Goldcrest^	<i>Regulus regulus</i>			2	1	2			
Goldfinch	<i>Carduelis carduelis</i>	2			2				4
Great Spotted Woodpecker	<i>Dendrocopos major</i>			1					
Great Tit	<i>Parus major</i>	1	1				1	1	
Grey Heron	<i>Ardea cinerea</i>				P		P		
Herring Gull^	<i>Larus argentatus</i>				2	P			
Hooded Crow	<i>Corvus cornix</i>	2		1	2	4			1
House Martin^	<i>Delichon urbicum</i>				4			2	
Jackdaw	<i>Corvus monedula</i>	3	2	2	5		4	1	1
Kestrel*	<i>Falco tinnunculus</i>	1							
Lesser Black-backed Gull^	<i>Larus fuscus</i>				4			2	
Linnet^	<i>Linaria cannabina</i>	2	2		1				
Little Egret	<i>Egretta garzetta</i>				P				

Common Name	Scientific Name	T1	T2	T3	T5	T6	T7	T8	PC1
Magpie	<i>Pica pica</i>	1	1	1			2		1
Mallard^	<i>Anas platyrhynchos</i>			2					
Oystercatcher*	<i>Haematopus ostralegus</i>				P				
Pheasant	<i>Phasianus colchicus</i>	1	P				1		P
Pied Wagtail	<i>Motacilla alba</i>				1	1			
Raven	<i>Corvus corax</i>							1	
Redwing*	<i>Turdus iliacus</i>			1		3			
Robin	<i>Erithacus rubecula</i>	1	2	3	2	5	3	2	1
Rook	<i>Corvus frugilegus</i>	19	12	4	27	11	9	9	3
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>			P	P				
Skylark^	<i>Alauda arvensis</i>							P	
Song Thrush	<i>Turdus philomelos</i>		1	P		P			
Starling^	<i>Sturnus vulgaris</i>	2			6		3	8	
Stonechat	<i>Saxicola torquata</i>	1							
Swallow^	<i>Hirundo rustica</i>				2	3	4		3
Whitethroat	<i>Sylvia communis</i>		1						
Willow Warbler^	<i>Phylloscopus trochilus</i>	1	2	4		5	1	4	2
Woodpigeon	<i>Columba palumbus</i>	6	11	6	2	5	8	2	
Wren	<i>Troglodytes troglodytes</i>	1	3	3	3	4	1	3	2

^ Amber-listed \* Red-listed (Gilbert *et al.* 2021)

Given the diversity and abundance of species recorded at the proposed development site the SID application site is considered of Local importance (lower value). The wider project area (including the SID application site and proposed Drumdowney Solar Farm) is considered to be of Local importance (Higher value) for birds. Much of the footprint of the proposed solar farm will be located within areas of improved agricultural grassland which is of local value (lower importance) for birds but given the location close to the coast, could be used on occasion by Gulls and other foraging/roosting waterbirds.

### 4.3.2 Non-volant Mammals

The NBDC database holds records for a number of non-volant mammals protected under the Wildlife Acts (1976; Wildlife Amendment Act, 2000) including species such as Badger (*Meles meles*), Red Squirrel (*Sciurus vulgaris*) and Otter (*Lutra lutra*). Article 17 returns confirm regular sightings and signs of Otter from along the Suir estuary ([www.npws.ie](http://www.npws.ie)).

The non-volant mammal species historically recorded in S61 which encompasses the application site are shown in Table 4.10. All of the native species are listed as “Least Concern” in Ireland at present (Marnell *et al.* 2019).

**Table 4.10. Non-volant mammal species records held by the NBDC database for the 10km Grid Square (S61) overlapping the proposed development site**

Species	Scientific Name	Status <sup>6</sup>	Grid Squares
Badger	<i>Meles meles</i>	Wildlife Act, 1976; Wildlife (Amendment) Act, 2000	S61
Bank Vole	<i>Myodes glareolus</i>	Invasive Species (Medium Impact)	S61
Brown Rat	<i>Rattus norvegicus</i>	Invasive species (High Impact) subject to Regulations 2011 S.I. No. 477/201 (Ireland)	S61
Fox	<i>Vulpes vulpes</i>		S61
Greater White-toothed Shrew	<i>Crocidura russula</i>	Invasive Species (Medium Impact)	S61
Grey Squirrel	<i>Sciurus carolinensis</i>	Invasive species (High Impact) subject to Regulations 2011 S.I. No. 477/201 (Ireland)	S61
Hedgehog	<i>Erinaceus europaeus</i>	Wildlife Act, 1976; Wildlife (Amendment) Act, 2000	S61
House Mouse	<i>Mus musculus</i>	Invasive species (High Impact)	S61
Irish Hare	<i>Lepus timidus hibernicus</i>	EU Habitats Directive [92/43/EEC] Annex V; Wildlife Act, 1976; Wildlife (Amendment) Act, 2000	S61
Irish Stoat	<i>Mustela erminea hibernica</i>	Wildlife Act, 1976; Wildlife (Amendment) Act, 2000	S61
Mink	<i>Mustela vison</i>	Invasive species (High Impact) subject to Regulations 2011 S.I. No. 477/201 (Ireland)	S61
Otter	<i>Lutra lutra</i>	EU Habitats Directive [92/43/EEC] Annex II & IV; Wildlife Act, 1976; Wildlife (Amendment) Act, 2000	S61
Pine Marten	<i>Martes martes</i>	EU Habitats Directive [92/43/EEC] Annex V; Wildlife Act, 1976; Wildlife (Amendment) Act, 2000	S61
Pygmy Shrew	<i>Sorex minutus</i>	Wildlife Act, 1976; Wildlife (Amendment) Act, 2000	S61
Rabbit	<i>Oryctolagus cuniculus</i>	Invasive Species (Medium Impact)	S61
Red Squirrel	<i>Sciurus vulgaris</i>	Wildlife Act, 1976; Wildlife (Amendment) Act, 2000	S61
Red-necked Wallaby	<i>Macropus rufogriseus</i>	Invasive Species (Medium Impact)	S61
Sika Deer	<i>Cervus nippon</i>	Invasive species (High Impact) subject to Regulations 2011 S.I. No. 477/201 (Ireland); Wildlife Act, 1976; Wildlife (Amendment) Act, 2000	S61
Wood Mouse	<i>Apodemus sylvaticus</i>		S61

<sup>6</sup> Red List Status after Marnell *et al.* (2019), Invasive impact after Kelly *et al.* (2013).

Table 4.11 summarises the non-volant mammals recorded historically in the tetrad which overlap the SID application site boundary. This illustrates that Badger and Pine Marten have been recorded in the local area.

Other species with restrictive habitat requirements are only found in tetrads with estuarine habitat across the wider project area e.g. Common Dolphin, *Delphinus delphis*, or in areas with freshwater or estuarine habitats e.g. Otter.

**Table 4.11 Non-volant mammals recorded in the tetrads which encompass the application site.**

Common Name	Scientific Name
Badger	<i>Meles meles</i>
Pine Marten	<i>Martes martes</i>

No sightings or signs of non-volant mammals were recorded during walkovers of the proposed SID application site.

Species identified during field surveys of the wider project area (i.e. including the Drumdowney Solar Farm site) included Badger, Fox, Otter and Rabbit. Analysis of the trail cameras deployed across this wider project area confirmed the presence of a number of non-volant mammal species (Table 4.12)

The proposed SID application site is considered to be of Local importance (lower value). Across the wider project study area, in recognition of the presence of protected non-volant mammal species and suitable foraging and commuting habitat for additional species such as Hedgehog, *Erinaceus europaeus*, the wider project site is assessed as having Local importance (higher value) for non-volant mammals.

**Table 4.12 Analysis of the trail cameras deployed across the wider project site in 2025.**

Species	Scientific Name	TC1	TC2	TC3	TC4
<i>Mammal species</i>					
Brown Rat	<i>Rattus norvegicus</i>			4	
Fox	<i>Vulpes vulpes</i>	8	2	1	1
Mink	<i>Mustela vison</i>			7	
Otter	<i>Lutra lutra</i>			2	
Pine Marten	<i>Martes martes</i>			3	
Red Squirrel	<i>Sciurus vulgaris</i>			1	
Sika Deer	<i>Cervus nippon</i>				10

### 4.3.3 Bats

The NBDC historic records for this area are summarised in Table 4.13 below. Five species have been recorded in 10km Grid Square S61.

**Table 4.13. Bat species records held by the NBDC database for the 10km Grid Square (S61) overlapping the proposed development site**

Species	Scientific Name
Brown Long-eared Bat	<i>Plecotus auritus</i>
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>
Daubenton's Bat	<i>Myotis daubentonii</i>
Leisler's Bat	<i>Nyctalus leisleri</i>
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>

There are no structures within the proposed SID application site that are attractive for roosting for bats and the hedgerows are intensively managed and are relatively unattractive for roosting bats.

Table 4.14 presents the results of the passive detector deployment from the wider project area (i.e. including the proposed Drumdowney Solar Farm site). All of the recorded sonograms were analysed using Kaleidoscope Prop software and identifications manually confirmed by Dr. Gavin Fennessy. Five species were confirmed to be present in this wider area with both Common Pipistrelle, *Pipistrellus pipistrellus* and Soprano Pipistrelle, *Pipistrellus pygmaeus*, recorded at all of the deployment locations. Other species identified were less frequently active and less widely detected. Leisler's Bat, *Nyctalus leisleri* was detected at BD2 and BD3. A few detections of Brown Long-eared Bat, *Plecotus auritus*, were also recorded at BD2. There were also a small number of detections of Myotids at BD1 and BD2.

In general, the level of activity was relatively modest for the time of year (given the length of the effective deployment c. 25 nights).

**Table 4.14 Analysis of the passive detectors deployed at the application site.**

Common Name	Scientific Name	BD1	BD2	BD3	BD4
Brown Long-eared Bat	<i>Plecotus auritus</i>		3		
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	705	549	3822	44
Leisler's Bat	<i>Nyctalus leisleri</i>		64	48	
Myotis sp.	<i>Myotis sp.</i>	6	2		
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	200	161	722	107

None of the Irish bat species are of elevated conservation concern at present. All bat species occurring in Ireland are legally protected under the Irish Wildlife Acts (1976 - 2012). Under this protection, it is an offence to hunt or interfere with or destroy their breeding or resting places (unless under statutory licence/permission). Irish bat species listed are also listed on Annex IV of the EU Habitats Directive, with Lesser Horseshoe Bat (not present in this area) listed on Annex II and Annex IV.

Based on the bat activity recorded across the wider project site the current SID application site is evaluated as of local value (lower to higher importance) for foraging and commuting bats.

### 4.3.4 Other Taxa

#### 4.3.4.1 Desktop study

Historic records from S61 10km Grid Square which encompasses the site there has also been historic records of Common Lizard, *Zootoca vivipara* from this area. Table 4.15 presents the invertebrate species that have been recorded historically from this wider area. As well as the endangered butterfly, Wall, *Lasiommata megera*, there are records of Marsh Fritillary, *Euphydryas aurinia*, the only Irish butterfly species listed on Annex II of the EU Habitats Directive.

**Table 3-16. Invertebrate species records held by the NBDC database for the 10km Grid Square (S61) overlapping the proposed development site.**

Species Group	Species	Scientific Name	Status <sup>7</sup>
Bees (Hymenoptera)	Buffish Mining Bee	<i>Andrena nigroaenea</i>	Vulnerable
	Gold-fringed Mason Bee	<i>Osmia aurulenta</i>	Near Threatened
	Grey-banded Mining Bee	<i>Andrena denticulata</i>	Vulnerable
	Large Red Tailed Bumble Bee	<i>Bombus lapidarius</i>	Near Threatened
	Moss Carder-bee	<i>Bombus muscorum</i>	Near Threatened
	Painted Mining Bee	<i>Andrena fucata</i>	Near Threatened
	Panzer's Nomad Bee	<i>Nomada panzeri</i>	Near Threatened
	Willoughy's Leafcutter Bee	<i>Megachile willughbiella</i>	Near Threatened
Butterflies (Lepidoptera)	Dark Green Fritillary	<i>Argynnis aglaja</i>	Vulnerable
	Dingy Skipper	<i>Erynnis tages</i>	Near Threatened
	Gatekeeper	<i>Pyronia tithonus</i>	Near Threatened
	Grayling	<i>Hipparchia semele</i>	Near Threatened
	Marsh Fritillary	<i>Euphydryas aurinia</i>	Vulnerable, EU Habitats Directive [92/43/EEC] Annex II.
	Small Heath	<i>Coenonympha pamphilus</i>	Near Threatened
	Wall	<i>Lasiommata megera</i>	Endangered
	Wood White	<i>Leptidea sinapis</i>	Near Threatened
Freshwater and Terrestrial Molluscs	Common Garden Snail	<i>Cornu aspersum</i>	Invasive Species (Medium Impact)
	Common Whorl Snail	<i>Vertigo pygmaea</i>	Near Threatened
	Ear Pond Snail	<i>Radix auricularia</i>	Vulnerable
	English Chrysalis Snail	<i>Leiostryla anglica</i>	Vulnerable
	Hollowed Glass Snail	<i>Zonitoides excavatus</i>	Vulnerable

<sup>7</sup> Red List Status after Fitzpatrick *et al.* (2006), Regan *et al.* (2010), Byrne *et al.* (2009), Invasive impact after Kelly *et al.* (2013).

Species Group	Species	Scientific Name	Status <sup>7</sup>
	Jenkins' Spire Snail	<i>Potamopyrgus antipodarum</i>	Invasive Species (Medium Impact)
	Keeled Slug	<i>Tandonia sowerbyi</i>	Invasive Species (Medium Impact)
	Lake Orb Mussel	<i>Musculium lacustre</i>	Vulnerable
	Marsh Whorl Snail	<i>Vertigo antivertigo</i>	Vulnerable
	Moss Bladder Snail	<i>Aplexa hypnorum</i>	Vulnerable
	Moss Chrysalis Snail	<i>Pupilla muscorum</i>	Endangered
	Silky Snail	<i>Ashfordia granulata</i>	Near Threatened
	Smooth Grass Snail	<i>Vallonia pulchella</i>	Vulnerable
	Swollen Spire Snail	<i>Mercuria cf. similis</i>	Endangered
	Wrinkled Snail	<i>Candidula intersepta</i>	Invasive Species (Medium Impact)
Crustaceans	Bay Barnacle	<i>Balanus improvisus</i>	Invasive species (Medium Impact) subject to Regulations 2011 S.I. No. 477/201 (Ireland)
	Chinese Mitten Crab	<i>Eriocheir sinensis</i>	Invasive species (High Impact) subject to Regulations 2011 S.I. No. 477/201 (Ireland)
	New Zealand Barnacle	<i>Elminius modestus</i>	Invasive Species (Medium Impact)

#### 4.3.4.2 Field records

The only other taxa of note recorded during walkover visits of the application site were Small Tortoiseshell, *Aglais urticae*, Red Admiral, *Vanessa atalanta* and Orange Tip, *Anthocharis cardamines* butterflies.

While hedgerow at the site provide some suitable habitat for certain other taxa, in general, the agricultural fields present at the application site are considered to be of local value (lower importance) for most such species.

## 4.4 Overall Site Evaluation

Taking the above into consideration, the proposed SID application site is currently of Local Importance (lower to higher level) (see Appendix B) as it contains some semi-natural habitat (*e.g.*, hedgerows) but is dominated by improved agricultural grassland (GA1) of low biodiversity value.

## 5 Potential Impacts

Potential impacts of the proposed development on ecology are discussed below. The assessment of potential impacts is informed by the desktop and field surveys carried out between 2024 and 2025, augmented by a thorough desktop review.

The substation will be based on EirGrid design specifications. The substation compound will consist of a two-storey GIS substation building, single-storey IPP Control Room building, HV electrical equipment and associated infrastructure including palisade fences and concrete post and rail fences. The installation of HV electrical equipment will include a transformer with associated equipment along with:

- Lightning Masts (LM);
- Back-Up Diesel Generator;
- Harmonic filters if required by EirGrid;
- Capacitor Bank if required by EirGrid;
- Fire/Blast Wall;
- Telecoms Pole.

The substation compound has a total area of 5,335m<sup>2</sup>. The proposed landscaping provides for the removal of c. 87 metres of hedgerow to facilitate the proposed development. Approximately 531 metres of existing hedgerow will be bolstered (Type 1) as part of the development, with an additional 287 linear metres of new hedgerow planting (Type 2) as per the submitted Landscape Mitigation Plan.

The remaining habitat directly impacted will be improved agricultural grassland (GA1) of low ecological importance. The construction programme for the entire of the electrical infrastructure works associated with the Drumdowney Solar Farm (including the substation) is estimated to be a total of 24 months.

The SID application site will be accessed for both the construction and operational phases by means of a single entrance from the L34142. This existing entrance will be subject to some upgrades, including removal of existing roadside sod and stone ditch to provide new gate as presented under Kilkenny County Council Reference 25/60391. A 4.5 metre wide compacted access track will extend from the entrance to the substation compound. The design includes a temporary construction track to cater for deliveries, which will be decommissioned post the construction phase (and land reinstated), as well as an operational access track. The track will include a geotextile base and filter membrane and 200 mm of Clause 804 sub-base.

In order to connect to the transmission network, it is proposed to connect the 110kV substation into the national grid via a 'loop-in / loop-out' underground 110kV cable grid connection which will connect into the existing 110kV Great Island to Waterford overhead line. Two new steel lattice interface towers of approximately 16 m in height will form part of the existing overhead line and both towers will connect to the proposed 110kV substation via underground 110kV cables. The interface towers are approximately 15 metres apart, therefore the same length of the existing 110kV Whitegate – Cow's Cross overhead line will need to be decommissioned. The underground cable is comprised of 3 no. power ducts, 2 no. telecom ducts

and 1 no. earth continuity duct. The cables to each interface tower are 68 and 83 metres in length. The work to construct and connect the interface towers will take c. 4 weeks in total.

This connection method will constitute a new node of the transmission network, connecting the proposed substation and associated solar farm generation to the national electricity grid. The construction method for the interface towers and decommissioning of 110kV overhead lines is set out in the Drumdowney Substation & Grid Connection Construction Methodology prepared by Drumdowney Solar Farm Limited.

All works will be carried out in accordance with international best practice and full compliance with health and safety requirements.

### 5.1 Potential Effects on Designated Sites

The proposed SID application area is within the River Barrow catchment. The location of the proposed substation is not situated within or closely adjacent to any European designated site. It is anticipated that the substation and grid connection will be constructed in parallel with the proposed solar farm development.

The substation is located in an area of low local ecological importance and there is no watercourse within or closely adjacent to the proposed SID application site. Standard construction phase environmental controls will be effective in minimising any wider environmental effects arising from the construction of the substation and grid loop-in at this location.

No Third Schedule Invasive species were recorded along the route of the proposed grid connection. There is some potential for localised temporary disturbance and displacement effects on locally occurring fauna during the construction phase. However, there was no evidence of the proposed SID application site being used by any of the QI/SCI species of the European designated sites in the wider area.

Notwithstanding the distances involved between the proposed development and the Natura 2000 sites in the wider area and lack of clear hydrological connectivity between the SID application site and any European designated sites the proposed SID application is part of a wider solar farm development project (Drumdowney Solar Farm) for which it was determined that in the absence of appropriate environmental controls and suitable mitigation measures that there was some likelihood of significant effects on the hydrologically connected European sites: River Barrow & River Nore SAC and Lower River Suir SAC. Therefore, on the basis that there is potential for significant effects arising from the wider solar farm development to which the proposed SID application is intrinsically linked a Natura Impact Statement is provided (Appendix 1) which fully considers the potential for the entire (wider) project to cumulatively result in adverse impacts on the SACs 'screened in'.

### 5.2 Potential Effects on Habitats and Flora

Habitats corresponding to those listed on Annex I of the EU Habitats Directive are not present within the proposed development study area. Botanical species protected under the Flora (Protection) Order 2022, listed in the EU Habitats Directive (92/43/EEC) or Red-listed (Wyse-Jackson *et al*, 2016) were not recorded during the site survey.

The SID application site will result in the loss of some open agricultural grassland of negligible ecological value and c. 87m of hedgerow of some local biodiversity value. Approximately 531 metres of existing hedgerow

will be bolstered (Type 1) as part of the development, with an additional 287 linear metres of new hedgerow planting (Type 2) as per the submitted Landscape Mitigation Plan.

Construction activities associated with the proposed development works have the potential to introduce non-native invasive species into the proposed development site. No Third Schedule Invasive species were recorded within the development footprint. The status of non-native invasive species shall be determined prior to the commencement of any construction activities and appropriate management undertaken if necessary. With the implementation of these measures, the risk of introduction and/or spread of non-native invasive species due to the proposed construction activities would be low and deemed a neutral effect.

No other habitats identified during the current survey will be impacted by the construction phase of the proposed development.

### **Operational Phase Impacts**

There will be no additional removal of habitat during the operational phase of the proposed development and there is no potential for significant negative impacts on habitat and flora arising for the operational phase of the proposed development.

## **5.3 Potential Effects on Fauna**

### **Construction Phase**

Potential construction effects on fauna could be associated with disturbance/displacement effects, loss or degradation of feeding or resting places, exclusion or even direct mortality. Most of these effects are rendered highly unlikely due to the nature of the receiving environment and scale of the proposed development.

During construction there may be some lighting of the temporary works compound and lighting has the potential to be disturbing to local fauna. Similarly, the construction phase of the proposed development has the potential to cause disturbance (noise/visual cues) to fauna occurring at the substation development site. Movement of plant and personnel and the associated noise and visual stimuli could potentially cause localised disturbance and displacement of certain faunal species. The introduction of edible and putrescible wastes can attract scavenging species and disrupt the local ecology. Given the scale of the works the potential effects are localised and temporary in nature and amenable to mitigation.

The loss of agricultural grassland habitats at the proposed SID application site will lead to a highly localised non-significant loss of foraging habitat for farmland bird species. The proposed development will result in the permanent removal of an area of grassland habitat. However, similar suitable habitat is relatively abundant in the wider area, as the proposed development site is situated in a landscape dominated by pasture.

The walkovers of the proposed SID application area recorded a relatively low diversity of species with no breeding or resting places of non-volant mammals and relatively low-quality field boundaries. In the absence of mitigation there is some potential for localised disturbance and displacement of fauna, particularly during the construction phase.

Given the nature of the habitats present and the results of the field walkovers no significant construction-phase impacts on fauna are expected as a result of the proposed development.

### **Operational Phase Effects**

The built nature of the substation infrastructure makes it relatively unattractive for most fauna species. Some species such as House Martin, *Delichon urbicum* are capable of using standalone structures as a suitable nesting site and others bird species such as Gulls and Corvids will also use perches within this type of built environment. However, due to the lack of attractive foraging habitat much of the built footprint within the SID application site will be unattractive for most fauna species.

Post construction the substation site will be marginally less attractive for most faunal species. All above ground structures, including the loop-in towers have some potential to marginally increase the risk of collision for birds commuting across the site, particularly in low visibility conditions. There will be some switchable lighting at the substation, but this will be minimal and used only as necessary. The substation will be visited occasionally but this will tend to be during daylight hours and the activity at the substation will not represent a significant source of ongoing disturbance.

The potential effects on fauna arising from the operation of the proposed development are therefore considered to be neutral and non-significant.

## **5.4 Cumulative Impacts**

For projects to act cumulatively in a manner that significantly impacts upon biodiversity there needs to be a mechanism by which such an effect is mediated. For instance, this could occur if there was cumulative impacts upon water quality, or loss of an important habitat feature. In general, if individual projects and plans adequately address the potential risks to the receiving environment there is significantly less risk of cumulative and in combination effects. Indeed, in circumstances where projects have landscaping and biodiversity measures that are compatible it may be the case that ecological connectivity may be improved through creation or enhancement of hedgerow, woodland and field margin habitats.

The proposed development is associated with the development of the proposed Drumdowney Solar Farm. Ecology Ireland also carried out the assessments (including preparing the EclA and NIS) for this solar farm development. The potential for significant effects on designated sites and their conservation objectives arising from the overall solar farm project is recognised as an in-combination effect in the accompanying NIS.

Ecology Ireland has considered other projects and plans relevant to this area and their potential to act cumulatively or in combination with the proposed development. The County Development plans for Kilkenny City & County (2021-2027) and Waterford City & County Council (2022-2027) formed part of this review.

A selection of plans and projects identified from this area are summarised in Table 5.1 below. Most of the planning permissions in the local area are associated with relatively minor works such as modifications to residential or farm buildings and construction of one-off houses.

The proposed development area is rural and agricultural land use is dominant. A number of the planning applications in the area relate to operations at or associated with Belview Port, electricity distribution from

Great Island Power station and renewable energy projects. There is a live application before the local authority (25/60254) in relation to modifications to road access at Belview Port and this application is accompanied by a NIS. The field surveys recorded Otter activity at the port, along the Suir Estuary.

Potential cumulative effects in relation to solar farms projects include construction related surface-water run-off, in particular where qualifying interests associated with the SACs could be subject to cumulative impact through hydrological or water quality impacts such as increased siltation, nutrient release and contaminated run-off arising from other developments. This project has been considered on its own and in relation to the potential for any cumulative or in combination impacts arising from any combination of the project proceeding in the future.

The earthworks associated with the proposed SID application are relatively minor and with the implementation of appropriate environmental controls and mitigation, the risk of any significant effects outside of the immediate footprint of the development is considered extremely unlikely.

## 5.5 Do nothing scenario

With regard to the 'do-nothing' scenario, it is assumed that, without permission, the project site will continue to be farmed in a similar fashion to that observed during site visits in 2024 and 2025. Therefore, improved agricultural grassland (GA1) will remain the dominant habitat with some linear woody habitats (hedgerows (WL1) and treelines (WL2) marking the field boundaries.

**Table 5.1 Selection of planning applications in the vicinity of the overall solar farm project (including the SID application site and the proposed Drumdowney Solar Farm).**

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
ABP-321962	c. 450m	Granted - 01/08/2025	An Coimisiún Pleanála	Construction of an integrated plasterboard manufacturing facility and all associated works. Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS) submitted with application.
25/60233	c. 140m	Granted – 23/06/2025	Kilkenny County Council	Constructing 2 no. industrial warehouse blocks for bulk storage, with Block A housing 4 no. single storey storage units (floor area - 3,488.4m <sup>2</sup> ) and Block B housing 4 no. single storey units (floor area - 8446.2m <sup>2</sup> ), new weighbridge and cabin, new internal access roads, retaining walls and boundary fencing and all ancillary works.
25/60208	c. 3.5km	Granted – 12/06/2025	Kilkenny County Council	for the renovation and extension of our existing administration offices together with a new security hut, altered entrance arrangement and all associated site works.
25/60177	c. 50m	Granted – 27/05/2025	Kilkenny County Council	for the construction of a bulk store and associated site works. The store will be used to store port related products such as break bulk, bulk and unitised loads.
25/60074	c. 480m	Granted – 21/05/2025	Kilkenny County Council	for the construction of a new wastewater treatment system and a proposed change to the site boundary situated.

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
24/60304	c. 3.8km	Granted – 10/04/2025	Waterford City & County Council	The Phase 1 development includes 9 blocks with a total gross floor area (GFA) of 60579sqm (64953sqm including undercroft and basement car parks (4374sqm)). The development involves construction of a podium which establishes new ground/ street formation level which varies from c.4.6mOD to 8.4mOD which connects to the Sustainable Transport Bridge (by WCCC) at the Central Plaza. Provision is made for pedestrian connection from Central Plaza to Dock Road via the approved pedestrian bridge (by WCCC). A new riverside promenade / cycleway (part of Greenway) is proposed between the Sustainable Transport Bridge and the Eastern Access to the site.
24/60308	c. 2.9km	Granted – 13/03/2025	Kilkenny County Council	for the proposed erection of 14 number semi-detached two-storey and basement [three-stories overall] dwellinghouses together with all associated site development works [including removal of existing concrete bases and reduction of levels to original contour levels] in lieu of 10 number houses [No 17-26] previously permitted under Planning Reference 16/872.
ABP-318204	c. 1km	Granted – 15/01/2025	An Bord Pleanála	Grid stability service development and associated site works.
ABP-318103	c. 1km	Granted – 13/11/2024	An Bord Pleanála	Development of a new electricity circuit. A Natura Impact Statement (NIS) was submitted with the application.
23/60426	c. 1km	Granted – 16/09/2024	Kilkenny County Council	For a 7-year planning permission for 3 No Bulk Stores, a marshalling yard and site works including earthworks, road works, entrance, gates and fencing, concrete paving, water services, drainage works, site lighting and landscaping. The stores will be used to store Port related products such as bulk goods, break bulk and unitised products.

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
23/60578	c. 3km	Granted – 05/08/2024	Kilkenny County Council	For the demolition of two existing shed buildings and removal of the remaining floor slab of a previous dwelling, the construction of 16 No. two storey houses (12 No. 3-bedroom & 04 No. 02-bedroom), a new site entrance from Abbey Road, new boundary treatments, and all associated site & development works.
24/60256	c. 750m	Granted – 23/07/2024	Kilkenny County Council	For the development of 2no. grain silos and associated site works.
20240309	c. 1.4km	Granted – 12/06/2024	Wexford County Council	Permission for development consisting of construction of a Battery Energy Storage System (BESS).
ABP-318914	c. 1km	Granted – 05/06/2024	An Bord Pleanála	110kV substation and 110kV underground grid connection.
23/60323	c. 1.6km	Granted – 08/04/2024	Kilkenny County Council	for the proposed erection of 4 number fully serviced 2 storey detached dwellings, 4 number detached single storey garages, 2 number proposed vehicular and pedestrian entrances, boundary treatments to include removal of existing stone wall to front of site to facilitate sightlines, landscaping, together with all associated site development works to include removal of adjoining section of farm building.
20231294	c. 1.2km	Granted – 16/02/2024	Wexford County Council	Permission for development, consisting of: Construction of an electrical infrastructure installation and associated underground grid connection (UGC).

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
23/60536	c. 3.5km	Granted – 25/01/2024	Kilkenny County Council	For the demolition of the existing biofilter for odour abatement and the construction of a new biofilter, stack and all associated pipework and ducting.
ABP-312631	c. 1.3km	Granted – 22/01/2024	An Bord Pleanála	Construction of two boreholes in milk processing plant. Natura Impact Statement submitted with the planning application. The Glanbia Ireland DAC facility has an Industrial Emissions Licence granted by the EPA.
23/60504	c. 3.6km	Granted – 04/01/2024	Kilkenny County Council	For the provision of new effluent treatment system with associated percolation area including all site development works.
23/60274	c. 690m	Granted – 02/11/2023	Kilkenny County Council	(1) New single storey warehouse, incorporating a 2 Storey office block; (2) Open sided covered goods in-take area from proposed warehouse to existing building; (3) New single storey storage building between proposed building and existing building; (4) Relocation of existing weigh-bridge and associated items; (5) Relocation of existing static water bladder tank; (6) Realignment of existing car parking area on site to include for additional spaces; (7) Realignment of internal site road, together with all associated site development works, all at Gorteens, Slieverue, Co. Kilkenny. This application is accompanied by a Natura Impact Statement (NIS).
ABP-314069	c. 3.6km	Granted – 27/10/2023	An Bord Pleanála	Construction of extension and all associated site works.

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
23/60352	c. 3.9km	Granted – 25/09/2023	Kilkenny County Council	For a water storage tank, single storey pump house and all associated site works.
22/318	c. 280m	Granted – 17/05/2023	Kilkenny County Council	For a laydown area for equipment and break bulk materials. The works will include earthworks, drainage, concrete paving, retaining walls and landscaping works. A Natura Impact Statement will accompany this application.
22/549	c. 690m	Granted – 28/04/2023	Kilkenny County Council	For a single-storey extension to existing warehouse (BV2) to north of site, new storm water attenuation tank and the part realignment of existing concrete yard together with all associated site development works.
23/29	c. 30m	Granted – 30/03/2023	Kilkenny County Council	For the construction of a slatted tank, cattle shed, alongside all associated site works.
ABP-311746	c. 4.4km	Granted – 02/02/2023	An Bord Pleanála	Waterford City Public Infrastructure Project - Flood Defences West. Development of c.1.1km of flood protection measures.
22/480	c. 720m	Granted – 19/01/2023	Kilkenny County Council	For a Maintenance Building, roof mounted solar panels and associate site works at Belivew Port.

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
22/569	c. 360m	Granted – 12/01/2023	Kilkenny County Council	To construct 3 no. wood based, biomass storage bays an ash storage building and associated site works including road widening to an existing internal road and a new concrete yard area. A Natura Impact Statement will accompany the Application. Smartply Europe currently hold an Industrial Emission Licence issued by the EPA.
20221162	2.2km	Granted – 16/12/2022	Wexford County Council	Permission to amend the design of the approved development (Planning Reference 20170330) which comprises consent for a Solar PV Energy Development. Proposed amendments include; (1) Change of location and increase in number of client substations, (2) Increase in number of storage rooms, (3) Decrease in number and size of transformer containers, (4) Deer fencing to decrease in size, (5) Number of CCTV cameras to be reduced, (6) Slight alteration to the access tracks, (7) Change in height and number of module racks and pile driven poles, (8) Change in height and angle of solar panels, and (9) Change in lifetime of the permission from 5 years to 10 years with an increase operational lifetime from 25 to 35 years.
20220628	1.7km	Granted – 06/07/2022	Wexford County Council	Permission for development which will consist of grid connection infrastructure to connect the approved Ballyedock Solar Farm (PA Ref:20170330) to the existing Great Island Substation comprising the laying of underground cables, overhead lines, associated infrastructure and Horizontal Directional Drilling. The proposed development will also include upgrades to the substation (previously consented under planning application reference 20170330) to align with the connection route to the national grid. A Natura Impact Statement has been prepared in respect of the application for planning permission.
22/452	c. 45m	Granted – 22/11/2022	Kilkenny County Council	For the construction of a Livestock Underpass beneath the public road between the crossroads and existing farmyard alongside all associated site works.

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
22/513	c. 40m	Granted – 27/09/2022	Kilkenny County Council	For the change of use of land to extend the service station carpark to enable the installation of a modular substation and ancillary site development works; to facilitate 2 no. shared electric vehicle charging units and 4 no. charging bays within a partially reconfigured parking area.
22/81	c. 40m	Granted – 04/04/2022	Kilkenny County Council	The development will consist of the installation of 5250 Solar PV panels over the roof of existing industrial buildings and all associated site works and services.
21/1030	c. 1km	Granted – 14/02/2022	Kilkenny County Council	For the handling and temporary storage of zinc and lead ore at an existing bulk store, and loading of the ore from the store onto ships from an existing Wharf.
21/989	c. 1.4km	Granted – 03/02/2022	Kilkenny County Council	The installation of a Combined Heat and Power (CHP) unit including a 7.55m high stack, stack access ladder and platform, improvements to the internal estate road and ancillary site works at the permitted cheese manufacturing plant, planning permission reference no. 19/668 (APB-306136-19). An Industrial Emissions Licence is required for the cheese manufacturing plant and the proposed development. A Natura Impact Statement will also be submitted with the application.
21/551	c. 3.2km	Granted – 08/11/2021	Kilkenny County Council	For the construction of a terrace of 5 No. two bedroom bungalows designed for the elderly, together with proposed boundary treatments, landscaping, car parking, drainage connections and all associated site development works.
21/586	c. 320m	Granted – 31/08/2021	Kilkenny County Council	For a 7 year planning permission for a bulk store and associated site works. The store will be used to store port related products such as break bulk, bulk and unitised loads.

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
ABP-308906	c. 1km	Granted – 23/06/2021	An Bord Pleanála	Proposed development will form part of the Greenlink Interconnector and will consist of the development of a new converter station, tail station, MV substation and 23km of high voltage direct current (JVDC) electricity cables, 420m of high voltage alternating current (HVAC) cables, 23.42km of fibre optic cable and all associated site works with an overall proposed development site area of 83.8ha.
20/845	c. 3.3km	Granted – 10/06/2021	Kilkenny County Council	For the following: a) change of use of the existing first floor area to residential use to provide 15 no. apartments, b) construct a new rooftop penthouse containing 8 no apartments (23 apartments in total) together with c) elevational modifications, and all associated site works.
20/700	c. 320m	Granted – 05/03/2021	Kilkenny County Council	To develop a log yard and associated works. The log yard will extend the area available for stockpiling and handling of logs for use in SmartPly's oriented strand board mill which adjoins the site. A Natura Impact Statement will accompany the Application.
20/453	c. 2.5km	Granted – 03/03/2021	Kilkenny County Council	The construction of 40 no. residential units.
25/60254	c. 0km	Due - 06/07/2025	Kilkenny County Council	The extension of the existing access road that provides access to lands located at Belview Port, Gorteens and Drumdowney Upper, Co. Kilkenny.

## 5 Mitigation Measures

The following mitigation measures will be implemented as part of the proposed project in order to minimise the potential effects on the existing ecology as discussed above. These measures are to be read in conjunction with the detailed construction phase commitments presented in the Construction Method Statement for that accompanies the planning application (Drumdowney Solar Farm Ltd. 2025). These include standard measures such as the proper handling of edible and putrescible wastes etc.

The measures outlined below will be implemented to ensure that any impacts on the receiving environment will be avoided during the project's construction and operational phases. Prior to commencement of construction works the contractor will draw up a final Method Statement including a Construction Environmental Management Plan which will be based on established best practice measures. These documents will be adhered to by the contractors and will be overseen by the project representative/foreman.

The following documents will contribute to the preparation of the Method Statement and CEMP:

- Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters. Inland Fisheries Ireland, Dublin,
- National Roads Authority (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. National Roads Authority, Dublin.
- E. Murnane, A. Heap and A. Swain. (2006) *Control of water pollution from linear construction projects*. Technical guidance (C648). CIRIA.
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- H. Masters-Williams et al (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532).
- Enterprise Ireland (unknown). Best Practice Guide (BPGCS005) Oil storage guidelines.
- Law, C. and D'Aleo, S. (2016) *Environmental good practice on site pocketbook*. (C762) 4<sup>th</sup> edition. CIRIA.
- CIRIA Environmental Good Practice on Site (fourth edition) (C741) 2015.

### General Environmental Controls and Mitigation

The final Construction Method Statement and CEMP will comply with any conditions of planning. The environmental measures to be included in the final CEMP will include the measures as set out in the following sections:

The environmental control measures for construction phase will include the following:

- Materials, plant and equipment shall be stored in the proposed site compounds.

- All hazardous liquid materials shall be stored in a bunded area and spill containment measures will be in place.
- Re-fuelling of machinery, plant or equipment will be carried out in the site compounds.
- Fuel pipes on plant, outlets at fuel tanks etc. will be regularly checked and maintained to ensure that no drips or leaks to ground occur. The following precautions will also be installed on fuel delivery pipes:
  - Any flexible pipe, tap or valve must be fitted with a lock where it leaves the container and be locked when not in use.
  - Flexible delivery pipes must be fitted with manually operated pumps or a valve at the delivery end that closes automatically when not in use.
  - Warning notices including “No smoking” and “Close valves when not in use” shall also be displayed.
- Any pouring of concrete will only be carried out in dry weather. Washout of concrete trucks shall be strictly confined to designated and controlled impermeable wash-out areas remote from watercourses, drainage channels and other surface water features.
- Spill kits will be available within each plant/vehicle on site and located close to identified pollution sources or sensitive receptors (fuel storage areas, etc.).
- Interceptor drip trays will be positioned under any stationary mobile plant to prevent oil contamination of the ground surface or water. Plant and site vehicles are to be well maintained and any vehicles leaking fluids must be repaired or removed from site immediately. Any servicing operations shall take place over drip trays.
- Areas used to store fuel and oil on the site will be appropriately lined and bunded to prevent the downward percolation of contaminants to natural soils and groundwater.
- Fuel for construction vehicles will be stored on an impervious base within a bund able to contain at least 110% of the volume stored. Rainwater will not be allowed to accumulate within the bund and in any way compromise the required 110% volume capacity. No tanks or containers may be perforated or dismantled on site. A competent operator shall empty all contents and residues for safe disposal elsewhere.
- Suitable wheel wash facilities, complete with C/W silt traps will be put in place to ensure vehicles entering/exiting the site do not carry/transport debris.
- If very wet ground must be accessed during the construction process bog mats will be used to enable access to these areas by machinery.
- Daily environmental toolbox talks / briefing sessions will be conducted for all persons working to outline the relevant environmental control measures and to identify any environment risk areas/works.

### Water quality

- A buffer of 5-10 m from the closest drain or watercourse will be established and clearly marked out prior to the commencement of construction activities where possible. The buffer will be maintained with the exception of localised areas where fencing, access, crossing or cable trenching is required.
- Silt fencing will be installed within the works area for the proposed interconnector cables. The silt fence will provide protection from sediment and potential site water runoff.
- The silt fencing will be checked twice daily during construction and once per day thereafter to ensure that it is working satisfactorily until such time as the re-instated ground/material has been fully established.
- If dewatering is required as part of the proposed works e.g., in trenches for underground cabling or in wet areas, water must be treated prior to discharge. The Contractor shall employ best practice settling systems to ensure maximum removal of suspended solids prior to discharge of any surface water or groundwater from excavations to receiving waterbodies. This may include treatment via settlement tanks. There will be no direct pumping of water from the works to any watercourses or drains at any time.
- An emergency-operating plan will be established to deal with incidents or accidents during construction that may give rise to pollution within any nearby watercourses or drains. This will include means of containment in the event of accidental spillage of hydrocarbons or other pollutants (spill kits etc.).
- The contractor will ensure that good housekeeping is always maintained and that all site personnel are made aware of the importance of the nearby estuary/aquatic environments and the requirement to avoid pollution of all types.

### Soil Management

- Excavated material will be temporarily stockpiled onsite for re-use during reinstatement. Stockpiles will be restricted to less than 2m in height.
- No stockpiles associated with the excavation works associated with the proposed grid connection will be located within 10m of drains.
- Imported materials and any site won materials will be tested prior to use to determine its geotechnical and geo-environmental properties to assess their suitability for use
- Any earthen (sod) banks to be excavated will be carefully opened with the surface sods being stored separately and maintained for use during reinstatement.

### Noise

All plant will be required to conform to the British Standards (BS) 5228 Code of practice for noise and vibration control on construction and open site. BS5228 provides a comprehensive guidance on construction noise including details of typical noise levels associated with various items of plant or activities, prediction methods and measures and procedures and is an accepted standard for construction practise in Ireland given the absence of statutory Irish guidelines.

### Air quality

The main activities that may give rise to dust emissions during construction include the following:

- Excavation and removal of earthworks.

- Materials handling and storage.
- Movement of vehicles (particularly HGV's) and mobile plant.
- Suspended solids in surface water runoff.

### Waste Management

All waste arising during the construction phase will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments, and regulations of the Waste Management Plan are followed.

### Additional Ecological Mitigation

The following mitigation measures will be implemented as part of the proposed project in order to minimise the potential effects on the existing ecology as discussed above.

- No removal of habitats or movement of construction machinery will occur outside of the development works area/footprint during the construction phase, where the works area/footprint will be clearly marked for associated site staff.
- The following best practice measures form part of the construction methodology and will help to contain and/or prevent the introduction of invasive species on the site as follows:
  - When deemed necessary, all plant and equipment employed on the proposed works (e.g., diggers, tracked machines, footwear etc.) will be thoroughly cleaned down using a power washer unit, and washed into a dedicated and contained area prior to arrival on site and on leaving site to prevent the spread of invasive aquatic / riparian species. A sign off sheet will be maintained by the contractor to confirm cleaning.
  - Material gathered in the dedicated and contained clean down area will need to be appropriately treated as contaminated material on site.
  - For any material entering the site, the supplier must provide an assurance that it is free of invasive species.
  - Ensure all site users are aware of invasive species management plan and treatment methodologies. This can be achieved through "toolbox talks" before works begin on the site.
  - Adequate site hygiene signage should be erected in relation to the management of non-native invasive material.
- All lighting, temporary and permanent will be cowled and downward directed with a colour temperature maximum of 2,700K. Thus light spill will be minimised and the lighting will be less disruptive to foraging/commuting bats.
- No removal of habitats or movement of construction machinery will occur outside of the development works area/footprint during the construction phase, where the works area/footprint will be clearly marked for associated site staff.
- All construction works will be carried out according to best practice with standard environmental controls in place to prevent any damaging run-off from the site (see CIRIA 2001, 2010 & 2015). The

construction of the proposed development will be implemented in accordance with the Construction Environmental Management Plan (CEMP) for the proposed development.

- To confirm the findings of the field studies that informed the assessment of the proposed development and the proposed Drumdowney Solar Farm and in keeping with recommended best practice, a pre-construction walkover of the site will be conducted immediately before the scheduled commencement of construction or vegetation clearance works.
- No 'woody' vegetation (hedgerows/trees) will be removed during the bird breeding season (March 1<sup>st</sup> to August 31<sup>st</sup> inclusive).
- All excavations/trenches will be covered at night, or a suitable means of escape (escape board) provided for nocturnal mammals. Any excavations open overnight will be inspected visually prior to restarting work. In the event that any fauna are discovered (including Frog spawn) in an area where construction work is scheduled the ECoW will be informed and appropriate advice sought before any work can proceed in the affected area.
  - In the event that protected fauna are discovered actively using the site for breeding/roosting (e.g., bird nest, bat roosting) during the construction phase, works in the area will cease immediately, and the area will be cordoned off and all non-essential personnel and vehicles excluded until advice is sought from a suitably qualified/experienced ecologist.

#### Operational Phase

The surface water generated in the hardstanding areas and in the bunded areas within the substation compound will discharge to soakaway via Class 1 Full Retention Oil Separators. The electrical transformer in the substation is oil filled equipment and, as such, is protected with impermeable bunds. Surface water generated in this bund will be pumped out by an oil sensitive pump ensuring that only non-contaminated water enters the site drainage network.

The foul drainage proposed caters for the wastewater generated in the welfare facilities of the proposed substation. These welfare facilities include a toilet and wash hand basin. The station will be unmanned in normal operation so demand for facilities which generate foul flows will be low.

The foul holding tanks will have a capacity of 5m<sup>3</sup> which is a multiple of the foul water which will be generated over three months of normal operation of the station. The foul holding tank will also be inspected by a suitably qualified and indemnified person at these intervals and records of inspections will be held on site for inspection by the local authority. A freeboard of 300mm will be provided for and the foul holding tank will be fitted with a high-level alarm. This alarm will be connected to a manned control station via the substation's Supervisory Control and Data Acquisition (SCADA) telecom relay system. This will allow for non-scheduled maintenance and emptying of the tank between the regular three-monthly intervals in the unlikely event that this is required. The foul holding tank will also be vented to the atmosphere to avoid the buildup of noxious and dangerous gases.

The proposed station will be unmanned and as such will generate small quantities of foul waste. There will be visits to the station for scheduled and unscheduled inspections, maintenance and repairs as necessary. It is anticipated that this will result in a contribution of 60 litres of foul waste per week. In the unlikely event that such a high visitation rate would be extrapolated throughout the year, this would result in 6,323 litres

per annum. While such a consistently high visitation is improbable, there is the possibility of increased numbers of staff being present on site for short durations during the commissioning of electrical elements of the station from time to time. It is envisaged that these extraordinary occurrences would balance out with the ordinary operation of the unmanned station to produce foul flows no greater than the 6,323 litres per annum as a “worst-case” scenario. It is common for much lower usage of the facilities on unmanned stations and therefore a much lower foul loading. A common problem on such unmanned stations is odours in the toilet areas due to the drying out of the water trap in the WC through evaporation resulting from the lack of use. For this reason, it is proposed to use self-flushing toilets in the station, which would flush automatically twice a week. The station will include two 6 litre flush WCs so a minimum weekly foul flow of 24 litres can be expected. The self-flushing WCs will therefore contribute 1,248 litres per annum.

Combining the automatic flush and maximum user demand figures would result in a maximum annual generation of 7,571 litres (7.5m<sup>3</sup>) of foul sewer water waste. The 5m<sup>3</sup> tank proposed will be emptied approximately every three months. As outlined, the capacity provided is well in excess of what is required.

It is proposed to provide the required potable water demand of the station (all options) with a bored well on site. The potable water demand within the site will be low as the proposed station is to be unmanned. To avoid issues like stagnation in the water supply line and problems resulting from this, there will be a continual water demand of 24 litres per week from automatically flushing WCs within the station. The water demand within the proposed development will be low and will be similar to the figures for foul sewer water generation as set out above in this report.

No significant effects are expected on the local environment during the operational phase of the proposed development. It is also concluded in the accompanying NIS (Appendix 1) that with the application of such standard controls there will be negligible risk of effects on the designated sites in the wider hinterland associated with the operation of the substation and wider proposed solar farm project.

## 6 Residual Effects and Conclusion

The proposed SID application site is currently considered to be of Local Importance (lower level) as it contains intensively managed agricultural land and regularly occurring species. The permanent development footprint is confined to open intensively managed agricultural fields, which are considered to be of lower local ecological value.

Any potential effects on ecology as a result of the proposed development are confined to the construction phase, which will be relatively short in duration (approximately 2 years) and will be insignificant due to the minor nature of the earthworks involved combined with the implementation of standard environmental controls as part of the project.

No significant effects on designated sites, habitats, flora or fauna have been identified as a result of the proposed development. Furthermore, the Natura Impact Statement (NIS) in support of the Appropriate Assessment process, which accompanies this EclA, objectively concludes that, with the implementation of mitigation measures, no significant effects arising from the wider proposed solar farm project will impact upon any Natura 2000 sites (see Appendix 1).

Taking the above into consideration, it is deemed that the proposed development will result in a neutral effect on ecology overall.

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**APPENDIX 1**  
**Natura Impact Statement (NIS)**

**In support of the Appropriate Assessment Process**

# **Natura Impact Statement**

## **PROPOSED SID SUBSTATION AND GRID CONNECTION, CO. KILKENNY**

**in support of the Appropriate Assessment Process**

**Prepared for:**

Drumdowney Solar Farm Ltd.

**Prepared by:**

Ecology Ireland Wildlife Consultants Ltd.



**December 2025**

# Natura Impact Statement

## PROPOSED SOLAR FARM AT DRUMDOWNEY, CO. KILKENNY

in support of the Appropriate Assessment Process



Document Rev. No.	Details	Contributors	Date
0	For issue	GF, SS	15/12/2025

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Appendix 1 – Conservation Objectives of Lower River Suir SAC and River Barrow & River Nore SAC

## Executive Summary

Ecology Ireland Wildlife Consultants Ltd. were commissioned by HW Planning Ltd., on behalf of Drumdowney Solar Farm Ltd. to undertake an appraisal of the potential impacts of a proposed high voltage (HV) substation and loop-in grid connection to the national electricity transmission grid network.

The development of a HV substation and loop-in grid connection at this location was previously assessed as part of the ecological impact assessment and Natura Impact Statement that accompanied the planning application for the proposed Drumdowney Solar Farm. This application was submitted directly to Kilkenny County Council. The operational lifetime of the solar farm is assumed to be 40 years. However, following the decommissioning of the solar farm, it is envisaged that the substation (and grid connection) will remain in situ as a valuable functioning and operational part of the national electricity transmission grid network managed by the Transmission Systems Operator, EirGrid.

The proposed development subject to this Strategic Infrastructure Development (SID) application to An Coimisiún Pleanála is not located within or closely adjacent to any designated sites. There is a total of 4 European sites located within 15km of the proposed substation development site. The closest of these sites are the River Barrow & River Nore SAC (2.4km) and Lower River Suir SAC (2.7km). The proposed development is located in the Suir Catchment with the Blackwater (Kilmacow)\_SC\_010 subcatchment. The site is not located close to any EPA mapped watercourse. The headwaters of the Rathpatrick Stream are located >300m west of the site and the Rathdowney Lower Stream is located >350m east of the application site. Both of these watercourses are tributaries of the Lower Suir.

The proposed development is intrinsically linked with the proposed Drumdowney Solar Farm development. Although the proposed substation and grid connection development is itself located distantly from the European sites and there is no clear hydrological pathway by which water-quality mediated effects are likely to result in significant effects on the Lower River Suir SAC or the River Barrow & River Nore SAC, the overall project includes the proposed solar farm development which has been assessed as requiring a Natura Impact Statement:

*“The proposed development site is located in close proximity to the Natura 2000 sites River Barrow & River Nore SAC and Lower River Suir SAC and there is a hydrological connection to these European designated sites. Significant effects including water-quality mediated effects and construction phase disturbance/displacement effects cannot be discounted without the implementation of appropriate mitigation, design and environmental controls. Therefore, it cannot be concluded, that the proposed project, individually or in combination with other plans or projects, will not have a significant effect on these Natura 2000 sites, without the consideration and analysis of further information. Therefore Stage 2 NIS (AA) is required.”*

Therefore, in this case the overall project, including the substation and grid connection and the Drumdowney solar farm are assessed to have elements that could in the absence of adequate environmental controls and mitigation measures result in significant effects on European designated sites in the wider receiving environment.

Following the application of detailed mitigation measures, it is objectively concluded that there will be no adverse impacts on the integrity of any of the Natura 2000 sites within the zone of influence of the proposed development as a result of the proposed development and other projects and plans of relevance in the area.

## 1 Introduction

Ecology Ireland Wildlife Consultants Ltd. (Ecology Ireland) were commissioned by Drumdowney Solar Farm Ltd., to undertake an appraisal of the potential impacts of a proposed Strategic Infrastructure Development (SID) for a proposed high voltage (HV) substation and loop-in grid connection to the national electricity transmission grid network.

The purpose of the proposed development is to transport the electricity generated at the proposed Drumdowney Solar Farm to the national electricity grid via an existing 110kV overhead line which crosses the development site. An application for the Drumdowney Solar Farm was made to Kilkenny County Council on the 28<sup>th</sup> February 2024 (Council Reference: 25/60391). The proposed solar farm development will consist of ground mounted panels on frames, inverter/transformer stations and all ancillary development works including the 33kV UGC Interconnectors. At the time of this assessment, a decision on that planning application was still awaited.

The current SID application includes a 110kV GIS substation and loop-in infrastructure comprising underground 110kV cabling and 2 no. interface towers which will connect into the existing 110kV Great Island to Waterford overhead line. Notwithstanding the dual consent process, this report considers both the substation and grid connection development and proposed solar farm development for the purposes of completing a robust assessment of the entire project.

A screening assessment is part of an appropriate assessment process that consists of up to four stages, where each stage follows on from the preceding one. In Stage 1, a screening process is undertaken to identify whether significant impacts on a Natura 2000 site are likely to arise from the project or plan in question. If significant impacts are likely to occur, then the process moves on to Stage 2 where an appropriate assessment (AA) considers potential mitigation measures for adverse impacts. If it is considered that mitigation measures will not be able to adequately minimise potential adverse impact on a Natura 2000 site, then an assessment of alternative solutions is considered in Stage 3. This may then be followed by Stage 4 of the process in the event that adverse impacts remain, and the proposed activity or development is deemed to be of Imperative Reasons of Overriding Public Interest (IROPI), allowing an assessment of compensatory measures to be considered. The outcome of a Stage 2 and higher assessment is presented in a report known as a Natura Impact Statement (NIS).

The first part of the assessment is a screening process to identify whether significant<sup>1</sup> effects on a Natura 2000 site are likely to arise from the project or plan in question, in view of best scientific knowledge and in light of the conservation objectives of any relevant European sites, when considered as an individual project or in combination with other plans and projects. If significant effects are likely to occur or if it is unclear whether significant effects are likely to occur, then the process moves onto the next phase where the project is subject to an appropriate assessment (AA) to determine whether the plan or project would

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<sup>1</sup> A European Court of Justice ruling in 2013 (Case C-258/11) has stated the following regarding significant effect: "Where a plan or project not directly connected with or necessary to the management of a site is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on that site."

directly affect the integrity of a European site. At this stage, potential mitigation measures for adverse impacts identified in Screening are considered. Typically, a Natura Impact Statement (NIS) is prepared by consultants on behalf of the promoter/developer of a plan or project, and this is part of the information used by the competent authority in carrying out an Appropriate Assessment of the proposed plan or project. If the competent authority is satisfied that the plan or project will not adversely affect the integrity of the site concerned, it may approve the project. If it is considered that mitigation measures will not be able to satisfactorily reduce potential adverse impact on a Natura 2000 site, then an assessment of alternative solutions is considered in third phase of the assessment process. If adverse impacts remain and the proposed activity or development is deemed to be of Imperative Reasons of Overriding Public Interest (IROPI), the final assessment step permits consideration of permission for development with consideration of compensatory measures.

While a screening assessment appraisal or NIS may be provided by the advocate of the plan or project in question, the AA itself is undertaken by the competent authority (*e.g.*, the planning authority and An Comisiún Pleanála). So, in this case, the Appropriate Assessment for the project, described herein, is undertaken by Kilkenny County Council; informed by this Screening for AA and NIS and any other relevant information provided to the statutory body.

## 1.1 Methodology

This report presents in brief the outcome of a Screening for AA. The subsequent Natura Impact Statement (NIS) is prepared to identify whether the proposed development, in view of best scientific knowledge and in light of the conservation objectives of any relevant European sites, when considered as an individual project or in combination with other plans and projects, will have an adverse effect on the integrity of any European Site. It is important to emphasise that a screening assessment does not have to ascertain the existence of a significant effect or impact on a Natura 2000 site as such; it only has to establish whether a significant effect or impact is possible or may occur (as per judgement by Ms. Justice Finlay Geoghegan; see guidelines below). At the NIS stage, all mitigation measures necessary to avoid, reduce or offset negative effects are considered.

The conservation objectives of Natura 2000 sites have been compiled by the National Parks & Wildlife Service (NPWS) in relation to the habitats and species (*i.e.*, qualifying interests) for which the sites are selected. These conservation objectives are referred to when carrying out appropriate assessments for plans and projects that might impact on these sites.

### 1.1.1 Guidance

Documents associated with the proposed development and relevant ecology databases were consulted as part of this assessment. Field assessments were also completed at the proposed development site from December 2024 to November 2025 in order to inform the EclA and Screening Assessment. The following guidelines and legal judgements were used in the completion of this assessment;

- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – European Commission Methodical Guidance on the provisions of Article 6(3) and 6(4) of the ‘Habitats’ Directive 92/43/EEC (European Commission 2001)

- Office of the Planning Regulator (OPR) Practice Note PN01, Appropriate Assessment Screening for Development Management (2021).
- Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (DoEHLG 2009)
- Integrated Biodiversity Impact Assessment – Streamlining AA, SEA and EIA Processes: Practitioner’s Manual (EPA 2013)
- European Court of Justice Ruling 11<sup>th</sup> April 2013 Case C-258/11 Peter Sweetman and Others v An Bord Pleanála - Criteria to be applied when assessing the likelihood that N6 Galway City Outer Bypass Road scheme will adversely affect the integrity of Lough Corrib SAC
- High Court Ruling 25<sup>th</sup> July 2014 by Ms. Justice Finlay Geoghegan; Neutral Citation [2014] IEHC 400; High Court Record No. 2013 802 JR; Kelly -v- An Bord Pleanála – Judicial review of grant of planning by An Bord Pleanála for two wind farm phases in County Roscommon
- High Court Ruling 24<sup>th</sup> November 2014 by Mr. Justice Hedigan; Neutral Citation [2014] IEHC 557; High Court Record No. 2014 320 JR; Rossmore Properties Limited & Anor -v- An Bord Pleanála
- High Court Ruling 25<sup>th</sup> February 2016 by Mr. Justice Barton. Neutral Citation [2016] IEHC 134; High Court Record No. 2013 450 JR; Balz & Anor -v- An Bord Pleanála.
- European Court of Justice ruling 12<sup>th</sup> April 2018 in respect of Case C-323/17 (People Over Wind & Sweetman) - it is not appropriate for the purposes of Appropriate Assessment (AA), at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of a plan or project.
- European Court of Justice ruling 19<sup>th</sup> April 2018 in respect of Case C-164/17, Compensation vs Mitigation, Grace & Sweetman Vs ABP.
- High Court Ruling 8<sup>th</sup> February 2019 by Justice Barniville in respect of Kelly -v- An Bord Pleanála & anor. The Court concludes “*as a matter of fact and law, that SUDS are not mitigation measures which a competent authority is precluded from considering at the stage 1 screening stage*”. The Irish High Court ([2019] IEHC 84)
- Heather Hill Management Company CLG v An Bord Pleanála (Burkeway Homes Limited as Notice Party) [2019] IEHC 450. Mr. Justice Garrett Simons granted an order of certiorari setting aside the decision of the BoÁrd to grant permission for a residential development of 197 units at Bearna Co. Galway, on the basis that it was a material contravention of the Galway County Development Plan (the CDP), it failed to carry out a 'justification test' as required and failed to carry out proper Appropriate Assessment screening.
- European Commission. *Managing Natura 2000 Sites: The provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC*, (21-11-18) C (2018) 7261 Final. Commission Notice Brussels.

### 1.1.2 Information Consulted for this Report

This assessment has been informed by the following sources of data:

- Desk based surveys and site surveys of the proposed development site;
- The Ecological Impact Assessment completed for the proposed development;
- Information on the location, nature and design of the proposed project as provided by the client;

- Department of Housing, Planning, Community and Local Government (DHPCLG) online land-use mapping ([www.myplan.ie/en/index.html](http://www.myplan.ie/en/index.html));
- Office of Public Works (OPW) National Flood Hazard Mapping website ([www.floodmaps.ie](http://www.floodmaps.ie))
- Environmental Protection Agency (EPA) geoportal mapping tool (<https://gis.epa.ie/EPAMaps/>);
- National Parks and Wildlife Service protected site and species information and data (<https://www.npws.ie/protected-sites>);
- National Biodiversity Data Centre ([www.biodiversityireland.ie](http://www.biodiversityireland.ie)); and
- Ordnance Survey of Ireland mapping and aerial photography ([www.osi.ie](http://www.osi.ie)).

## 2 Stage 1: Screening for Appropriate Assessment

### 2.1 Brief Description of the Site & Project

#### 2.1.1 Site Location

The location of the proposed development and the associated Drumdowney Solar Farm is shown in Figure 2.1. The proposed development which is subject to this SID application to An Coimisiún Pleanála comprises of:

1. A 110kV GIS electricity substation with two-storey GIS substation building, single-storey Independent Power Producer (IPP) control room building, HV electrical equipment and associated infrastructure (to include transformer, lightning protection masts, back-up diesel generator, fire/blast wall, telecoms pole, perimeter security fencing, security lighting, water and drainage infrastructure, and temporary construction compound) to connect to and serve a solar farm;
2. Associated loop-in / loop out infrastructure to connect into an existing 110kV overhead transmission line (including underground 110kV cabling, 2 No. new interface towers and decommissioning of ca. 15m of existing 110kV overhead line);
3. Construction and operational access from the public road L34142;
4. All ancillary site development, landscaping and earthworks. The development subject to this application forms part of grid connection and access arrangements which will facilitate the connection of the proposed Drumdowney Solar Farm (Kilkenny County Council Reference 25/60391) to the national grid.

#### 2.1.2 Proposed Development

The substation will be based on EirGrid design specifications. The substation compound will consist of a two-storey GIS substation building, single-storey IPP Control Room building, HV electrical equipment and associated infrastructure including palisade fences and concrete post and rail fences. The installation of HV electrical equipment will include a transformer with associated equipment along with:

- Lightning Masts (LM);
- Back-Up Diesel Generator;
- Harmonic filters if required by EirGrid;
- Capacitor Bank if required by EirGrid;
- Fire/Blast Wall;
- Telecoms Pole.

The substation compound has a total area of 5,335m<sup>2</sup>.

Earthworks will be undertaken so the compound is level, with a finish compound level of 91.65m.

## 2.2 Site Access

The site will be accessed for both the construction and operational phases by means of a single entrance from the L34142. This existing entrance will be subject to some upgrades, including removal of existing roadside sod and stone ditch to provide new gate as presented under Kilkenny County Council Reference 25/60391. The entrance will be suitably splayed and has been subject to sight line and autotrack analysis, with the latter including modelling of abnormal load delivery for the transformer. Operational sightlines will be maintained by trimming back hedgerows with all necessary land within ownership.

A 4.5 metre wide compacted access track will extend from the entrance to the substation compound. The design includes a temporary construction track to cater for deliveries, which will be decommissioned post the construction phase (and land reinstated), as well as an operational access track. The track will include a geotextile base and filter membrane and 200 mm of Clause 804 sub-base.

## 2.3 Connection to National Grid

In order to connect to the transmission network, it is proposed to connect the 110kV substation into the national grid via a 'loop-in / loop-out' underground 110kV cable grid connection which will connect into the existing 110kV Great Island to Waterford overhead line.

Two new steel lattice interface towers of approximately 16 m in height will form part of the existing overhead line and both towers will connect to the proposed 110kV substation via underground 110kV cables. The interface towers are approximately 15 metres apart, therefore the same length of the existing 110kV Whitegate – Cow's Cross overhead line will need to be decommissioned. The underground cable is comprised of 3 no. power ducts, 2 no. telecom ducts and 1 no. earth continuity duct. The cables to each interface tower are 68 and 83 metres in length.

This connection method will constitute a new node of the transmission network, connecting the proposed substation and associated solar farm generation to the national electricity grid. The construction method for the interface towers and decommissioning of 110kV overhead lines is set out in the Drumdowney Substation & Grid Connection Construction Methodology prepared by Drumdowney Solar Farm Ltd. (2025).

All works will be carried out in accordance with international best practice and full compliance with health and safety requirements.

## 2.4 Temporary Construction Compound

As outlined in the submitted site layout plans, it is proposed to provide a temporary construction compound west of the proposed substation, accessed from the entrance from the L34142. The temporary compound will include the following facilities at a minimum:

- Adequate canteen space to allow for all workers during the peak period;
- Office space with lighting, heating and internet facilities;

- Toilets and adequate welfare facilities for construction staff in accordance with the relevant statutory Health & Welfare guidelines;
- Parking space for both light and heavy vehicles;

Designated skips and temporary storage areas.

## 2.5 Surface Water Drainage and Water Services

Surface water drainage proposals for the development have been developed to mimic the natural drainage patterns of the site and thereby be in accordance with the best management practices of Sustainable Drainage Systems (SuDS) including those set out in the SuDS Manual (C753) published by CIRIA in 2015. Specifically, this includes the following:

- The compound construction is formed with permeable stone thus mimicking a soakaway scenario. ESB compound stone is single sized for the first 150mm for safety purposes. It then changes to a graded 6F2 material.
- The main areas to be drained includes the roofs and the compound road. These equate to approximately 2359m<sup>2</sup>. The compound road will be drained via series of road gullies.
- Assuming even the most basic of infiltration rates down through the permeable compound stone, the existing greenfield situation is easily maintained.

The surface water generated in the hardstanding and bunded areas will discharge to the soakaway via a Class 1 Full Retention Oil Separator. The electrical transformer in the substation is oil filled equipment and, as such, is protected with impermeable bunds. Surface water generated in this bund will be pumped out by an oil sensitive pump ensuring that only non-contaminated water enters the site drainage network.

In relation to wastewater, a 5m<sup>3</sup> foul holding tank is proposed as part of the operational development. These tanks are normally used in ESB substations. It will be emptied periodically, with the capacity in excess of modelled holding requirements.

It is proposed to provide the required potable water demand of the station with a bored well on site. The potable water demand within the site will be low as the proposed station is to be unmanned. To avoid issues like stagnation in the water supply line and problems resulting from this, there will be a continual water demand of 24 litres per week from automatically flushing WCs within the station.

## 2.6 Site Restoration and Landscaping

This will involve the reinstatement of all other excavated materials and associated landscaping works. It will include the replacement of topsoil in disturbed ground areas such as access tracks and the removal of the construction compound and other temporary work areas.

The proposed landscaping provides for the removal of c.87 metres of hedgerow to facilitate the proposed development. Approximately 531 metres of existing hedgerow will be bolstered (Type 1) as part of the

development, with an additional 287 linear metres of new hedgerow planting (Type 2) as per the submitted Landscape Mitigation Plan.

## 2.7 Other Planned Works

It is intended that the proposed 110kV substation and grid connection will service the Drumdowney Solar Farm, which is currently the subject of a planning application to Kilkenny County Council. At the time of writing, the solar farm application is undetermined.

The proposed solar farm will consist of solar panels on ground mounted frames, 27 no. single storey electrical inverter/transformer stations, 5 no. single storey spare parts containers, 3 no. Ring Main Units, 5 no. weather stations, underground electrical ducting and cabling within the development site, private lands and within the L3429, L7523, L7563, L7469, L3407, L3414, L34144, L7466, L3406, L7483, L3415, N25 and N29 public roads to connect solar farm field parcels, security fencing, CCTV, access tracks, 7 no. watercourse/drain deck crossings and 4 no. horizontal directional drill crossings (under the N25 and N29 public roads and the Luffany River), temporary construction compounds, landscaping and all associated ancillary development and drainage works. Construction and operational access will be via 7 no. existing entrances from the L3429, L7469, L7466, L4783 and L34142 which will be subject to entrance upgrade works. Separate construction phase access options are proposed for Parcel 4 via Port of Waterford and the L4783. The operational lifespan of the solar farm will be 40 years.

The solar farm will contribute directly to a carbon dioxide emission reduction of 41,647 tonnes per annum or the equivalent of approximately 1,665,917 tonnes of CO<sub>2</sub> over the 40 year lifetime of the project.



Figure 2-1 Site Location Map and proposed Drumdowney Solar Farm layout.

## 2.8 Site Details

As described in the accompanying EclA the proposed development site is located within improved agricultural grassland (GA1) bordered by hedgerow (WL1). No Annex I habitats listed under the EU Habitats Directive are present within the study site. The dominant habitats present are primarily of local importance (lower to higher value) ecological value. No botanical species protected under the Flora (Protection) Order 2022, listed in Annex II or IV of the EU Habitats Directive (92/43/EEC), or Red listed in Ireland were recorded. All species recorded during the botanical survey are considered common for similar habitats in the general area.

No breeding or resting places of non-volant mammals were recorded at the site. A relatively low diversity of bird species was recorded at the site over the course of a breeding season survey and consecutive winter season surveys.

There are no structures within the proposed substation application site that are attractive for roosting for bats and the hedgerows are intensively managed and are relatively unattractive for roosting bats.

The proposed development site is assessed as of Local Importance (lower to higher level) as it contains some semi-natural habitat (*e.g.*, hedgerows) but is dominated by improved agricultural grassland (GA1) of low biodiversity value.

## 2.9 Description of the Natura 2000 Sites

### **Proposed Development Site**

The proposed development site is not located within or closely adjacent to any designated sites. The location of the European designated sites in the wider hinterland is shown in Figure 2.2 and nationally designated sites in the wider area are shown in Figure 2.3.

There is a total of 4 European sites located within 15km of the proposed substation development site. The closest of these sites are the River Barrow & River Nore SAC (002162; 2.4km) and Lower River Suir SAC (002137; 2.7km; Table 2.1). Both of these estuarine sites are adjacent to Parcel 4 of the proposed Drumdowney Solar Farm (Figure 2.3). No other European designated site is located within 12.5km of the application boundary. The location of the designated sites in the wider hinterland is shown in Figure 2.2 and Figure 2.3.

There are a total of three SACs and one SPA located within 15km of the application site boundary (Table 2.1).

**Table 2.1 Designated sites located in the wider hinterland of the site and their distance from the SID application boundary.**

Site Name	Site Code	Minimum Distance (km)
<i>European sites</i>		
River Barrow & River Nore SAC	002162	2.4
Lower River Suir SAC	002137	2.7
Tramore Dunes & Backstrand SAC	000671	12.9
Tramore Back Strand SPA	004027	12.9
<i>Nationally designated sites (no NHAs within 15km)</i>		
Barrow River Estuary pNHA	000698	2.2
Lough Cullin pNHA	000406	3.0
King's Channel pNHA	001702	3.6
Grannyferry pNHA	000833	5.2
Ballyhack pNHA	000695	7.6
Waterford Harbour pNHA	000787	7.9
Ballykelly Marsh pNHA	000744	8.5
Belle Lake pNHA	000659	10.3
Duncannon Sandhills pNHA	001736	11.0
Oaklands Wood pNHA	000774	11.7
Tramore Dunes & Backstrand pNHA	000671	12.9
Boley Fen pNHA	000699	13.5
Brownstown Wood pNHA	000827	13.8
Lower River Suir pNHA	000399	14.0
Kylecorragh Wood pNHA	000842	14.7

The proposed development is located in the Suir Catchment with the Blackwater (Kilmacow)\_SC\_010 subcatchment. The site is not located close to any EPA mapped watercourse. The headwaters of the Rathpatrick Stream are located >300m west of the site and the Rathdowney Lower Stream is located >350m east of the application site. Both of these watercourses are tributaries of the Lower Suir.

The proposed development is intrinsically linked with the proposed Drumdowney Solar Farm development. Although the proposed development is itself located distantly from the European sites and there is no clear hydrological pathway by which water-quality mediated effects are likely to result in significant effects on the Lower River Suir SAC or the River Barrow & River Nore SAC, the overall project includes the proposed solar farm development which has been assessed as requiring a Natura Impact Statement:

*“The proposed development site is located in close proximity to the Natura 2000 sites River Barrow & River Nore SAC and Lower River Suir SAC and there is a hydrological connection to these European designated sites. Significant effects including water-quality mediated effects and construction phase disturbance/displacement effects cannot be discounted without the implementation of appropriate*

*mitigation, design and environmental controls. Therefore, it cannot be concluded, that the proposed project, individually or in combination with other plans or projects, will not have a significant effect on these Natura 2000 sites, without the consideration and analysis of further information. Therefore Stage 2 NIS (AA) is required."*

Therefore, in this case the overall project, including the substation and grid connection and solar farm are assessed to have elements that could in the absence of adequate environmental controls and mitigation measures result in significant effects on European designated sites in the wider receiving environment.

Table 2.2 presents the qualifying and special conservation interests of the designated sites located within 15km of the application site.

There is no hydrological link between the application site and the other more distant SAC sites from the proposed solar farm. Given the distances involved and the lack of a hydrological pathway it is concluded that there is no likelihood of any significant effects on these distant SACs.

Given the distances involved there is no likelihood of any direct disturbance effects on any of the faunal species at the more distant European designated sites. Ex-situ disturbance impacts (*i.e.*, where highly mobile species from the designated sites may occur at the development site to forage or commute) must also be considered. This effect is only applicable to designated sites where such fauna are relevant (*e.g.* birds, bats), and where the development site supports habitats of ecological interest for the fauna in question. The SPA sites located in the wider hinterland are all relatively distant from application site: Tramore Back Strand SPA (12.9km), Bannow Bay SPA (16km), Seas off Wexford SPA (17.1km) and River Nore SPA (19.4km). The first two of these European sites are designated for wintering bird species, the River Nore SPA is designated for the conservation of breeding Kingfisher, *Alcedo atthis*, and the Seas off Wexford SPA is designated for seabird species.

The site walkovers of the wider project site carried out during the overwintering period did not record any regular use of the application lands by any of the SCI species of these SPA sites located in the wider hinterland area, apart from small flocks ( $\leq 20$  individuals) of gulls (Black-headed Gulls, Herring Gulls and Lesser Black-backed Gulls), which are SCIs of the Seas off Wexford SPA, occasionally foraging/roosting on improved agricultural grassland in Parcels 1, 3 and 4 associated with the solar farm. These gull species are large and mobile, and hence are expected to feed widely in the area. The surrounding area contains large areas of similar grassland habitat so the development of these areas is not thought to significantly impact the gull species. Additionally, it is expected that the gulls are likely to continue using these areas within the site to forage once the construction is complete, particularly due to the fact that there will be less disturbance from people, machinery and animals once the panels are in place compared to the disturbance levels experienced when the land is actively managed as agricultural land.

While wader species, such as Curlew, Golden Plover or Lapwing, are SCIs of Bannow Bay SPA and Tramore Back Strand SPA and could be displaced by the erection of solar panels- no flocks of wading bird species were recorded at rest in any of the lands within the Project study area. There is no evidence that these lands are of value for any ex-situ foraging or roosting for species associated with the SPAs in the wider receiving environment. Relatively modest numbers of wading birds were recorded in the estuaries adjoining Parcel 4 but no field-feeding flocks of any of these species were observed. It is concluded that

there is no likelihood of any significant ex-situ disturbance/displacement effects of birds associated with the distant SPAs in the wider receiving environment.

**Table 2.2 Natura 2000 Sites within 15km of the proposed development**

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
River Barrow and River Nore SAC (002162)	<p>The conservation objectives of this site relate to maintaining or restoring the favourable conservation condition of the following qualifying interests;</p> <ul style="list-style-type: none"> <li>• Estuaries [1130]</li> <li>• Mudflats and sandflats not covered by seawater at low tide [1140]</li> <li>• Reefs [1170]</li> <li>• Salicornia and other annuals colonising mud and sand [1310]</li> <li>• Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</li> <li>• Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</li> <li>• Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</li> <li>• European dry heaths [4030]</li> <li>• Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]</li> <li>• Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]</li> <li>• Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</li> <li>• Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</li> <li>• Desmoulin's Whorl Snail <i>Vertigo moulinsiana</i> [1016]</li> <li>• Freshwater Pearl Mussel <i>Margaritifera margaritifera</i> [1029]</li> <li>• White-clawed Crayfish <i>Austropotamobius pallipes</i> [1092]</li> <li>• Sea Lamprey <i>Petromyzon marinus</i> [1095]</li> <li>• Brook Lamprey <i>Lampetra planeri</i> [1096]</li> <li>• River Lamprey <i>Lampetra fluviatilis</i> [1099]</li> <li>• Twaite Shad <i>Alosa fallax fallax</i> [1103]</li> <li>• Salmon <i>Salmo salar</i> 1106]</li> <li>• Otter <i>Lutra lutra</i> [1355]</li> <li>• Killarney Fern <i>Trichomanes speciosum</i> [1421]</li> <li>• Nore Freshwater Pearl Mussel, <i>Margaritifera durrovensis</i></li> </ul> <p>(After NPWS 2025)</p>	2.4km from the SID application site
Lower River Suir SAC (002137)	<p>The conservation objectives of this site relate to maintaining or restoring the favourable conservation condition of the following qualifying interests;</p> <ul style="list-style-type: none"> <li>• Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</li> <li>• Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</li> <li>• Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]</li> <li>• Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</li> <li>• Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</li> <li>• <i>Taxus baccata</i> woods of the British Isles [91J0]</li> <li>• Freshwater Pearl Mussel <i>Margaritifera margaritifera</i> [1029]</li> <li>• White-clawed Crayfish <i>Austropotamobius pallipes</i> [1092]</li> </ul>	2.7km from the SID application site

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
	<ul style="list-style-type: none"> <li>• Sea Lamprey <i>Petromyzon marinus</i> [1095]</li> <li>• Brook Lamprey <i>Lampetra planeri</i> [1096]</li> <li>• River Lamprey <i>Lampetra fluviatilis</i> [1099]</li> <li>• Twaite Shad <i>Alosa fallax fallax</i> [1103]</li> <li>• Salmon <i>Salmo salar</i> 1106]</li> <li>• Otter <i>Lutra lutra</i> [1355]</li> </ul> <p>(After NPWS 2017)</p>	
Tramore Dunes and Backstrand SAC (000671)	<p>The conservation objectives of this site relate to maintaining or restoring the favourable conservation condition of the following qualifying interests;</p> <ul style="list-style-type: none"> <li>• Mudflats and sandflats not covered by seawater at low tide [1140]</li> <li>• Annual vegetation of drift lines [1210]</li> <li>• Perennial vegetation of stony banks [1220]</li> <li>• Salicornia and other annuals colonising mud and sand [1310]</li> <li>• Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</li> <li>• Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</li> <li>• Embryonic shifting dunes [2110]</li> <li>• Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]</li> <li>• Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]</li> </ul> <p>(After NPWS 2013a)</p>	12.9km from the SID application site
Tramore Back Strand SPA (004027)	<p>The conservation objectives of this site relate to maintaining or restoring the favourable conservation condition of the following Special conservation interests;</p> <ul style="list-style-type: none"> <li>• Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A046]</li> <li>• Golden Plover <i>Pluvialis apricaria</i> [A140]</li> <li>• Grey Plover <i>Pluvialis squatarola</i> [A141]</li> <li>• Lapwing <i>Vanellus vanellus</i> [A142]</li> <li>• Dunlin <i>Calidris alpina</i> [A149]</li> <li>• Black-tailed Godwit <i>Limosa limosa</i> [A156]</li> <li>• Bar-tailed Godwit <i>Limosa lapponica</i> [A157]</li> <li>• Curlew <i>Numenius arquata</i> [A160]</li> <li>• Wetland and Waterbirds [A999]</li> </ul> <p>(After NPWS 2013b)</p>	12.9km from the SID application site

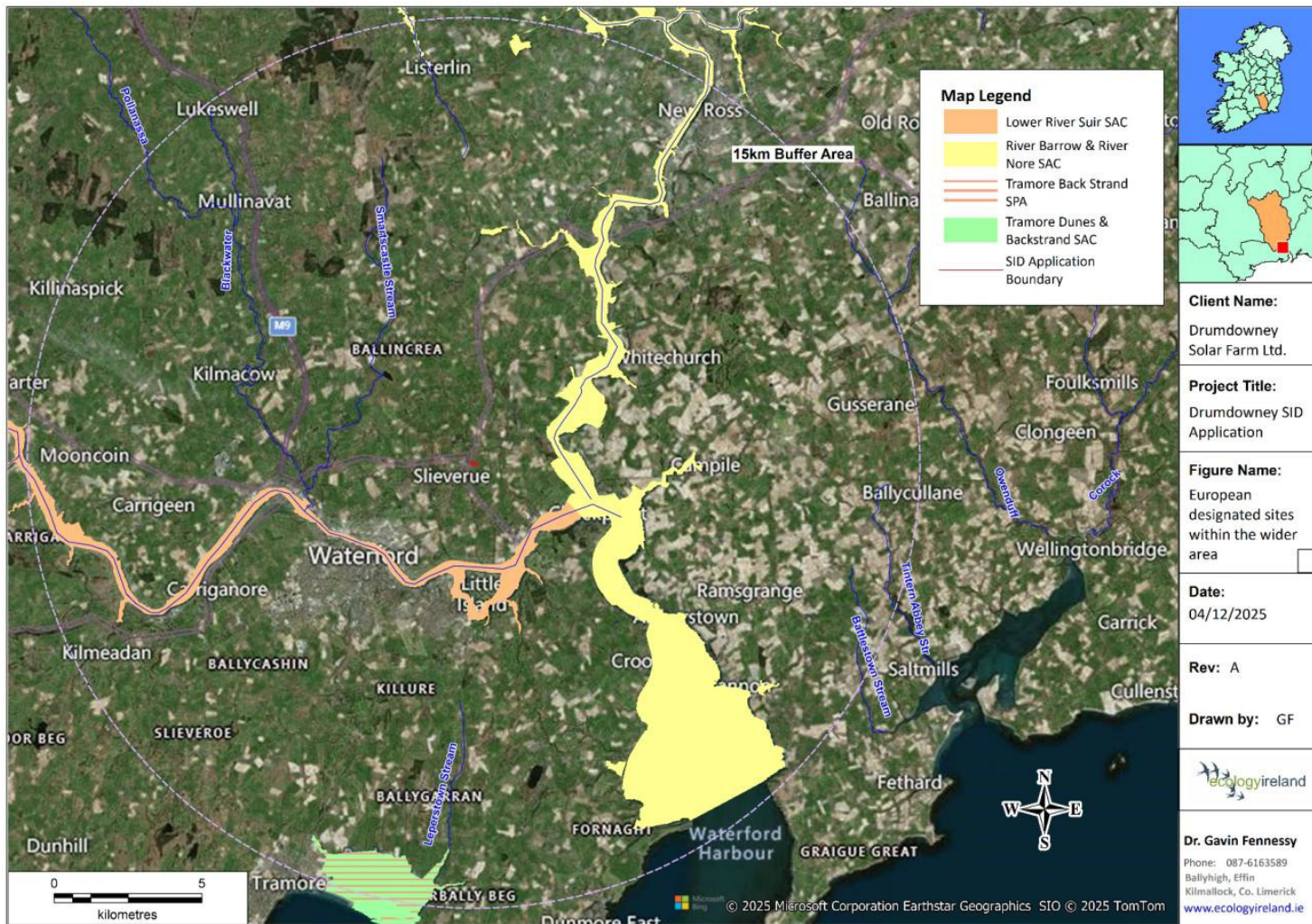


Figure 2.2 European designated sites in wider receiving area.

### 2.9.1 Other designated sites

There are a total of 15 pNHAs located within 15km of the application site (Table 2.1). There are no NHAs within 15km of the proposed development site (see Figure 2.3). Table 2.3 summarises the conservation features of each of the pNHA sites located within 15km of the application site. The closest of these pNHA sites is the Barrow River Estuary pNHA (000698; 2.2km).

There is one Ramsar sites within 15km of the project site; Tramore Backstrand (Site No. 835). Tramore Backstrand is within Tramore Dunes and Backstrand SAC and Tramore Backstrand SPA.

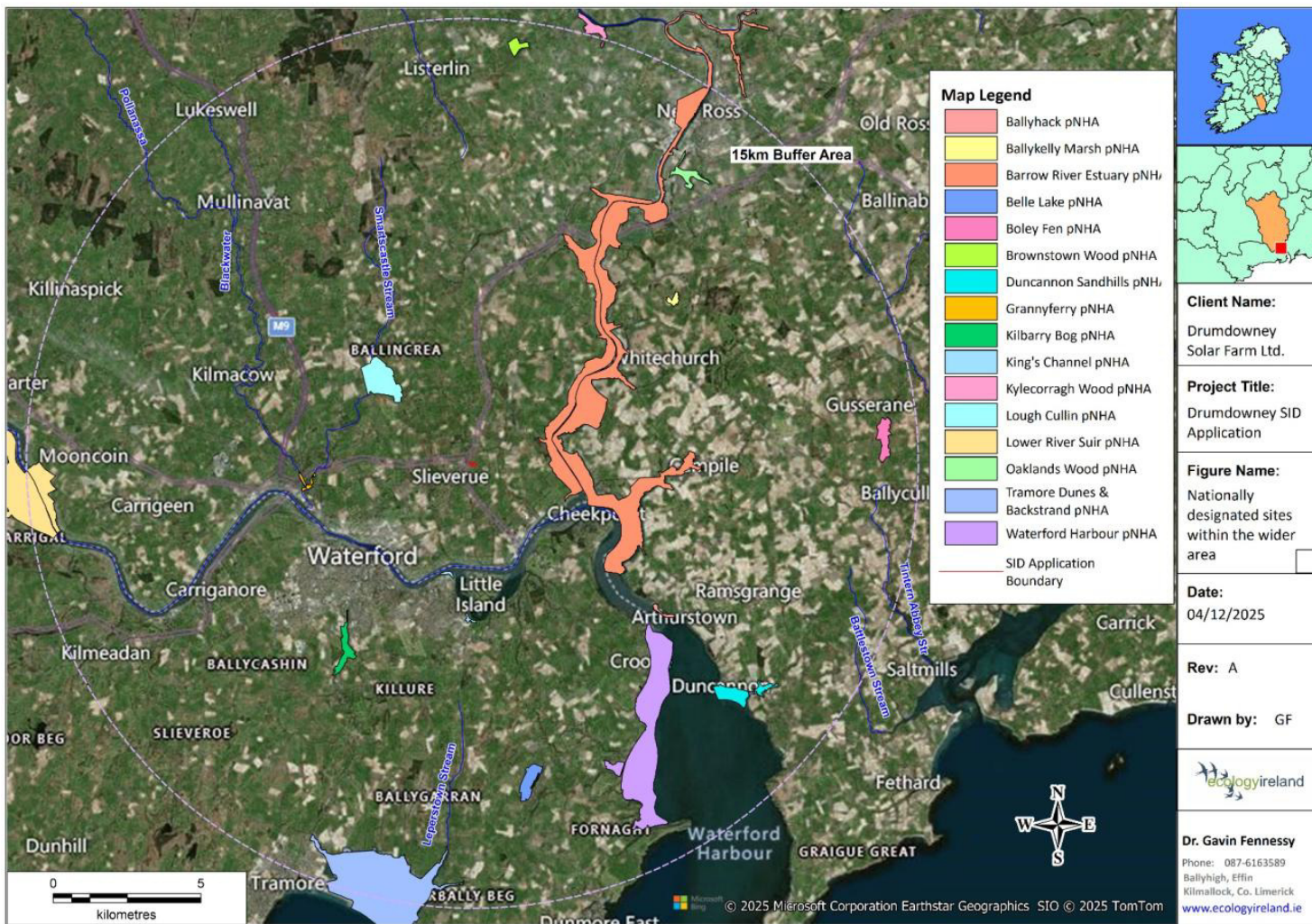
There are also several Important Bird and Biodiversity Areas (IBAs) in the wider environment of the proposed development site, primarily associated with the south coast. These include Dunmore East, Tramore Backstrand, and Bannow Bay. Additional IBAs include the Northeast Celtic Sea and the Mid Waterford marine extension, located at the mouth of Waterford Harbour.

**Table 2.3 Site Synopses of the Nationally Designated Sites within 15km of the Application Site.**

Site Name & Code	Description	Minimum Distance from Site (km)
Barrow River Estuary pNHA (000698)	The Barrow River Estuary pNHA forms part of the River Barrow and River Nore SAC. This site comprises the lower and upper tidal reaches of the river Barrow before it enters Waterford Harbour. It extends from St. Mullins in Co. Carlow to Cheek Point in Co. Waterford (approximately 20-25 kilometres) and includes both sides of the river. This site is important because environmental factors have allowed plant communities to develop here that are found nowhere else in the country. Three legally protected plant species are found, and another Rare species ( <i>Carex divisa</i> ) has its only known Irish station here. The presence of Rare, Red Data Book fish and of Peregrine Falcon is also notable.	2.2km
Lough Cullin pNHA (000406)	Lough Cullin pNHA is located in south Kilkenny, 6km north of Waterford. Streams enter the basin from the NW, NE and SE and cause considerable flooding in most winters. The outflow is sluggish towards Dunkitt and the Suir though here and elsewhere there has been work to deepen the channel.  The main interest of the site lies in its flowering plants some of which are rare in the Kilkenny and Waterford region. There is also a high population of snipe in winter as well as smaller numbers of curlew, lapwing and mallard. In summer sedge warbler and reed bunting breed.	3.0km
King's Channel pNHA (001702)	The King's Channel pNHA forms part of the Lower River Suir SAC. King's Channel is an offshoot of the Suir Estuary below Waterford which surrounds the triangular Little Island. It is relatively deep and at low water retains a broad channel between mudbanks. The channel itself is not of significant interest except to a few cormorant and other seabirds but the southern shore is lined in places by a flat saltmarsh.	3.6km
Grannyferry pNHA (000833)	Grannyferry pNHA consists of reedswamp, marshes and wet fields with a salt influence which declines from south to north. Small numbers of Mallard and Water Rail occur within the area and in summer there are, most probably, Sedge Warbler and Reed Bunting nesting.	5.2km
Kilbarry Bog pNHA (001700)	Kilbarry Bog pNHA is located on the southern outskirts of Waterford City; it lies on either side of the former Great Southern Railway line, parts of which are today used as a foot path and cycle way. The site is drained by the St John's River in the north, whilst there is a flow of water into the site from the hills to the south-east. This wetland is not, in fact, a bog in the true sense, but rather comprises an area of reed swamp, freshwater marsh, wet grassland and scrub. Parts of the site are known as Ballynakill Marsh.  Kilbarry Bog is a site of conservation importance for a variety of reasons: it is the only remaining wetland of its type of significance in the vicinity of Waterford City; it supports a variety of wetland vegetation types and plant species; it is the site of	6.4km

Site Name & Code	Description	Minimum Distance from Site (km)
	records for the scarce Summer Snowflake; it supports a good diversity of birds, including an important breeding population of Reed Warbler; a range scarce invertebrate species has been recorded from the site.	
Ballyhack pNHA (000695)	<p>Ballyhack pNHA forms part of the River Barrow and River Nore SAC. The site is situated at the mouth of the River Suir, 1km west of Arthurstown in Co.Wexford. Old Red Sandstone underlies this hillside site and a number of interesting plant communities grow among the rock outcrops.</p> <p>A small area of dry heath, a habitat listed on Annex I of the EU Habitats Directive, which is dominated by Gorse (<i>Ulex europaeus</i>), occurs on the site. Ballyhack encompasses, in a small area, a variety of habitats which are not frequent in south-east Ireland. The site is also rich in species and contains one of only two stations known for the Clustered Clover in the country.</p>	7.6km
Waterford Harbour pNHA (000787)	Waterford Harbour pNHA forms part of the River Barrow and River Nore SAC. This site is of conservation importance for the extensive and good quality intertidal sand and mudflats, a habitat listed under Annex I of the EU Habitats Directive. The intertidal habitats are used by important numbers of wading birds during winter, as well as by small numbers of wildfowl.	7.9km
Ballykelly Marsh pNHA (000744)	Ballykelly Marsh pNHA combines an arable field with a high quality wetland site. The arable field contains a rare arable weed community including the protected flora species <i>Fuckria elatine</i> . Adjacent to this field is a small species rich lake and fen area. Such small wetlands are characteristic of the South-East of Ireland but are decreasing rapidly due to drainage and land reclamation.	8.5km
Belle Lake pNHA (000659)	Belle Lake pNHA is an attractive lake which lies at about 50m above sea level, 7 km south east of Waterford city. The water of the lake is clear and quite rich in calcium. A wide variety of other aquatic plants also grow in the lake including at least 4 species of Pondweed ( <i>Potamogeton</i> spp.). There are patches of tall emergent swamp on the east shore, and a thick zone of reed swamp on the less steeply sloping, more sheltered, muddy shore typical of the west of the lake. This reed fringe is continuous with a large reedbed to the south of the lake which has occasional Willows ( <i>Salix</i> spp.) throughout, and an Alder ( <i>Alnus glutinosa</i> ) and Willow woodland at its western end. The inclusion of a small Ash ( <i>Fraxinus excelsior</i> ) and Oak ( <i>Quercus</i> sp.) woodland on the northeastern shore adds to the diversity of habitats represented on site. As for any substantial lake and reedbed this is an important site for birds. In particular the lake is used by regionally important numbers of Whooper swan.	10.3km
Duncannon Sandhills pNHA (001738)	Duncannon Sandhills pNHA forms part of the River Barrow and River Nore SAC. The Duncannon Sandhills site comprises Duncannon Strand and the freshwater marsh in the valley to the east in Shanacloon Townland. 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. The dunes which fringe the strand are dominated by Marram grass ( <i>Ammophila arenaria</i> ) towards the sea. The marsh to the east is situated in a narrow valley and is dominated by Common Reed ( <i>Phragmites australis</i> ) which gives way to areas of Soft Rush ( <i>Juncus effusus</i> ) and Tufted Hair-grass ( <i>Deschampsia cespitosa</i> ).	11.0km
Oaklands Wood pNHA (000774)	Oaklands Wood pNHA is a mixed coniferous and deciduous wood located approximately 2 km south of New Ross. The site is of interest as it is a representative area of broadleaved woodland and associated flora.	11.7km
Tramore Dunes And Backstrand pNHA (000671)	Tramore Dunes And Backstrand pNHA forms part of Tramore Dunes and Backstrand SAC and Tramore Back Strand SPA. Tramore Back Strand SPA is located approximately 2 km east of Tramore town in County Waterford. It comprises a medium-sized estuary sheltered from the open sea by a long shingle spit, with high dunes. The area known as the Back Strand empties almost completely at low tide; it is connected to the outer bay and sea by narrows at Rinnashark. The site is of high ornithological importance for wintering waterfowl, with one species occurring in internationally important numbers and a further seven species having populations of national importance. The regular occurrence of Little Egret, Golden Plover and Bar-tailed Godwit is of particular note as these three species are listed on Annex I of the E.U. Birds Directive. Tramore	12.9km

Site Name & Code	Description	Minimum Distance from Site (km)
	Back Strand is also a Ramsar Convention site.	
Boley Fen pNHA (000699)	Boley Fen is located at Rathumney, approximately 5 km east of Campile. It comprises of intermediate fen with wet grassland and tall sedge ( <i>Carex</i> spp.) communities with encroaching scrub, mainly willows ( <i>Salix</i> spp.). Areas of the site have been afforested.	13.5km
Brownstown Wood pNHA (000827)	Brownstown Wood pNHA is a beautiful tract of deciduous Oak woodland situated on a low hill, 7km west of New Ross in County Kilkenny. This woodland is very unusual in that the canopy consists almost exclusively of Oak ( <i>Quercus</i> sp.). This site also includes some areas of scrub where natural regeneration of Ash and Oak is occurring on previously clear felled woodland.  Because intact oak woodland is such a rare habitat in Ireland, this site is of regional importance.	13.8km
Lower River Suir (Coolfinn, Portlaw) pNHA (000399)	Lower River Suir (Coolfinn, Portlaw) pNHA overlaps with the Lower River Suir SAC. The Coolfinn Marshes are situated about half way between Waterford city and Carrick-on-Suir. The site is primarily composed of pastoral farmland. The site is a wildfowl sanctuary. The site supports nationally important numbers of overwintering Greylag Geese (av. max. 435) which graze the agricultural grasslands. Other species recorded in significant numbers include Whooper Swan, Teal, Tufted Duck, Golden Plover, Lapwing and Curlew.	14.0km
Kylecorragh Wood pNHA (000842)	Kylecorragh Wood pNHA part of the River Barrow and River Nore SAC. The site is situated on the steeply sloping banks of the River Nore, 5km west of New Ross, County Kilkenny. Apart from some damage from clear felling at the east of the site, this woodland has retained much of its natural character and contains a good diversity of species. This type of woodland, with a high canopy composed almost entirely of Oak ( <i>Quercus</i> spp.) is very rare in Ireland and is therefore of great scientific interest. Ecologically, it is also important because it is one of the few remaining examples of this habitat in the country.	14.7km



### 3 Stage 1: Assessment Criteria

#### 3.1 Elements of the Project Likely to Impact on the Natura 2000 Sites

The proposed development subject to this SID application to An Coimisiún Pleanála in isolation does not have any likelihood of significant effects on European designated sites. The site is remote from the European sites and the site is not known to be used by any of the mobile QI/SCI species of designated sites in the wider area with any regularity. In addition, there is no watercourse within or adjacent to the proposed development site which could convey water quality mediated impacts on hydrologically connected Natura 2000 sites. However, as the proposed development it is intrinsically linked to the proposed Drumdowney Solar Farm development there is a likelihood of in-combination effects, given that the proposed solar farm development identified likely significant effects on the two sites adjacent to Parcel 4:

- Lower River Suir SAC
- River Barrow & River Nore SAC

Both sites are designated for a range of habitat and faunal interests. Many of the Qualifying Interests are known to occur further upstream and away from the brackish water influence (e.g White-clawed Crayfish, *Austropotamobius pallipes*).

##### 3.1.1 Direct Habitat Loss

The development site is not part of any designated site, nor does it require any resources from them; thereby ruling out any direct habitat loss at the conservation sites in question.

##### 3.1.2 Indirect Habitat Loss or Deterioration

The proposed development will not give rise itself to any indirect habitat loss or deterioration on European sites in the wider hinterland. However, the NIS for the proposed Drumdowney Solar Farm identified that in the absence of appropriate environmental controls there is some potential for run-off from the construction site of the Solar Farm to impact upon the quality or extent of a number of the qualifying habitats of River Barrow & River Nore SAC and Lower River Suir SAC. The recently updated Conservation Objectives of the River Barrow & River Nore SAC indicate that the QI habitats downstream of the application site, and therefore potentially affected by run-off from the site are Estuaries [1130], Mudflats and Sandflats not covered by seawater at low tide [1140] and potentially Reefs [1170]. In addition, several of the QI species of both SAC's could potentially be affected including Lamprey, *Lampetra* sp., Salmon, *Salmo salar*, Twaité Shad, *Allosa fallax* and Otter e.g. through changes in water quality or prey availability. There are areas of Atlantic Salt Meadow (*Glauco-Puccinellietalia maritima*) a QI habitat of the Lower River Suir SAC upstream of Parcel 4 and the confluence with the Luffany Stream. There is also a potential hydrological route from Parcel 3 through the Blackwater River which means that part of the site is upstream of this QI habitat.

It is worth noting that in the 'do-nothing' scenario, the wider development site (would be subject to regular ploughing, re-seeding, fertiliser and weed spraying activities, which would represent a much higher and repeated risk of watercourse siltation/contamination than the relatively minor earthworks associated with the construction phase of the proposed development.

All other general/sanitary waste generated at the site during construction will be appropriately managed prior to removal off-site by licenced contractors and there will be no disposal of such waste to nearby watercourses or any designated site.

In the absence of adequate mitigation (*e.g.* standard environmental controls and implementation of buffer zones to watercourses) for the associated solar farm development there is some likelihood of significant effects arising from run-off of contaminants from the site. The wider project involves an application site which is large and located relatively close to both River Barrow & River Nore SAC and Lower River Suir SAC. In the absence of appropriate mitigation, the potential for in-combination indirect habitat loss or deterioration cannot be discounted at this stage.

#### Disturbance/Displacement

Similarly, in combination activities associated with the wider project construction of the proposed solar farm development could disturb and/or displace faunal species associated with designated conservation sites through noise and/or visual cues. Direct disturbance/displacement effects in relation to noise and/or visual cues on fauna associated with designated sites could be of relevance given that part of the proposed wider solar farm, development site is located adjacent to the estuarine sections of the Lower River Suir SAC and the River Barrow & River Nore SAC. Both of these sites have Otter as a QI species. Otter are likely to be present also along the Luffany Stream and were photographed on trail camera on the watercourse west of Parcel 3. Works have the potential to cause localised disturbance to Otter – through noise and/or visual cues.

#### **Operational Phase**

##### Proposed Development Site

No significant effects are expected on designated sites during the operational phase of the proposed SID, or the wider solar farm development.

Taking the above into consideration, potential effects on the designated sites arising from the operation of the proposed development are considered neutral.

##### **3.1.3 Likely Significant Effects: Conclusion**

The development site is not part of the Natura 2000 sites under consideration here and does not require any resources from them – thereby ruling out any direct habitat loss impacts.

However, as the intrinsically linked proposed solar farm has, in the absence of appropriate environmental controls, been assessed as having likely significant effects on Natura 2000 sites it is considered that the in-combination effects of the proposed development are also significant.

## **3.2 Likely Impacts of the Project on the Natura 2000 Sites**

As outlined in Section 3.1 above, it is deemed that elements of the wider project (in particular potential overland flow of construction stage silt/pollutants directly from the associated solar farm directly to, or to watercourses hydrologically linked to, the Lower River Suir SAC and the River Barrow & River Nore SAC have the (in-combination) potential to impact these Natura 2000 sites within the project Zone of Influence,

without the implementation of best practice measures, a CEMP or site-specific mitigation measures during the project construction phase and at eventual decommissioning.

### 3.2.1 Size, Scale & Land-take

The size of the SID application site is 1.75 hectares.

### 3.2.2 Distance from or Key Features of the Natura 2000 Sites

As described in Table 2-1 above.

### 3.2.3 Resource Requirements (water abstraction etc.)

Not applicable.

### 3.2.4 Excavation Requirements

The proposed substation compound area is approximately 5,335m<sup>2</sup> including the surrounding fence. The substation area will be secured by a 2.6m high palisade fence. The construction sequence will be as follows;

- Any mitigation measures or conditions of the planning permission will be implemented.
- An Assigned Certifier will be appointed in accordance with Building Control Regulations.
- The AF2 Commencement Notice will be submitted upon completion of a comprehensive Preliminary Safety and Health Plan (PSHP) by the PSDP. This Health and Safety Plan will be built up from the Preliminary Plan;
- A temporary construction compound with appropriate mobile sanitary facilities will be set up to facilitate the construction process. The location of this temporary construction compound is shown on the site location drawings. Sanitary facilities will be pumped to a holding tank which will be monitored and disposed off-site by a suitably licensed waste contractor;
- The extents of substation compound and drainage will be marked out by a qualified engineer.
- Earthworks will be undertaken in order to create a level compound level across the entire substation footprint. The cut material is unlikely to be suitable for reuse as fill under EirGrid standards and therefore it will be transported off site to a suitably licensed facility.
- A drainage system will be excavated and installed around the compound area.
- Topsoil and subsoil will be removed from the footprint of the compound using an excavator.
- A layer of geotextile material will be laid over the footprint of the compound.
- Using an excavator, a base layer of Clause 804 material will be laid followed by a 6F2 capping layer which will provide the finished surface.
- Each layer will be compacted using a vibrating roller.
- Earthing cable will be laid underground around the substation for connection to the various electrical components during the electrical fit out phase.

- The construction of the substation compound comprising of two-storey GIS substation building, IPP Control building and all associated outdoor electrical equipment, including 1 no. transformer, associated internal access track, 2.6m high station perimeter fencing and concrete post and rail property boundary fence will be built.
- The construction of the IPP control building will begin by setting out the foundations. The building foundations will consist of reinforced concrete rafts or footings. Pre-formed works will be constructed to the specifications of the detailed design. The concrete will be mixed off site and transported in on cement trucks where the foundations will be poured in-situ in the preformed works.
- Adequate lighting will be installed around the compound on the lighting columns.
- Lightning protection masts will be installed to protect the station from direct lightning strike.
- An underground cable chamber will be installed outside the IPP compound entrance to act as the common interface point for the 33kV interconnector cables coming from the solar farm inverter/transformer stations going into the substation. The solar farm contractor will be typically responsible for routing all the interconnector cables into this chamber and then the separate substation contractor will manage the short connection of the 33kV cables from this chamber into the switchgear housed in the IPP control building.

Following the completion of construction works, the electrical infrastructure can be installed. The following electrical installation works will take place.

- Delivery and installation of transformer. The delivery of the transformer will be managed in accordance with regulations governing the movement of abnormal loads. In advance of undertaking abnormal load deliveries necessary permitting, approvals and infrastructure accommodation works will be agreed with An Garda Síochána and implemented accordingly. Delivery vehicles will only follow agreed routes and where possible will be delivered overnight to minimise potential for delay and obstruction to general traffic.
- Delivery and installation of all other HV equipment.
- Wiring and cabling of HV/LV equipment, protection and control cabinets.
- Commissioning of all newly installed equipment.

The following equipment is required for the construction of the substation compound:

- Tracked Excavators;
- 360° tracked excavators (13 ton normally, 22 ton for rock breaker);
- Tracked dumpers / tractors and trailers;
- Vibrating rollers;
- Power Tools;
- Scaffolding;

- Crane;
- Hoist; and
- Generator.

### 3.2.5 Emission (disposal to land, water or air)

As described above the proposed development in itself is unlikely to result in any significant effects on any European designated sites. However, the proposed development is intrinsically linked to Drumdowney Solar Farm development and the NIS for the proposed solar farm identified that construction and decommissioning phase elements of that project (in particular potential overland flow of construction stage silt/pollutants to the watercourses hydrologically connected to and the estuaries that form part of the Lower River Suir SAC and the River Barrow and River Nore SAC and disturbance/displacement of Otter have the potential to impact Natura 2000 sites (i.e., Lower River Suir SAC and the River Barrow & River Nore SAC) within the project Zone of Influence. Such impacts cannot be discounted without adequate Construction and Environmental Management Plan (CEMP) commitments being implemented and/or site-specific mitigation measures being put in place during the project construction/decommissioning phase.

### 3.2.6 Transportation Requirements

There will be some localised increase in construction traffic during the construction phase (however operational phase maintenance requirements are low. The facility will not require any day-to-day staffing and security will be remote and monitored via CCTV.

### 3.2.7 Duration of Operations

The operational lifetime of solar farms is assumed to be 40 years. However, following the decommissioning of the solar farm, it is envisaged that the substation (and grid connection) will remain in situ as a valuable functioning and operational part of the electricity transmission network managed by the Transmission Systems Operator, EirGrid.

### 3.2.8 Cumulative and In-combination Effects

For projects to act cumulatively in a manner that significantly impacts upon biodiversity there needs to be a mechanism by which such an effect is mediated. For instance, this could occur if there were cumulative impacts upon water quality, or loss of an important habitat feature. In general, if individual projects and plans adequately address the potential risks to the receiving environment there is significantly less risk of cumulative and in combination effects. Indeed, in circumstances where projects have landscaping and biodiversity measures that are compatible it may be the case that ecological connectivity may be improved through creation or enhancement of hedgerow, woodland and field margin habitats.

The proposed development is associated with the development of the proposed Drumdowney Solar Farm. Ecology Ireland also carried out the assessments (including preparing the EclA and NIS) for this solar farm development. The potential for significant effects on designated sites and their conservation objectives arising from the overall solar farm project is recognised as an in-combination effect in the accompanying NIS.

Ecology Ireland has considered other projects and plans relevant to this area and their potential to act cumulatively or in combination with the proposed development. The County Development plans for

Kilkenny City & County (2021-2027) and Waterford City & County Council (2022-2027) formed part of this review.

A selection of plans and projects identified from this area are summarised in Table 3.1 below. Most of the planning permissions in the local area are associated with relatively minor works such as modifications to residential or farm buildings and construction of one-off houses.

The proposed development area is rural and agricultural land use is dominant. A number of the planning applications in the area relate to operations at or associated with Belview Port, electricity distribution from Great Island Power station and renewable energy projects. There is a live application before the local authority (25/60254) in relation to modifications to road access at Belview Port and this application is accompanied by a NIS. The field surveys recorded Otter activity at the port, along the Suir Estuary.

Potential cumulative effects in relation to solar farms projects include construction related surface-water run-off, in particular where qualifying interests associated with the SACs could be subject to cumulative impact through hydrological or water quality impacts such as increased siltation, nutrient release and contaminated run-off arising from other developments. This project has been considered on its own and in relation to the potential for any cumulative or in combination impacts arising from any combination of the project proceeding in the future.

The earthworks associated with the proposed development are relatively minor and with the implementation of appropriate environmental controls and mitigation, the risk of any significant effects outside of the immediate footprint of the development is considered extremely unlikely.

**Table 3.1 Selection of planning applications in the vicinity of the overall solar farm project (including the SID application site and the proposed Drumdowney Solar Farm).**

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
ABP-321962	c. 450m	Granted - 01/08/2025	An Coimisiún Pleanála	Construction of an integrated plasterboard manufacturing facility and all associated works. Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS) submitted with application.
25/60233	c. 140m	Granted – 23/06/2025	Kilkenny County Council	Constructing 2 no. industrial warehouse blocks for bulk storage, with Block A housing 4 no. single storey storage units (floor area - 3,488.4m <sup>2</sup> ) and Block B housing 4 no. single storey units (floor area - 8446.2m <sup>2</sup> ), new weighbridge and cabin, new internal access roads, retaining walls and boundary fencing and all ancillary works.
25/60208	c. 3.5km	Granted – 12/06/2025	Kilkenny County Council	for the renovation and extension of our existing administration offices together with a new security hut, altered entrance arrangement and all associated site works.
25/60177	c. 50m	Granted – 27/05/2025	Kilkenny County Council	for the construction of a bulk store and associated site works. The store will be used to store port related products such as break bulk, bulk and unitised loads.
25/60074	c. 480m	Granted – 21/05/2025	Kilkenny County Council	for the construction of a new wastewater treatment system and a proposed change to the site boundary situated.

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
24/60304	c. 3.8km	Granted – 10/04/2025	Waterford City & County Council	The Phase 1 development includes 9 blocks with a total gross floor area (GFA) of 60579sqm (64953sqm including undercroft and basement car parks (4374sqm)). The development involves construction of a podium which establishes new ground/ street formation level which varies from c.4.6mOD to 8.4mOD which connects to the Sustainable Transport Bridge (by WCCC) at the Central Plaza. Provision is made for pedestrian connection from Central Plaza to Dock Road via the approved pedestrian bridge (by WCCC). A new riverside promenade / cycleway (part of Greenway) is proposed between the Sustainable Transport Bridge and the Eastern Access to the site.
24/60308	c. 2.9km	Granted – 13/03/2025	Kilkenny County Council	for the proposed erection of 14 number semi-detached two-storey and basement [three-stories overall] dwellinghouses together with all associated site development works [including removal of existing concrete bases and reduction of levels to original contour levels] in lieu of 10 number houses [No 17-26] previously permitted under Planning Reference 16/872.
ABP-318204	c. 1km	Granted – 15/01/2025	An Bord Pleanála	Grid stability service development and associated site works.
ABP-318103	c. 1km	Granted – 13/11/2024	An Bord Pleanála	Development of a new electricity circuit. A Natura Impact Statement (NIS) was submitted with the application.
23/60426	c. 1km	Granted – 16/09/2024	Kilkenny County Council	For a 7-year planning permission for 3 No Bulk Stores, a marshalling yard and site works including earthworks, road works, entrance, gates and fencing, concrete paving, water services, drainage works, site lighting and landscaping. The stores will be used to store Port related products such as bulk goods, break bulk and unitised products.

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
23/60578	c. 3km	Granted – 05/08/2024	Kilkenny County Council	For the demolition of two existing shed buildings and removal of the remaining floor slab of a previous dwelling, the construction of 16 No. two storey houses (12 No. 3-bedroom & 04 No. 02-bedroom), a new site entrance from Abbey Road, new boundary treatments, and all associated site & development works.
24/60256	c. 750m	Granted – 23/07/2024	Kilkenny County Council	For the development of 2no. grain silos and associated site works.
20240309	c. 1.4km	Granted – 12/06/2024	Wexford County Council	Permission for development consisting of construction of a Battery Energy Storage System (BESS).
ABP-318914	c. 1km	Granted – 05/06/2024	An Bord Pleanála	110kV substation and 110kV underground grid connection.
23/60323	c. 1.6km	Granted – 08/04/2024	Kilkenny County Council	for the proposed erection of 4 number fully serviced 2 storey detached dwellings, 4 number detached single storey garages, 2 number proposed vehicular and pedestrian entrances, boundary treatments to include removal of existing stone wall to front of site to facilitate sightlines, landscaping, together with all associated site development works to include removal of adjoining section of farm building.
20231294	c. 1.2km	Granted – 16/02/2024	Wexford County Council	Permission for development, consisting of: Construction of an electrical infrastructure installation and associated underground grid connection (UGC).

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
23/60536	c. 3.5km	Granted – 25/01/2024	Kilkenny County Council	For the demolition of the existing biofilter for odour abatement and the construction of a new biofilter, stack and all associated pipework and ducting.
ABP-312631	c. 1.3km	Granted – 22/01/2024	An Bord Pleanála	Construction of two boreholes in milk processing plant. Natura Impact Statement submitted with the planning application. The Glanbia Ireland DAC facility has an Industrial Emissions Licence granted by the EPA.
23/60504	c. 3.6km	Granted – 04/01/2024	Kilkenny County Council	For the provision of new effluent treatment system with associated percolation area including all site development works.
23/60274	c. 690m	Granted – 02/11/2023	Kilkenny County Council	(1) New single storey warehouse, incorporating a 2 Storey office block; (2) Open sided covered goods in-take area from proposed warehouse to existing building; (3) New single storey storage building between proposed building and existing building; (4) Relocation of existing weigh-bridge and associated items; (5) Relocation of existing static water bladder tank; (6) Realignment of existing car parking area on site to include for additional spaces; (7) Realignment of internal site road, together with all associated site development works, all at Gorteens, Slieverue, Co. Kilkenny. This application is accompanied by a Natura Impact Statement (NIS).
ABP-314069	c. 3.6km	Granted – 27/10/2023	An Bord Pleanála	Construction of extension and all associated site works.

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
23/60352	c. 3.9km	Granted – 25/09/2023	Kilkenny County Council	For a water storage tank, single storey pump house and all associated site works.
22/318	c. 280m	Granted – 17/05/2023	Kilkenny County Council	For a laydown area for equipment and break bulk materials. The works will include earthworks, drainage, concrete paving, retaining walls and landscaping works. A Natura Impact Statement will accompany this application.
22/549	c. 690m	Granted – 28/04/2023	Kilkenny County Council	For a single-storey extension to existing warehouse (BV2) to north of site, new storm water attenuation tank and the part realignment of existing concrete yard together with all associated site development works.
23/29	c. 30m	Granted – 30/03/2023	Kilkenny County Council	For the construction of a slatted tank, cattle shed, alongside all associated site works.
ABP-311746	c. 4.4km	Granted – 02/02/2023	An Bord Pleanála	Waterford City Public Infrastructure Project - Flood Defences West. Development of c.1.1km of flood protection measures.
22/480	c. 720m	Granted – 19/01/2023	Kilkenny County Council	For a Maintenance Building, roof mounted solar panels and associate site works at Belivew Port.

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
22/569	c. 360m	Granted – 12/01/2023	Kilkenny County Council	To construct 3 no. wood based, biomass storage bays an ash storage building and associated site works including road widening to an existing internal road and a new concrete yard area. A Natura Impact Statement will accompany the Application. Smartply Europe currently hold an Industrial Emission Licence issued by the EPA.
20221162	2.2km	Granted – 16/12/2022	Wexford County Council	Permission to amend the design of the approved development (Planning Reference 20170330) which comprises consent for a Solar PV Energy Development. Proposed amendments include; (1) Change of location and increase in number of client substations, (2) Increase in number of storage rooms, (3) Decrease in number and size of transformer containers, (4) Deer fencing to decrease in size, (5) Number of CCTV cameras to be reduced, (6) Slight alteration to the access tracks, (7) Change in height and number of module racks and pile driven poles, (8) Change in height and angle of solar panels, and (9) Change in lifetime of the permission from 5 years to 10 years with an increase operational lifetime from 25 to 35 years.
20220628	1.7km	Granted – 06/07/2022	Wexford County Council	Permission for development which will consist of grid connection infrastructure to connect the approved Ballyedock Solar Farm (PA Ref:20170330) to the existing Great Island Substation comprising the laying of underground cables, overhead lines, associated infrastructure and Horizontal Directional Drilling. The proposed development will also include upgrades to the substation (previously consented under planning application reference 20170330) to align with the connection route to the national grid. A Natura Impact Statement has been prepared in respect of the application for planning permission.
22/452	c. 45m	Granted – 22/11/2022	Kilkenny County Council	For the construction of a Livestock Underpass beneath the public road between the crossroads and existing farmyard alongside all associated site works.

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
22/513	c. 40m	Granted – 27/09/2022	Kilkenny County Council	For the change of use of land to extend the service station carpark to enable the installation of a modular substation and ancillary site development works; to facilitate 2 no. shared electric vehicle charging units and 4 no. charging bays within a partially reconfigured parking area.
22/81	c. 40m	Granted – 04/04/2022	Kilkenny County Council	The development will consist of the installation of 5250 Solar PV panels over the roof of existing industrial buildings and all associated site works and services.
21/1030	c. 1km	Granted – 14/02/2022	Kilkenny County Council	For the handling and temporary storage of zinc and lead ore at an existing bulk store, and loading of the ore from the store onto ships from an existing Wharf.
21/989	c. 1.4km	Granted – 03/02/2022	Kilkenny County Council	The installation of a Combined Heat and Power (CHP) unit including a 7.55m high stack, stack access ladder and platform, improvements to the internal estate road and ancillary site works at the permitted cheese manufacturing plant, planning permission reference no. 19/668 (APB-306136-19). An Industrial Emissions Licence is required for the cheese manufacturing plant and the proposed development. A Natura Impact Statement will also be submitted with the application.
21/551	c. 3.2km	Granted – 08/11/2021	Kilkenny County Council	For the construction of a terrace of 5 No. two bedroom bungalows designed for the elderly, together with proposed boundary treatments, landscaping, car parking, drainage connections and all associated site development works.
21/586	c. 320m	Granted – 31/08/2021	Kilkenny County Council	For a 7 year planning permission for a bulk store and associated site works. The store will be used to store port related products such as break bulk, bulk and unitised loads.

Ref. Number	Distance from Solar Farm Project	Status	Planning Authority	Description
ABP-308906	c. 1km	Granted – 23/06/2021	An Bord Pleanála	Proposed development will form part of the Greenlink Interconnector and will consist of the development of a new converter station, tail station, MV substation and 23km of high voltage direct current (JVDC) electricity cables, 420m of high voltage alternating current (HVAC) cables, 23.42km of fibre optic cable and all associated site works with an overall proposed development site area of 83.8ha.
20/845	c. 3.3km	Granted – 10/06/2021	Kilkenny County Council	For the following: a) change of use of the existing first floor area to residential use to provide 15 no. apartments, b) construct a new rooftop penthouse containing 8 no apartments (23 apartments in total) together with c) elevational modifications, and all associated site works.
20/700	c. 320m	Granted – 05/03/2021	Kilkenny County Council	To develop a log yard and associated works. The log yard will extend the area available for stockpiling and handling of logs for use in SmartPly's oriented strand board mill which adjoins the site. A Natura Impact Statement will accompany the Application.
20/453	c. 2.5km	Granted – 03/03/2021	Kilkenny County Council	The construction of 40 no. residential units.
25/60254	c. 0km	Due - 06/07/2025	Kilkenny County Council	The extension of the existing access road that provides access to lands located at Belview Port, Gorteens and Drumdowney Upper, Co. Kilkenny.

### 3.3 Likely Changes to the Natura 2000 Sites

As outlined in Section 3.1 above, it is deemed that in-combination construction phase elements of the project (in particular potential overland flow of construction stage silt/pollutants during the construction Drumdowney Solar Farm) to the watercourses hydrologically connected to and the estuaries that form part of the Lower River Suir SAC and the River Barrow and River Nore SAC and potential disturbance/displacement of Otter has the potential to impact Natura 2000 sites (i.e., the Lower River Suir SAC and the River Barrow and River Nore SAC) within the project Zone of Influence, without the implementation of best practice measures, a CEMP or site-specific mitigation measures during the project construction phase and during eventual decommissioning.

Table 3-2 presents a screening rational for QIs of both of the designated sites potentially affected by the proposed development.

#### 3.3.1 Reduction of Habitat Area

There is the potential for in-combination indirect habitat loss or deterioration of Natura 2000 sites within the project Zol from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination, particularly during the project construction phase.

#### 3.3.2 Disturbance to Key Species

During construction of the associated solar farm development (and decommissioning), disturbance associated with the movement of plant and personnel could potentially disturb or displace Otters in areas proximate to the active works.

#### 3.3.3 Habitat or Species Fragmentation

Not applicable.

#### 3.3.4 Reduction in Species Density

There is some potential for the wider proposed project to contribute towards changes in water quality of Natura 2000 sites within the project Zol. This is related to the potential for run-off or discharge into the aquatic environment from the associated proposed solar farm contributing to downstream impacts such as increased siltation, nutrient release and/or contamination, particularly during the wider solar farm project construction phase. In the event that the water quality/feeding resource in nearby areas of the estuaries was impacted this could lead to a reduction in the qualifying fauna species density in these areas (e.g. Otter, Salmon, *Salmo salar*). Similarly, if disturbance/displacement of Otters was to occur as a result of the development that could impact upon the local distribution and abundance of the species within the SACs in question.

#### 3.3.5 Changes in Key Indicators of Conservation Value (water quality etc.)

There is some potential for the proposed wider solar farm project to contribute towards changes in water quality of Natura 2000 sites within the project Zol. This is related to the in-combination potential for run-off or discharge into the aquatic environment contributing to downstream impacts such as increased siltation, nutrient release and/or contamination, particularly during the project construction phase.

### **3.4 Likely Impacts on the Natura 2000 Sites as a Whole**

It is considered that in the absence of adequate mitigation that in-combination the construction phase elements of the wider project (to the watercourses hydrologically connected to and the estuaries that form part of the Lower River Suir SAC and the River Barrow and River Nore SAC) and disturbance/displacement of Otter which is a qualifying interest of both of the SACs in question has the potential to have significant effects on the Natura 2000 sites (i.e., Lower River Suir SAC and the River Barrow and River Nore SAC) within the project Zone of Influence. Such in-combination impacts cannot be discounted without adequate CEMP commitments being implemented and/or site-specific mitigation measures being put in place during the project construction phase. Likewise, it is reasonable to infer that in the absence of adequate environmental controls during the decommissioning phase that there could be similar effects on the local Natura 2000 sites.

#### **3.4.1 Interference with the Key Relationships that Define the Structure and Function of the Natura 2000 Sites**

Without the implementation of best practice measures, a CEMP or site-specific mitigation measures during the project construction phase (and again during decommissioning), it is considered that in-combination construction phase elements of the wider solar farm project may have the potential to contribute towards significant effects that may interfere with the structure and function of Natura 2000 sites within the project ZoI; Lower River Suir SAC and the River Barrow and River Nore SAC.

### **3.5 Indicators of Significance as a Result of the Identification of Effects Set Out Above**

As outlined above, it is deemed that in-combination construction phase elements of the wider solar farm project (in particular potential overland flow of construction stage silt/pollutants) to the watercourses hydrologically connected to and the estuaries that form part of the Lower River Suir SAC and the River Barrow and River Nore SAC and potential disturbance/displacement of Otter has the potential to impact Natura 2000 sites (i.e., the Lower River Suir SAC and the River Barrow and River Nore SAC) within the project Zone of Influence, without the implementation of best practice measures, a CEMP or site-specific mitigation measures during the project construction phase. Likewise, it is reasonable to infer that in the absence of adequate environmental controls during the decommissioning phase that there could be similar effects on the local Natura 2000 sites.

#### **3.5.1 Loss**

There is the potential for in-combination indirect habitat loss or deterioration of Natura 2000 sites within the wider solar farm project ZoI from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination, particularly during the project construction/decommissioning phases.

#### **3.5.2 Fragmentation**

Not applicable.

#### **3.5.3 Disruption**

There is the potential for indirect habitat loss or disruption of Natura 2000 sites within the wider solar farm project ZoI from the effects of run-off or discharge into the aquatic environment through impacts such as

increased siltation, nutrient release and/or contamination, particularly during the project construction/decommissioning phases.

#### 3.5.4 Disturbance

The construction/decommissioning phase activity in the wider solar farm project has the potential to displace Otters from areas within and proximate to the development site. This could involve disturbance of Otters within the designated sites or ex-situ disturbance of Otters and Gulls elsewhere within the development site.

#### 3.5.5 Change to Key Elements of the Site

As outlined in Section 3.1 above, it is deemed that in combination construction phase elements of the wider solar farm project (in particular potential overland flow of construction stage silt/pollutants) to the watercourses hydrologically connected to and the estuaries that form part of the Lower River Suir SAC and the River Barrow and River Nore SAC and potential disturbance/displacement of Otter has the potential to impact Natura 2000 sites (i.e., the Lower River Suir SAC and the River Barrow and River Nore SAC) within the project Zone of Influence. Such impacts cannot be discounted without adequate CEMP commitments being implemented and/or site-specific mitigation measures being put in place during the project construction phase. Likewise, it is reasonable to infer that in the absence of adequate environmental controls during the decommissioning phase that there could be similar effects on the local Natura 2000 sites.

### 3.6 Elements of the Project Likely to Significantly Impact on the Natura 2000 Sites or where the Scale or Magnitude of Impacts are Unknown

On its own the proposed development does not have any likelihood of significant effects on European designated sites. The site is remote from the European sites and the site is not known to be used by any of the mobile QI/SCI species of designated sites in the wider area with any regularity. In addition, there is no watercourse within or adjacent to the proposed development site which could convey water quality mediated impacts on hydrologically connected Natura 2000 sites. However, as it is intrinsically linked to the proposed Drumdowney Solar Farm development there is a likelihood of in-combination effects, given that the proposed solar farm development identified likely significant effects on the two sites adjacent to Parcel 4:

- Lower River Suir SAC
- River Barrow & River Nore SAC

Table 3.2 presents the rationale for qualifying interests 'screened in' and Table 3.3 shows the reasons other QIs are 'screened out' for further consideration at the NIS stage. This assessment is presented in the NIS for the proposed solar farm development.

Therefore, it cannot be concluded, that the proposed project, individually or in combination with other plans or projects, will not have a significant effect on a Natura 2000 sites, without the consideration and analysis of further information. Therefore Stage 2 NIS (AA) is required. A Natura Impact Statement (NIS) is presented in **Section 4**, to provide scientific examination of the project to enable the competent authority

to undertake an AA. The NIS will examine potential effects to Natura 2000 sites screened in as part of this Screening for Appropriate Assessment; site Lower River Suir SAC and the River Barrow and River Nore SAC.

**Table 3-2 Screened-In Qualifying Interests**

SAC	Qualifying Interest (QI)	Screening Rationale
Lower River Suir SAC	Salmon ( <i>Salmo salar</i> ) [1106]	Estuarine habitat used during migration; vulnerable to sediment or pollutant input.
Lower River Suir SAC	Otter ( <i>Lutra lutra</i> ) [1355]	Uses estuarine margins; may be disturbed by construction activity. Present in the Luffany and minor watercourses adjacent to Parcel 3.
Lower River Suir SAC	Atlantic Salt Meadows [1330]	Downstream habitat to water flowing into the Blackwater and onto the Suir, potentially sensitive to runoff and eutrophication.
Lower River Suir SAC	Twaite Shad ( <i>Alosa fallax fallax</i> ) [1103]	Migrates through estuary in spring; vulnerable to turbidity or pollution.
River Barrow and River Nore SAC	Salmon ( <i>Salmo salar</i> ) [1106]	As above.
River Barrow and River Nore SAC	Otter ( <i>Lutra lutra</i> ) [1355]	As above.
River Barrow and River Nore SAC	Atlantic Salt Meadows [1330]	As above.
River Barrow and River Nore SAC	Twaite Shad ( <i>Alosa fallax fallax</i> ) [1103]	As above.
River Barrow and River Nore SAC	Sea Lamprey ( <i>Petromyzon marinus</i> ) [1095]	Estuarine sections used in migration/spawning.
River Barrow and River Nore SAC	River Lamprey ( <i>Lampetra fluviatilis</i> ) [1099]	May be present in estuarine reaches during life cycle.
River Barrow and River Nore SAC	Brook Lamprey ( <i>Lampetra planeri</i> ) [1096]	Occasional use of estuarine areas; precautionary inclusion.

**Table 3-3 Screened-Out Qualifying Interests**

Site	Qualifying Interest	Reason for Screening Out
Lower River Suir SAC [002137]	1029 <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel)	No suitable habitat or hydrological link.
Lower River Suir SAC [002137]	1092 <i>Austropotamobius pallipes</i> (White-clawed Crayfish)	No instream works; estuarine setting unsuitable.
Lower River Suir SAC [002137]	3260 Floating river vegetation	Estuarine section unsuitable; feature limited to upstream freshwater reaches.
Lower River Suir SAC [002137]	7220 Petrifying springs with tufa formation	No karst or spring hydrology in receiving environment.
Lower River Suir SAC [002137]	91A0 Old sessile oak woods	No semi-natural woodland habitat present or within ZOI.
Lower River Suir SAC [002137]	91E0 Alluvial forests	No qualifying alluvial woodland within zone of influence.
River Barrow and River Nore SAC [002162]	1029 <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel)	No freshwater substrate; project located near estuarine section.
River Barrow and River Nore SAC [002162]	1092 <i>Austropotamobius pallipes</i> (White-clawed Crayfish)	No direct works to instream habitat; estuarine section unsuitable.
River Barrow and River Nore SAC [002162]	7220 Petrifying springs with tufa formation	No spring-fed tufa features present or hydrologically connected.
River Barrow and River Nore SAC [002162]	91A0 Old sessile oak woods	No qualifying habitat present; habitat not hydrologically linked.
River Barrow and River Nore SAC [002162]	91E0 Alluvial forests	No qualifying riparian woodland present in study area.
River Barrow and River Nore SAC [002162]	4030 European dry heaths	No dry heath habitat within zone of influence.

Site	Qualifying Interest	Reason for Screening Out
River Barrow and River Nore SAC [002162]	6430 Hydrophilous tall herb fringe communities	No hydrophilous tall herb communities present or likely to be affected.
River Barrow and River Nore SAC [002162]	6985 <i>Vandenboschia speciosa</i> (Killarney Fern)	No suitable shaded, humid niche habitat present.
River Barrow and River Nore SAC [002162]	1016 <i>Vertigo moulinsiana</i>	No calcareous fen habitat present; unsuitable conditions.

## 4 Natura Impact Statement

This section of the report provides the necessary information to inform the AA process to be completed by the consenting authority. This NIS provides the relevant scientific information to enable the competent authority in carrying out its AA to determine beyond reasonable scientific doubt whether the proposed development would adversely affect the integrity of Natura 2000 sites.

The NIS assesses whether or not the proposed development in combination with the proposed Drumdowney Solar Farm would adversely affect the integrity of Natura 2000 sites within the project Zol, for which effects could not be excluded during the Screening for AA (see Section 3 for details). The Natura 2000 sites are as follows:

- Lower River Suir SAC
- River Barrow and River Nore SAC

As outlined in the NIS for the proposed Drumdowney Solar Farm, the solar farm development site has potential hydrological connectivity with the Natura 2000 sites (site Lower River Suir SAC and the River Barrow and River Nore SAC). Parcel 4 of the proposed solar farm is located closely adjacent to these Natura 2000 sites. All of the SID application site as well as the wider Drumdowney Solar Farm is located within the subcatchment of these designated sites. Parcel 3 of the solar farm is adjacent to watercourses which flow into the Blackwater a tributary of the Suir. The solar farm also requires dry-deck crossings of drains and a HDD crossing of the Luffany (upstream of the Suir Estuary). There is potential for impacts to occur through run-off of contaminants to the Natura 2000 sites and potential disturbance/displacement impacts on Otter, a qualifying interest species of both SACs. These likely effects were identified in the screening process as requiring further consideration and appropriate mitigation.

Table 4-1 summarises the qualifying and special conservation interests of these sites. The detailed Conservation Objectives of these sites are provided in Appendix 1 to this NIS. As summarised in Table 3-2 only certain QIs have the potential to be impacted upon by the proposed solar farm development. In relation to water-quality mediated impacts there is some potential for impact upon fish species, Atlantic Salt Meadows and Otter.

The mitigation and environmental control measures outlined in Section 4.2 have been designed to prevent any damaging run-off or pollution of either of the Natura 2000 sites located proximate to the development. Similarly, the mitigation also presents precautionary measures designed to minimise the potential disturbance of Otters that may be present in the vicinity of the proposed solar farm. As noted previously, the proposed development does not have any likelihood of significant effects on European designated sites. The site is remote from the European sites and the site is not known to be used by any of the mobile QI/SCI species of designated sites in the wider area with any regularity. In addition, there is no watercourse within or adjacent to the proposed development site which could convey water quality mediated impacts on hydrologically connected Natura 2000 sites. However, as it is intrinsically linked to the proposed Drumdowney Solar Farm development there is a likelihood of in-combination effects, given that the proposed solar farm

development identified likely significant effects on the River Barrow and River Nore SAC and the Lower River Suire SAC

Table 4-1 Details of the Natura 2000 sites considered in this NIS.

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
River Barrow and River Nore SAC (002162)	<p>The conservation objectives of this site relate to maintaining or restoring the favourable conservation condition of the following qualifying interests;</p> <ul style="list-style-type: none"> <li>• Estuaries [1130]</li> <li>• Mudflats and sandflats not covered by seawater at low tide [1140]</li> <li>• Reefs [1170]</li> <li>• Salicornia and other annuals colonising mud and sand [1310]</li> <li>• Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</li> <li>• Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</li> <li>• Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]</li> <li>• European dry heaths [4030]</li> <li>• Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]</li> <li>• Petrifying springs with tufa formation (Cratoneurion) [7220]</li> <li>• Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]</li> <li>• Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</li> <li>• Desmoulin's Whorl Snail <i>Vertigo moulinsiana</i> [1016]</li> <li>• Freshwater Pearl Mussel <i>Margaritifera margaritifera</i> [1029]</li> <li>• White-clawed Crayfish <i>Austropotamobius pallipes</i> [1092]</li> <li>• Sea Lamprey <i>Petromyzon marinus</i> [1095]</li> <li>• Brook Lamprey <i>Lampetra planeri</i> [1096]</li> <li>• River Lamprey <i>Lampetra fluviatilis</i> [1099]</li> <li>• Twaite Shad <i>Alosa fallax fallax</i> [1103]</li> <li>• Salmon <i>Salmo salar</i> [1106]</li> <li>• Otter <i>Lutra lutra</i> [1355]</li> <li>• Killarney Fern <i>Trichomanes speciosum</i> [1421]</li> <li>• Nore Freshwater Pearl Mussel, <i>Margaritifera durrovensis</i></li> </ul> <p>(After NPWS 2025)</p>	<p>2.4km from the SID site</p> <p>[Directly bordering Parcel 4 of the associated proposed solar farm development]</p>

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
Lower River Suir SAC (002137)	<p>The conservation objectives of this site relate to maintaining or restoring the favourable conservation condition of the following qualifying interests;</p> <ul style="list-style-type: none"> <li>• Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330]</li> <li>• Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260]</li> <li>• Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]</li> <li>• Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</li> <li>• Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</li> <li>• <i>Taxus baccata</i> woods of the British Isles [91J0]</li> <li>• Freshwater Pearl Mussel <i>Margaritifera margaritifera</i> [1029]</li> <li>• White-clawed Crayfish <i>Austropotamobius pallipes</i> [1092]</li> <li>• Sea Lamprey <i>Petromyzon marinus</i> [1095]</li> <li>• Brook Lamprey <i>Lampetra planeri</i> [1096]</li> <li>• River Lamprey <i>Lampetra fluviatilis</i> [1099]</li> <li>• Twaite Shad <i>Alosa fallax fallax</i> [1103]</li> <li>• Salmon <i>Salmo salar</i> [1106]</li> <li>• Otter <i>Lutra lutra</i> [1355]</li> </ul> <p>(After NPWS 2017)</p>	<p>2.7km from the SID site</p> <p>[0.04km from the proposed solar farm development site]</p>

## 4.1 Impact Assessment

### 4.1.1 Characterising Impacts

The methodology for the assessment of impacts is derived from the Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites (EC, 2002). When describing changes/activities and impacts on ecosystem structure and function, the types of impacts that are commonly presented include the following:

- direct and indirect effects,
- short- and long-term effects,
- construction, operational and deconstruction / demolition effects, and
- isolated, interactive and cumulative effects.

Impacts that could potentially occur through the implementation of the project can be categorised under a number of impact categories as outlined in the EC 2002 document as follows:

- Loss/Reduction of habitat area,
- Disturbance to key species,
- Habitat or species fragmentation,
- Reduction in species density, and
- Changes in key indicators of conservation value such as decrease in water quality and quantity.

### Meaning of 'Adversely Affect the Integrity of the Site'

The concept of the 'integrity of the site' is explained in the EU publication Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, as follows;

*'It is clear from the context and from the purpose of the directive that the 'integrity of the site' relates to the site's conservation objectives. For example, it is possible that a plan or project will adversely affect the integrity of a site only in a visual sense or only habitat types or species other than those listed in Annex I or Annex II. In such cases, the effects do not amount to an adverse effect for purposes of Article 6(3), provided that the coherence of the network is not affected. On the other hand, the expression 'integrity of the site' shows that focus is here on the specific site. Thus, it is not allowed to destroy a site or part of it on the basis that the conservation status of the habitat types and species it hosts will anyway remain favourable within the European territory of the Member State.*

*As regards the connotation or meaning of 'integrity', this can be considered as a quality or condition of being whole or complete. In a dynamic ecological context, it can also be considered as having the sense of resilience and ability to evolve in ways that are favourable to conservation. The 'integrity of the site' has been usefully defined as 'the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified'*

A site can be described as having a high degree of integrity where the inherent potential for meeting site conservation objectives is realised, the capacity for self-repair and self-renewal under dynamic conditions is maintained, and a minimum of external management support is required. When looking at the 'integrity of the site', it is therefore important to take into account a range of factors, including the possibility of effects manifesting themselves in the short, medium and long-term.

The integrity of the site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives.

#### 4.1.2 Potential Effects from the Proposed Development to Qualifying Habitats and Species of Natura 2000 Sites within the Project Zone of Influence

Potential in-combination effects associated with the proposed development and the associated Drumdowney Solar Farm development to the Qualifying Habitats and Species of Natura 2000 Sites within the project Zone of Influence (site Lower River Suir SAC and the River Barrow and River Nore SAC) are as follows:

**Construction phase** elements of the associated solar farm development (in particular potential overland flow of construction stage silt/pollutants to watercourses hydrologically linked to the designated sites in question, or directly to these sites themselves) have the potential to impact Natura 2000 sites (i.e., Lower River Suir SAC and the River Barrow and River Nore SAC). Such effects can result in indirect habitat loss or deterioration of these Natura 2000 sites, as well as reduction in density of qualifying avian species. Likewise, it is reasonable to infer that in the absence of adequate environmental controls during the decommissioning phase that there could be similar effects on the local Natura 2000 sites.

**Disturbance or displacement** effects on Otter could occur, particularly during construction and to a lesser extent during the eventual decommissioning phase of the associated solar farm development as a result of the movement and operation of plant and personnel. The construction activity will involve the movement of plant and personnel and associated noise and visual stimuli which could potentially affect the distribution and abundance of Otters using nearby parts of the designated sites, or ex situ disturbance in areas of the development site away from the SACs. Direct disturbance/displacement effects in relation to noise and/or visual cues on fauna associated with designated sites could be of relevance given that Parcel 4 is located closely adjacent to the two estuarine sections of these designated sites.

Ex-situ disturbance/displacement effects also need to be considered in relation to highly mobile qualifying interest species that can occur outside of the designated site itself. There is potential that Otters could utilise lands within the site for foraging purposes, albeit on an occasional basis, given that there is very limited attractive habitat for the species within the construction footprint. There is no evidence that the lands within the proposed solar farm development site are of high resource value for Otters.

Given that the associated solar farm development area appears to be unattractive for Otters and that no holts were discovered proximate to the Drumdowney Solar Farm development site, there is little concern in relation to potential in-combination disturbance or direct displacement of the species from the development site. Construction and decommissioning works are also temporary in nature and any areas with high-levels of activity are likely to be highly localised at any time. Construction works are also limited to the hours of daylight when Otters would not be expected to be active.

The construction related noise and traffic will see a temporary localised increase in the movement of plant and personnel on the lands within the proposed development site and across the associated solar farm development site. There is the potential for construction activity throughout the year and some potential for disturbance (visual and noise related etc.) to Otters present locally. Potential direct disturbance effects would of course be limited to areas of construction close to the designated sites (Parcel 4 of the Drumdowney Solar Farm). However, these are currently intensively managed agricultural fields with regular movement of farm vehicles and livestock. The lands are screened from the River Barrow estuary by mature woodland and the Lower Suir Estuary is located well below the lands in Parcel 4 where the fields rise steeply away from the estuary.

The construction of the solar arrays within each parcel of the associated solar farm is likely to take c. 3-5 months (per parcel) within an overall construction phase for the solar farm project including the proposed substation and grid connection of c. 24 months. Of relevance to this NIS, a perimeter fence for the solar farm will be constructed of stockproof fencing and will be up to 2.4 m in height. The solar PV panels will be mounted on supporting structures, in the form of metal frames, which are typically anchored by driven or screw piles to a depth of up to 2m, causing minimal ground disturbance and occupying less than 1% of the land area. The angled racks will be anchored to the ground using one of the following methods:

- *Screw piles or rammed piles*: This is the preferred method of founding the racks, as it is the quickest to construct and most economical. This can be considered the default

method and it is expected that the vast majority of the site will use screw or rammed piles as anchors;

- *Pre-drilled holes with backfilling/concrete:* In certain cases, geotechnical conditions such as the presence of rock close to the surface may require foundation holes to be pre-drilled prior to ramming the piles. These holes would then be backfilled with concrete or other aggregate. A pre-construction geotechnical assessment will confirm if this type of anchor is required. It is expected that this would only be deployed in localised pockets of land where rock was present, if at all;
- *Ballast foundations:* This foundation type can be used in localised circumstances where penetration of the ground surface is not possible. This method uses concrete anchors to counteract any lift forces generated by wind loading on the modules. Ballast foundations could be deployed in areas of the site in the event of rock near the surface, or where there is potential for sub-surface archaeology.

The construction phase will be temporary in nature and away from water, during daylight hours and highly localised within improved agricultural grassland so the potential for disturbance / displacement of Otters is not deemed to be significant. The CEMP which accompanied the application for planning permission for Drumdowney Solar Farm details measures that will be implemented to ensure that the noise and visual disturbance of the wider receiving environment will be minimised. The development site will not be lit at night.

The following section details the mitigation and monitoring commitments which were provided in the NIS for the proposed solar farm development which will be effective in ensuring that there are no adverse in-combination effects on the integrity of the Natura 2000 sites under consideration as a result of any phase of the project. As previously stated, the proposed development of the substation and grid connection by itself, does not have any likelihood of significant effects on European designated sites. However, as it is intrinsically linked to the proposed Drumdowney Solar Farm development there is a likelihood of in-combination effects, given that the proposed solar farm development identified likely significant effects on the River Barrow and River Nore SAC and the Lower River Suire SAC

## 4.2 Best Practice Design and Mitigation Measures

The measures outlined below are those provided in the NIS for the associated Drumdowney Solar Farm development which included environmental controls for the entire solar farm project and will be implemented to ensure that any impacts on the receiving environment will be avoided during the project's construction and operational phases. If adverse impacts from the solar farm development are avoided then this will mean that there is no likelihood of significant in-combination effects arising from the overall solar project in this area.

### 4.2.1 Construction & Environmental Management Plan (CEMP)

A detailed CEMP has been prepared for the proposed solar farm development. The CEMP contains commitments designed to mitigate issues related to the potential for run-off or contamination of watercourses and any associated risks to the hydrologically connected Natura 2000 sites. In addition, it captures the more general ecological and environmental commitments as a whole, including mitigation to minimise the potential disturbance to non-qualifying interests and non-special conservation interests.

An Ecological Clerk of Works (ECoW) will be appointed to ensure the full and proper implementation of all environmental controls and mitigation commitments throughout construction. An ECoW will also be appointed to oversee the eventual decommissioning of the solar farm. No significant effects are predicted on designated sites during the operational phase of the proposed development. Surface water run-off will be accommodated by the existing drainage regime at the site. The solar farm is designed so as to minimise the effect on the original drainage and infiltration pattern of the site.

The contractor will be required to incorporate all of the commitments in the CEMP into the Construction and Environmental Management Plan (CEMP) they prepare as part of their contractual obligations. The objectives of this document are as follows:

- To ensure that best construction management practices are applied to the site by the main contractor and that measures are in place during construction to reduce as much as possible the impact of the works on people, property and the environment.
- To ensure that waste generated during the demolition, construction will be managed and disposed of in a way that ensures the provisions of the Waste Management Acts 1996 – 2013 and associated Regulations are applied. The report sets out the methodology to ensure that waste reduction, re-use and recycling are maximised during the construction of the project.
- To detail how the proposed development will implement a comprehensive and integrated approach to protecting the watercourses and other sensitive receptors within the potential zone of influence.

Specific best practice measures to safeguard the receiving environment, the water quality of the watercourses present and consequently those Natura 2000 sites downstream of the proposed development site are included in the CEMP and are also presented below.

**Storage/Use of Materials Plant & Equipment**

- Materials, plant and equipment shall be stored in the proposed site compounds. The temporary construction compounds will incorporate these relevant measures, with suitable provision made for a geotextile base and support silt fencing on any downslope edges to watercourses/drains.
- A buffer of 5-10m to all watercourses including drains except for a small number of localised areas where a fence line or CCTV pole may marginally extend within that buffer will be established and clearly marked out prior to the commencement of construction activities where possible. The buffer will be maintained during the construction of the proposed cable interconnectors.
- Plant and equipment will be parked in areas remote from any sensitive locations.
- Re-fuelling of machinery, plant or equipment will be carried out in the site compounds.
- Hazardous liquid materials or materials with potential to generate runoff shall be stored in areas remote from any sensitive locations, including drains.
- All hazardous liquid materials shall be stored in a bunded area and spill containment measures will be in place.
- All oils, fuels and other hazardous liquid materials shall be clearly labelled and stored in an upright position in an enclosed bunded area within the proposed development site compound. The capacity of the bunded area shall conform with EPA Guidelines – hold 110% of the contents or 110% of the largest container whichever is greater.
- Fuel may be stored in the designated bunded area or in fuel bowsers located in the proposed compound locations. Fuel bowsers shall be double skinned and equipped with certificates of conformity or integrity tested, in good condition and have no signs of leaks or drip trays will be turned upside down if not in use to prevent the collection of rainwater.
- Waters collected in drip trays must be assessed prior to discharge. If classified as contaminated, they shall be disposed by a permitted waste contractor in accordance with current waste management legal and regulatory requirements.
- Plant and equipment to be used during works, will be in good working order, fit for purpose, regularly serviced/maintained and have no evidence of leaks or drips.
- No plant used shall cause a public nuisance due to fumes, noise, and leakage or by causing an obstruction.
- Re-fuelling of machinery, plant or equipment will be carried out in the site compound as per the appointed Construction Contractor re-fuelling controls.
- All persons working will receive work specific induction in relation to material storage arrangements and actions to be taken in the event of an accidental spillage.

- Daily environmental toolbox talks / briefing sessions will be conducted for all persons working to outline the relevant environmental control measures and to identify any environment risk areas/works.

### **Surface Water Mitigation During Construction**

The following mitigation measures will be carried out by the Contractor during construction phase to prevent surface water runoff into sensitive drains or watercourses. The 33kV interconnector cable associated with the solar farm will cross streams / drains via 7 no. watercourse/drain deck crossings via horizontal directional drill crossings (under the N25 and N29 public roads and the Luffany River).

A significant offset of >100m between the proposed solar arrays and the River Barrow has been incorporated into the design of the proposal to protect local water quality and that of downstream designated sites. Similarly, a buffer zone of a minimum of 10m from all watercourses including drains will be implemented except for a small number of localised areas where a fence line or CCTV pole may marginally extend within that buffer. The buffer will be established and clearly marked out prior to the commencement of construction activities where possible. The buffer will be maintained during the construction of the proposed cable interconnectors.

Any material or substance which could cause pollution, including fuels or silty water will be prevented from entering groundwater, surface water drains or nearby watercourses by the appropriate use of and temporary installation of silt fences, cut-off drains, silt traps and drainage to vegetated areas where appropriate. Stilling ponds will be used to minimise the risk of suspended solids, where necessary.

The temporary construction compounds will incorporate these relevant measures, with suitable provision made for a geotextile base and support silt fencing on any downslope edges to watercourses/drains. Stockpiles of soil will be stored well away from the drains on site and (if appropriate) ringed with silt fences. The contractor will carry out environmental awareness training as part of the site inductions for all staff.

Fuel pipes on plant, outlets at fuel tanks etc. will be regularly checked and maintained to ensure that no drips or leaks to ground occur. The following precautions will also be installed on fuel delivery pipes:

- Any flexible pipe, tap or valve must be fitted with a lock where it leaves the container and be locked when not in use;
- Flexible delivery pipes must be fitted with manually operated pumps or a valve at the delivery end that closes automatically when not in use;
- Warning notices including “No smoking” and “Close valves when not in use” shall also be displayed;
- Spill kits will be available within each plant/vehicle on site and also located close to identified pollution sources or sensitive receptors (fuel storage areas, etc.);

- Interceptor drip trays (or similar, e.g. plant nappies, – open metal drip trays are not acceptable) will be available in accordance with standard good practice across the construction industry;
- Interceptor drip trays will be positioned under any stationary mobile plant to prevent oil contamination of the ground surface or water. Plant and site vehicles are to be well maintained and any vehicles leaking fluids must be repaired or removed from site immediately. Any servicing operations shall take place over drip trays;
- Areas used to store fuel and oil on the site will be appropriately lined and bunded to prevent the downward percolation of contaminants to natural soils and groundwater;
- Fuel for construction vehicles will be stored on an impervious base within a bund able to contain at least 110% of the volume stored. Rainwater will not be allowed to accumulate within the bund and in any way compromise the required 110% volume capacity. No tanks or containers may be perforated or dismantled on site. A competent operator shall empty all contents and residues for safe disposal elsewhere;
- Suitable wheel wash facilities, complete with C/W silt traps will be put in place to ensure vehicles entering/existing the site do not carry/transport debris;
- Topsoil and vegetation must be stored separately from subsoil and shall be retained and reinstated on all areas of stripped ground as soon as possible to prevent erosion and leaching/loss of nutrients.

#### **Mitigation of Dust during Construction**

The main activities that may give rise to dust emissions during construction include the following:

- Excavation and removal of earthworks.
- Materials handling and storage.
- Movement of vehicles (particularly HGV's) and mobile plant.
- Suspended solids in surface water runoff.

The following mitigation measures will be carried out by the Contractor during construction phase to prevent dust entering the drains or nearby watercourses or the surrounding residential areas:

- Construction traffic carrying loose material will be covered to reduce dust generation. This measure will be combined with wheel washing at site access points. A water bowser will be provided for dust suppression on site if necessary and areas of concern can be 'dampened down' during periods of dry weather.
- If necessary, arrangements will be made for sweeping public roads in the vicinity of the site access using a standard road sweeper. The Site Manager will be responsible for determining if additional measures will be required.

- Speed limits on site (15km/h or less) to reduce dust generation and mobilisation. Furthermore, any areas that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions. Measures are to include the following:
- Truck spraying and hosing down will be carried out during dry periods and as necessary to control dust.
- A road sweeper operating during the soil-stripping and excavation stage as required.
- The design of the proposed solar farm has incorporated buffer zones around drains and nearby watercourses in order to protect local water quality and that of downstream designated sites. Crossing of drains/minor watercourses will be by way of clear span structures and under the supervision of the ECoW.
- Solar panel cleaning will take place annually or as required. Cleaning will most likely be undertaken using a lightweight tracked machine with a special cleaning attachment. Due to the Irish climate which is relatively mild with high rainfall, solar panel cleaning is required less than other climates such as hot and dusty conditions. However, we assume an annual cleaning cycle to ensure optimum solar farm performance. The panels will be cleaned with water only, and no chemical products will be used.
- All construction (and decommissioning) works will be carried out according to best practice with standard environmental controls in place to prevent any damaging run-off from the site (see CIRIA 2001, 2010 & 2015). The construction of the proposed development will be implemented in accordance with the Construction Environmental Management Plan (CEMP) for the proposed development.
- All other mitigation measures, biodiversity enhancement and monitoring commitments described in the EclA will be fully implemented.

### **Ecological Mitigation**

The following mitigation measures will be implemented as part of the proposed project in order to minimise the potential effects on the existing ecology as discussed above. These measures are to be read in conjunction with the detailed construction phase commitments presented in the CEMP that accompanies the planning application.

- An Ecological Clerk of Works (ECoW) will be appointed to ensure that the mitigation strategy is correctly implemented both during the construction phase, establishment of the landscaping measures and for the duration of the eventual decommissioning of the project.
- Construction works will be carried out according to best practice with standard environmental controls in place to prevent any damaging run-off from the site (see CIRIA 2010 Environmental Good Practice on Site. CIRIA, UK; and CIRIA 2001 Control of water pollution from construction sites: guidance for consultants and contractors. CIRIA C532. London 2001.)

- Any silty water generated on site will be settled out as much as possible through drainage mitigation measures (silt traps, silt fences, cut off drains, etc.) and channelled into vegetated areas at least 50 metres from watercourses, to allow the settlement of solids.
- A phased approach will be taken when constructing the substation and access tracks for the site, as per the outlined construction programme. This will include a focused gap between the soil stripping of the substation and access tracks, as part of a precautionary approach.
- As a precautionary measure, the soil stripping and construction of the site access tracks will be carried out outside of periods of wet weather. Scheduling of works will avoid insofar as practicable the wetter months of the year. In addition, appropriate run-off control will be installed and maintained for the duration of the construction phase. It will help minimise the risk of run-off from the site by limiting the earthworks undertaken in the wetter months of the year.
- In advance of the stream crossing works required for the underground interconnector cabling, a staked silt fence shall be installed at a distance of 2-3m from the channel on both banks. The approaching track excavations will be stopped at this distance back from the channel, therefore retaining a vegetated buffer strip between the access track approach and the channel until such time as the dry deck is lifted into place.
- Silt fencing shall be retained on the downslope between the dry deck plinth and the channel until such time as the access track has bedded in and the swales (with check dams in-site) have revegetated.
- The swales alongside the access track approaching the stream crossing deck shall have temporary and permanent gravel check-dams installed to slow velocity and attenuate flow prior to reaching the channel.
- Dust can be created from movement of construction traffic and from general construction activities and can be carried by prevailing winds impacting upon the local area. The air quality management objectives are: Protection of air quality; Use all reasonable and practicable measures to minimise airborne dust and greenhouse gas emissions to minimise impacts on land, flora/fauna, water and air quality; Track and report; Minimise impacts on adjacent residents, land owners and community.
- Construction traffic carrying loose material will be covered to reduce dust generation. This measure will be combined with wheel washing at site access points. A water bowser will be provided for dust suppression on site if necessary and areas of concern can be 'dampened down' during periods of dry weather.
- If necessary, arrangements will be made for sweeping public roads in the vicinity of the site access using a standard road sweeper. The Site Manager will be responsible for determining if additional measures will be required.
- The design of the proposed solar farm has incorporated buffer zones around drains within the site and from adjacent watercourses in order to protect local water quality and that of downstream designed sites. Crossing of drains will be by way of clear span structures and under the supervision of the ECoW.

- Solar panel cleaning will take place annually or as required. Cleaning will most likely be undertaken using a lightweight tracked machine with a special cleaning attachment. Due to the Irish climate which is relatively mild with high rainfall, solar panel cleaning is required less than other climates such as hot and dusty conditions. However, we assume an annual cleaning cycle to ensure optimum solar farm performance. The panels will be cleaned with water only, and no chemical products will be used.
- All construction (and decommissioning) works will be carried out according to best practice with standard environmental controls in place to prevent any damaging run-off from the site (see CIRIA 2001, 2010 & 2015). The construction of the proposed development will be implemented in accordance with the Construction Environmental Management Plan (CEMP) for the proposed development.
- All other mitigation, biodiversity enhancement and monitoring commitments described in the EclA will be fully implemented.

### **Responsibilities of the Site Manager/ECow**

The Site Manager/Environmental Clerk of Works will be responsible for the pollution prevention programme presented in the planning phase CEMP for the proposed Drumdowney Solar Farm and will ensure that routine checks of key construction design measures are carried out to ensure compliance. A record of these checks will be maintained throughout the duration of the project.

The prepared EclA also includes a suite of identified mitigation measures to in order to minimise potential effects on the existing ecology. Some overlap exists in respect of the above referenced measures.

- Detailed mitigation to minimise the risk of run-off or pollution of drains or adjacent watercourses during construction is provided in the CEMP and Construction Method Statement for Electrical Infrastructure which accompany this application. This includes the following commitments:
  - a. A buffer of 10m from the closest drain will be established and clearly marked out prior to the commencement of construction activities where possible. The buffer will be maintained with the exception of localised areas where access, crossing or cable trenching is required.
  - b. Silt fencing will be installed within the works area for the proposed interconnector cables. The silt fence will provide protection from sediment and potential site water runoff.
  - c. The silt fencing will be checked twice daily during construction and once per day thereafter to ensure that it is working satisfactorily until such time as the re-instated ground/material has been fully established.
  - d. If dewatering is required as part of the proposed works e.g., in trenches for underground cabling or in wet areas, water must be treated prior to discharge. The Contractor shall employ best practice settling systems to ensure maximum removal of suspended solids prior to discharge of any surface water or groundwater from excavations to receiving waterbodies. This may include treatment via settlement

- tanks. There will be no direct pumping of water from the works to any watercourses or drains at any time.
- e. An emergency-operating plan will be established to deal with incidents or accidents during construction that may give rise to pollution within any nearby watercourses or drains. This will include means of containment in the event of accidental spillage of hydrocarbons or other pollutants (spill kits etc.).
  - f. The contractor will ensure that good housekeeping is always maintained and that all site personnel are made aware of the importance of the nearby estuary/aquatic environments and the requirement to avoid pollution of all types.
- Construction works will be carried out according to the CEMP which will incorporate all of the planning phase commitments along with standard environmental controls to prevent any damaging run-off from the site (see CIRIA 2001, 2010 & 2015).
  - A suitably qualified Environmental/Ecological Clerk of Works (ECoW) will be appointed to oversee the implementation of environmental mitigation throughout the construction phase.
  - As a precautionary measure, the soil stripping and construction of the site access tracks will be carried out outside of periods of wet weather. Scheduling of works will avoid insofar as practicable the wetter months of the year unless otherwise agreed with the planning authority. In addition, appropriate run-off control will be installed and maintained for the duration of the construction phase. It will help minimise the risk of run-off from the site by limiting the earthworks undertaken during wetter periods of the year.
  - Prior to the commencement of construction (or vegetation removal) in areas within 200m of an EPA named watercourse the area will be surveyed to record evidence of Otter activity. In the event that a holt is present, no work will be carried out within 200m of the holt until a derogation licence has been sought and granted to permit works according to the recommended protocol and licence conditions.
  - The design of the proposed solar farm has incorporated buffer zones around drains and watercourses in order to protect local water quality and that of downstream designed sites. Crossing of drains/minor watercourses will be by way of clear span structures, with the exception of the HDD crossing of the Luffany. All of these watercourse crossing works will be carried out under the supervision of the ECoW.

#### **Mitigation Measures for Habitats and Flora**

- No removal of habitats or movement of construction machinery will occur outside of the development works area/footprint during the construction phase, where the works area/footprint will be clearly marked for associated site staff.
- The landscaping plan for the proposed development will be fully implemented.
- A pre-construction survey of the site and along the interconnector routes will be carried out to record any Third Schedule Invasive Plant Species that may be present. If any are located within the works footprint and Invasive Species Management Plan will be prepared and

implemented under the supervision of the ECoW. This process will be repeated ahead of the decommissioning phase of the project.

- a. The survey will be repeated ahead of the decommissioning phase and any recommended actions in relation to control or eradication of invasive plant species will be fully implemented.

### **Mitigation Measures for Fauna**

- Pre-construction (and decommissioning) surveys for Badger, Otter and roosting bats shall be carried out prior to the commencement of any works.
  - Prior to the commencement of construction (or vegetation removal) in areas within 200m of an EPA named watercourse the area will be surveyed to record evidence of Otter activity. In the event that a holt is present, no work will be carried out within 200m of the holt until a derogation licence has been sought and granted to permit works according to the recommended protocol and licence conditions.
  - Any trees required to be removed (whether within hedgerow or the scrub/woodland) will be subject to ground-level inspection to record any trees with moderate or higher bat roost potential (Collins, 2016). Any trees with moderate/higher potential will be subject to more detailed assessment, including climbing and direct inspection of potential roost features. In the event that any roosting bats are discovered -the tree will not be removed until such time as a derogation licence is obtained. All recommendations and licence conditions will be implemented under the supervision of the ECoW. As a secondary mitigation, all trees/shrubs that are felled will be left 'sit' for a minimum of 24 hours before being cut/logged or mulched.
  - A pre-works survey will be carried out to assess the activity at the known Badger sett on site and to record any new activity (or setts) that may be present. No construction/decommissioning traffic will be permitted within 50m of an active sett without the advice of a suitably qualified ecologist and in consultation with the National Parks and Wildlife Service. The ecologist will advise on the need for any further consultation or licensing ahead of the commencement of construction. Badger activity will be monitored throughout the construction phase and the ECoW will have 'Stop Works' authority.
- In the event that protected fauna are found actively using the site for breeding/roosting (*e.g.* bird nest, bat roosting) during the construction phase, works will cease immediately and the area will be cordoned off until advice is sought from a suitably qualified/experienced ecologist.
- There will be no removal of woody vegetation during the bird breeding season (1<sup>st</sup> March to August 31<sup>st</sup> inclusive).
- All excavations/trenches will be covered at night, or a suitable means of escape provided for nocturnal mammals such as Badger and Otter.

- A tree survey shall be performed to identify any trees in dangerous states prior to works commencing. Any trees requiring intervention will be inspected for roosting bats and nesting birds and the ECoW will ensure that any risks to breeding or resting birds and mammals are minimised.
- Security fencing shall have a 200mm gap between the bottom of the fence and the ground, or alternatively mammal gates will be provided at regular intervals (every 150m at a minimum) at the base of the fence to allow free movement of mammals through the solar farm site.
- A total of 50 woodcrete (or recycled plastic) bat boxes will be erected at the site to improve the roosting potential of the site for bats. The boxes will be erected under the supervision of a suitably qualified ecologist. The boxes will be checked and maintained annually by a suitably qualified (and licensed ecologist) and replaced as necessary over the lifetime of the project.
- Two Barn Owl nest boxes will be erected at locations chosen by a suitably qualified ecologist. The boxes will be erected under the supervision of the ecologist. The boxes will be checked and maintained annually by a suitably qualified (and licensed ecologist) and replaced as necessary over the lifetime of the project.

#### **Decommissioning & Restoration Phase Mitigation**

At the time of decommissioning and restoration for the proposed solar farm, the Applicant will ensure that any related activities in support of same are undertaken with such due care and diligence in order to reduce or eliminate risk to the environment. The Applicant will lead the decommissioning and restoration process;

- The Applicant will ensure adequate internal and external resources are available to manage and undertake all decommissioning activities required and be required to submit for agreement with the planning authority a Decommissioning and Restoration Plan;
- The date for decommissioning will be well known in advance of the activation of the Decommissioning and Restoration Plan;
- Pre-works walkovers will be carried out by a suitably qualified ecologist to identify any ecological constraints on site and to provide appropriate advice ahead of the mobilisation of the decommissioning contractors.
- All potential negative environmental effects from decommissioning of the project will be mitigated through established measures. These measures include, but are not limited to:
  - The use of erosion and sediment control measures;
  - Maintenance of all existing buffers (hedgerows / treeline, drainage ditches etc.);
  - Timing of decommissioning works to ensure that they do not interfere with wildlife breeding / nesting times; and
  - Measures which will rapidly establish a vegetative cover on any disturbed areas.

- All stored fluids or solid materials, be they chemicals, greases or oils shall be returned to suppliers where appropriate. Alternatively, they will be disposed of off-site to licensed waste facilities;
- Disposal off-site shall mean that licensed removal contractors, licensed removal equipment and licensed reception facilities are utilised where required during decommissioning;
- Disposal off-site shall mean that a full record and log will be maintained of all plant, equipment, finished or raw materials and fluids removed off-site;
- Not all structures will be removed from site. For example, if infrastructure forms parts of the substation or grid connection then ownership of this belongs to ESB Networks and may be retained for future long-term use as part of the national electricity distribution system. In addition, the landowner may choose to retain access tracks within the solar farm for improved access with the farm holding. It should be noted that any structures or land uses which are proposed to be retained will be advised to Kilkenny County Council in advance of final decommissioning and restoration.
- All contractors engaged in the Decommissioning and Restoration Plan shall be fully licensed, experienced and approved to undertake the activities for which they are engaged; and
- On completion of decommissioning, a Closure Validation Audit Report will be completed and issued to Kilkenny County Council to demonstrate that the site is suitable for use and its condition would not pose a future risk to public health or the environment. This report will be issued to the Council and the site will only be confirmed as fully decommissioned on the Councils confirmation that it is satisfied with the findings from this report.
- After ensuring the solar panels are disconnected from the electrical network, the panels may be individually removed from their frame. The panels can be reused depending on their age and condition. If they are not fit for reuse, they will be disposed of to a suitably licenced waste facility. Storage containers will be available should the panels be reused or disposal containers if they are to be transported to a waste facility.
  - The panels will be mounted on a steel frame system. These can be reused, so they will be stored and taken off site. The mounting system is connected to the ground via a small driven pile system. These driven steel piles will be removed with a rig. These will not be reused so they will be taken off site for recycling.
- The electrical cabling will be disconnected. The cables and accompanying ducting will then be removed via digger. The cables will be pulled from the ducts and recycled appropriately. The ducting will also be sent to the relevant waste facility.
- Depending on the condition of the inverter and transformer station, they will either be refurbished and reused, or disassembled and recycled. The inverter and transformers will be disconnected from all electrical systems. A crane will then transfer the stations onto a flatbed lorry to be removed from site. The remaining concrete pad foundations, or supporting blocks, will be broken up and removed from site for appropriate recycling. The land will then be filled and re-seeded for full reinstatement.
- Site Security Equipment includes the perimeter fencing and CCTV system. These will be dismantled and removed once all other equipment has been removed from site. The security fence will be removed and depending on its condition, transported for recycling or reuse. The holes from the fencing will be refilled. The CCTV system will be disconnected, and the poles removed from the ground. Similarly, the holes will be refilled and the land reinstated.

- Additional site access tracks constructed as part of the solar farm may add value to the site and as such their removal will be subject to landowner agreement. Should the landowner request that the access tracks be removed, the stone build-up of the road will be broken-up, removed and appropriately recycled. The area will then be covered with a layer of topsoil to allow for the reinstatement of the land.

The site decommissioning and restoration plan will be executed in line with the environmental conditions of the Planning Permission. In advance of final decommissioning and restoration the Applicant will consult with Kilkenny County Council to agree any additional requirements. Following the decommissioning of the site the agricultural land will be restored to its original state. Should the access tracks be removed, the areas will be covered with topsoil and planted with a grass seed mixture. The vegetation will be monitored by the Applicant to ensure the grass areas are growing sufficiently. If there are any the areas showing poor growth, these will be re-ploughed and re-seeded. All pre-existing drains will be retained in their original state throughout the lifetime of the solar farm. Should any existing drains or ditches become damaged during the decommissioning process, these will be repaired. Please refer to the Construction Environmental Management Plan for further details on site drainage. The land will be reinstated to its original conditions as per the agreement with the landowner.

The 110kV substation and grid connection which comprises this SID application to An Coimisiún Pleanála will become the property of ESB Networks once the project is energised and will therefore remain on-site following the decommissioning of the solar farm as per the connection agreement with ESB Networks. This infrastructure will have a future long term use as part of the national electricity transmission system.

#### 4.2.2 Wastewater/Foul Effluent Discharge

There will no wastewater requirements associated with the proposed solar farm. In relation to the proposed development site, surface water generated in the hardstanding areas and in the bunded areas within the substation compound will discharge to soakaway via Class 1 Full Retention Oil Separators. The electrical transformer in the substation is oil filled equipment and, as such, is protected with impermeable bunds. Surface water generated in this bund will be pumped out by an oil sensitive pump ensuring that only non-contaminated water enters the site drainage network.

The foul drainage proposed caters for the wastewater generated in the welfare facilities of the proposed substation. These welfare facilities include a toilet and wash hand basin. The station will be unmanned in normal operation so demand for facilities which generate foul flows will be low.

The foul holding tanks will have a capacity of 5m<sup>3</sup> which is a multiple of the foul water which will be generated over three months of normal operation of the station. The foul holding tank will also be inspected by a suitably qualified and indemnified person at these intervals and records of inspections will be held on site for inspection by the local authority. A freeboard of 300mm will be provided for and the foul holding tank will be fitted with a high-level alarm. This alarm will be connected to a manned control station via the substation's Supervisory Control and Data Acquisition (SCADA) telecom relay system. This will allow for non-scheduled maintenance and emptying of the tank between the regular three-monthly intervals in the unlikely event that this is required. The foul

holding tank will also be vented to the atmosphere to avoid the buildup of noxious and dangerous gases.

The proposed station will be unmanned and as such will generate small quantities of foul waste. There will be visits to the station for scheduled and unscheduled inspections, maintenance and repairs as necessary. It is anticipated that this will result in a contribution of 60 litres of foul waste per week. In the unlikely event that such a high visitation rate would be extrapolated throughout the year, this would result in 6,323 litres per annum. While such a consistently high visitation is improbable, there is the possibility of increased numbers of staff being present on site for short durations during the commissioning of electrical elements of the station from time to time. It is envisaged that these extraordinary occurrences would balance out with the ordinary operation of the unmanned station to produce foul flows no greater than the 6,323 litres per annum as a “worst-case” scenario. It is common for much lower usage of the facilities on unmanned stations and therefore a much lower foul loading. A common problem on such unmanned stations is odours in the toilet areas due to the drying out of the water trap in the WC through evaporation resulting from the lack of use. For this reason, it is proposed to use self-flushing toilets in the station, which would flush automatically twice a week. The station will include two 6 litre flush WCs so a minimum weekly foul flow of 24 litres can be expected. The self-flushing WCs will therefore contribute 1,248 litres per annum.

Combining the automatic flush and maximum user demand figures would result in a maximum annual generation of 7,571 litres (7.5m<sup>3</sup>) of foul sewer water waste. The 5m<sup>3</sup> tank proposed will be emptied approximately every three months. As outlined, the capacity provided is well in excess of what is required.

It is proposed to provide the required potable water demand of the station (all options) with a bored well on site. The potable water demand within the site will be low as the proposed station is to be unmanned. To avoid issues like stagnation in the water supply line and problems resulting from this, there will be a continual water demand of 24 litres per week from automatically flushing WCs within the station. The water demand within the proposed development will be low and will be similar to the figures for foul sewer water generation as set out above in this report.

It is concluded that with the application of such standard controls there will be negligible risk of effects on the designated sites in the wider hinterland associated with the operation of the substation and wider proposed solar farm project.

## 4.3 NIS Summary and Conclusion

### 4.3.1 Integrity Of The Site

From the *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* (EC, 2002), the meaning of integrity is described as follows:

*'The integrity of a site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives'.*

The concept of the 'integrity of the site' is also explained in the EU publication *Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC* (EC, 2000), as follows:

*'It is clear from the context and from the purpose of the directive that the 'integrity of the site' relates to the site's conservation objectives. For example, it is possible that a plan or project will adversely affect the integrity of a site only in a visual sense or only habitat types or species other than those listed in Annex I or Annex II. In such cases, the effects do not amount to an adverse effect for purposes of Article 6(3), provided that the coherence of the network is not affected. On the other hand, the expression 'integrity of the site' shows that focus is here on the specific site. Thus, it is not allowed to destroy a site or part of it on the basis that the conservation status of the habitat types and species it hosts will anyway remain favourable within the European territory of the Member State.*

### 4.3.2 Integrity of the Natura 2000 Sites within the Project Zone of Influence

Potential for any significant adverse in-combination effects will be resolved through the implementation of the mitigation commitments described above.

From the information gathered and the predictions made about the changes that are likely to result from the construction, operational and decommissioning stages of the wider project and the mitigation commitments proposed to avoid impacts on the two Natura 2000 sites within the zone of influence of the entire project, an Integrity of Site Checklist for Natura 2000 sites considered in this Natura Impact Statement is presented in Table 4.2 below.

**Table 4.2 Integrity of Site Checklist for Natura 2000 Sites within the Project Zone of Influence**

Conservation Objectives		
Does the project have the potential to:	Yes or No	Comment
Cause delays in progress towards achieving the conservation objectives of the site?	No	There will be no significant direct impacts to the QIs of the Natura 2000 sites located within the project ZOI and considered in this NIS. Potential indirect in-combination effects to Natura 2000 sites e.g. via overland flow and/or contamination of drains and watercourses hydrologically linked to Lower River Suir SAC and the River Barrow and River Nore SAC from the associated solar farm

Conservation Objectives		
Does the project have the potential to:	Yes or No	Comment
		development have been considered in the above assessment. Works practices and design measures have been proposed in the CEMP that accompanies the NIS for the proposed Drumdowney Solar Farm and herein to address potential impacts which could be caused by uncontrolled run-off and/or sources of disturbance for Otters. The proposed development will therefore not cause delays in achieving the conservation objectives of Natura 2000 sites within project Zol.
Interrupt progress towards achieving the conservation objectives of the site?	No	The proposed SID development and overall solar farm project will not in combination interrupt the achievement the site's Conservation Objectives or those factors that help maintain the favourable conditions of the site or interfere with the distribution and density of key indicator species.
Disrupt those factors that help to maintain the favourable conditions of the site?	No	There will be no significant direct impacts to the QIs of the Natura 2000 sites located within the project Zol and considered in this NIS. Potential indirect effects to Natura 2000 sites e.g. via overland flow and/or contamination of drains and watercourses hydrologically linked to Lower River Suir SAC and the River Barrow and River Nore SAC have been considered in the above assessment.
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No	Works practices and design measures have been proposed to address potential impacts which could be caused by uncontrolled run-off and/or sources of disturbance for Otters. The proposed solar project will therefore not interrupt progress towards achieving the conservation objectives of the Natura 2000 sites, disrupt the factors that maintain favourable conditions with these sites, or interfere with the balance, distribution of density of key species that are the indicators of the favourable condition of these Natura 2000 sites.
Other Objectives: Does the project have the potential to:	Yes or No	Comment

Conservation Objectives		
Does the project have the potential to:	Yes or No	Comment
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?	No	There will be no significant direct impacts to the QIs of the Natura 2000 sites located within the project ZOI and considered in this NIS. Potential indirect in-combination effects to Natura 2000 sites e.g. via overland flow and/or contamination of drains and watercourses hydrologically linked to Lower River Suir SAC and the River Barrow and River Nore SAC have been considered in the above assessment. Works practices and design measures have been proposed to address potential impacts which could be caused by uncontrolled run-off and/or sources of disturbance for Otters. The overall proposed solar project will not cause changes to the vital defining aspects (that determine how the site functions as a habitat or ecosystem or change the dynamics of the relationships that define the structure and/or function of the site.
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No	
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No	The proposed solar project will not interfere with predicted or expected natural changes to the Natura 2000 sites under consideration.
Reduce the area of key habitats?	No	The proposed development will not result in the loss, reduction or change of key features associated with Natura 2000 sites. The proposed development is located within an area of intensive agriculture and the development footprint is not within any designated conservation sites, nor does it require any resources from these sites; thereby ruling out any direct habitat loss at the conservation sites in question. Indirect habitat loss or deterioration of designated sites within the surrounding area could occur from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination. However, works practices and design measures have been committed to address all potential impacts to these watercourses and by extension effects to
Reduce the population of key species?	No	
Change the balance between key species?	No	
Reduce diversity of the site?	No	

Conservation Objectives		
Does the project have the potential to:	Yes or No	Comment
		the hydrologically connected Natura 2000 sites.
Result in disturbance that could affect population size or density or the balance between key species?	No	The proposed solar farm project will not result in disturbance that will affect population size or densities of Qualifying features associated with the Natura 2000 sites within the project ZoI. The construction works are temporary in nature and will be concentrated outside the wettest months of the year. While Otters occur locally, they are strongly associated with the riparian corridor. Therefore, significant in-combination ex-situ disturbance impacts are deemed highly unlikely. Much of the project area is partly or wholly screened from view from the intertidal areas of importance for Otters. Even in areas of the associated solar farm closest and most visible to the intertidal habitats there is limited potential for significant disturbance due to the nature and scale of the construction effort required. The mitigation measures will ensure that the soil-stripping and access road construction will be carried out outside of the wetter periods of year and that appropriate surface water run-off controls will be in place ahead of the soil-stripping and access track construction phase, further minimising the potential for any significant in-combination disturbance effects.
Result in fragmentation?	No	There will be no fragmentation of Natura 2000 sites within the project ZoI as a result of the development.
Result in loss or reduction of key features (e.g., tree cover, tidal exposure, annual flooding, etc.)?	No	The proposed development will not result in the loss or reduction of key features of Natura 2000 Sites.

#### 4.4 Conclusion

The AA Screening (see **Section 3**) found that it could not be excluded, on the basis of objective scientific information that the proposed works, individually or in combination with other plans or projects, would have a significant effect on a Natura 2000 site. Therefore, a NIS (presented in **Section 4**) was required to ascertain whether the proposed works would have an (in-combination) adverse effect on the integrity of the Natura 2000 sites.

Best practice measures and mitigation measures (as outlined within **Section 4.2**) have been identified to ensure that potential pollutant sources are not released during the construction or operation of the wider solar farm project to the receiving environment and that the potential for disturbance and displacement effects on Otters is minimised such that there is no risk of adverse effects on these Qualifying Features of Natura 2000 sites within this project's Zol.

**It has been objectively concluded that the proposed development will not adversely affect the integrity of Natura 2000 sites, and there is no reasonable scientific doubt in relation to this conclusion.**

## 5 References

CIRIA. 2001. Control of water pollution from construction sites: guidance for consultants and contractors. CIRIA C532. London 2001.

CIRIA. 2010 (third edition C692). Environmental Good Practice on Site. CIRIA, UK.

CIRIA. 2015 (4<sup>th</sup> editions). Environmental Good Practice on Site. CIRIA, UK.

Department of Environment, Heritage & Local Government (DoEHLG). 2009. Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities. DoEHLG, Dublin.

European Commission. 2001. Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – European Commission Methodical Guidance on the provisions of Article 6(3) and 6(4) of the ‘Habitats’ Directive 92/43/EEC. European Commission DG Environment, Oxford UK.

Environmental Protection Agency (EPA). 2013. Integrated Biodiversity Impact Assessment – Streamlining AA, SEA and EIA Processes: Practitioner’s Manual. EPA STRIVE Programme 2007–2013; Report Series No. 106. EPA, Wexford.

## **Appendix 1**

### **Conservation Objectives of**

**Lower River Suir SAC**

**River Barrow & River Nore SAC**

# National Parks and Wildlife Service

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## *Conservation Objectives Series*

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### Lower River Suir SAC 002137



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

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



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**Citation:**

**NPWS (2017) Conservation Objectives: Lower River Suir SAC 002137. Version 1.  
National Parks and Wildlife Service, Department of Arts, Heritage, Regional,  
Rural and Gaeltacht Affairs.**

**Series Editor: Rebecca Jeffrey  
ISSN 2009-4086**

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

Code	Description
002137	Lower River Suir SAC
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 fallax</i>
1106	Salmon <i>Salmo salar</i>
1330	Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritimae</i> )
1355	Otter <i>Lutra lutra</i>
1410	Mediterranean salt meadows ( <i>Juncetalia maritimi</i> )
3260	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
91A0	Old sessile oak woods with <i>Quercus robur</i> and <i>Q. petraea</i> in the British Isles
91E0	Alluvial forests with <i>Alnus glutinosa</i> and <i>A. incana</i> (Alno-Padion, Alnion incanae, Salicion albae)E
91J0	Wet heath and bog woodlands of the British IslesE

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

## Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: [www.npws.ie/Publications](http://www.npws.ie/Publications)

### NPWS Documents

<b>Year :</b>	1998
<b>Title :</b>	Conservation management of the white-clawed crayfish, <i>Austropotamobius pallipes</i>
<b>Author :</b>	Reynolds, J.D.
<b>Series :</b>	Irish Wildlife Manual No. 1
<b>Year :</b>	2006
<b>Title :</b>	Otter survey of Ireland 2004/2005
<b>Author :</b>	Bailey, M.; Rochford, J.
<b>Series :</b>	Irish Wildlife Manual No. 23
<b>Year :</b>	2006
<b>Title :</b>	Initiation of a monitoring program for the freshwater pearl mussel, <i>Margaritifera margaritifera</i> , in the Clodiagh River (Suir)
<b>Author :</b>	Ross, E.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2007
<b>Title :</b>	A survey of juvenile lamprey populations in the Corrib and Suir catchments
<b>Author :</b>	O'Connor, W.
<b>Series :</b>	Irish Wildlife Manual No. 26
<b>Year :</b>	2007
<b>Title :</b>	Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents. Article 17 forms and supporting maps
<b>Author :</b>	NPWS
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2008
<b>Title :</b>	National survey of native woodlands 2003-2008
<b>Author :</b>	Perrin, P.M.; Martin, J.; Barron, S.; O'Neill, F.H.; McNutt, K.E.; Delaney, A.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2009
<b>Title :</b>	Saltmarsh monitoring project 2007-2008
<b>Author :</b>	McCorry, M.; Ryle, T.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2009
<b>Title :</b>	NS II freshwater pearl mussel sub-basin management plans: monitoring of the freshwater pearl mussel in the Clodiagh
<b>Author :</b>	Ross, E.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2009
<b>Title :</b>	NS II freshwater pearl mussel sub-basin management plans: fisheries survey. Stage 1 report
<b>Author :</b>	Paul Johnston Associates
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2009
<b>Title :</b>	NS II freshwater pearl mussel sub-basin management plans: report on biological monitoring of surface water quality in Clodiagh (Waterford) catchment
<b>Author :</b>	Morgan, G.
<b>Series :</b>	Unpublished report to NPWS

<b>Year :</b>	2010
<b>Title :</b>	A provisional inventory of ancient and long-established woodland in Ireland
<b>Author :</b>	Perrin, P.M.; Daly, O.H.
<b>Series :</b>	Irish Wildlife Manual No. 46
<b>Year :</b>	2010
<b>Title :</b>	A technical manual for monitoring white-clawed crayfish ( <i>Austropotamobius pallipes</i> ) in Irish lakes
<b>Author :</b>	Reynolds, J., O'Connor, W., O'Keeffe, C.; Lynn, D.
<b>Series :</b>	Irish Wildlife Manual No.45
<b>Year :</b>	2010
<b>Title :</b>	Second draft Clodiagh freshwater pearl mussel sub-basin management plan (2009-2015). March 2010
<b>Author :</b>	NPWS
<b>Series :</b>	Unpublished document to the Department of Environment, Heritage and Local Government
<b>Year :</b>	2010
<b>Title :</b>	NS2 freshwater pearl mussel sub-basin management plans. Phytobenthos monitoring of the Clodiagh catchment, Co. Waterford (SERBD). June and July
<b>Author :</b>	Ní Chatháin, B.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2012
<b>Title :</b>	Lower River Shannon SAC (site code: 2165) Conservation objectives supporting document- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche- Batrachion vegetation V1
<b>Author :</b>	NPWS
<b>Series :</b>	Conservation objectives supporting document
<b>Year :</b>	2013
<b>Title :</b>	National otter survey of Ireland 2010/12
<b>Author :</b>	Reid, N.; Hayden, B.; Lundy, M.G.; Pietravalle, S.; McDonald, R.A.; Montgomery, W.I.
<b>Series :</b>	Irish Wildlife Manual No. 76
<b>Year :</b>	2013
<b>Title :</b>	Irish semi-natural grasslands survey 2007-2012
<b>Author :</b>	O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; Perrin, P.M.
<b>Series :</b>	Irish Wildlife Manual No. 78
<b>Year :</b>	2013
<b>Title :</b>	Results of monitoring survey of old sessile oak woods and alluvial forests
<b>Author :</b>	O'Neill, F.H.; Barron, S.J.
<b>Series :</b>	Irish Wildlife Manual No. 71
<b>Year :</b>	2013
<b>Title :</b>	Results of a monitoring survey of yew woodland
<b>Author :</b>	Cross, J.; Lynn, D.
<b>Series :</b>	Irish Wildlife Manual No. 72
<b>Year :</b>	2013
<b>Title :</b>	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments
<b>Author :</b>	NPWS
<b>Series :</b>	Conservation assessments

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

## Other References

<b>Year :</b>	1898
<b>Title :</b>	Contributions towards a Cybele Hibernica. Second Edition
<b>Author :</b>	Colgan, N.; Scully, R.W.
<b>Series :</b>	Edward Ponsonby, Dublin
<b>Year :</b>	1982
<b>Title :</b>	Otter survey of Ireland
<b>Author :</b>	Chapman, P.J.; Chapman, L.L.
<b>Series :</b>	Unpublished report to Vincent Wildlife Trust
<b>Year :</b>	1988
<b>Title :</b>	The reproductive biology of freshwater mussels in Ireland, with observations on their distribution and demography
<b>Author :</b>	Ross, E.D.
<b>Series :</b>	Unpublished Ph.D. Thesis, National University of Ireland, Galway
<b>Year :</b>	1991
<b>Title :</b>	The spatial organization of otters ( <i>Lutra lutra</i> ) in Shetland
<b>Author :</b>	Kruuk, H.; Moorhouse, A.
<b>Series :</b>	Journal of Zoology, 224: 41-57
<b>Year :</b>	1992
<b>Title :</b>	Status of the freshwater pearl mussels <i>Margaritifera margaritifera</i> and <i>M. m. durrovensis</i> in the Nore, Barrow and Suir River tributaries, south-east Ireland
<b>Author :</b>	Moorkens, E.A.; Costello, M.J.; Speight, M.C.D.
<b>Series :</b>	Irish Naturalists' Journal, 24(3): 127-131
<b>Year :</b>	1996
<b>Title :</b>	Studies on the biology and ecology of <i>Margaritifera</i> in Ireland
<b>Author :</b>	Moorkens, E.
<b>Series :</b>	Unpublished Ph.D. thesis, University of Dublin, Trinity College.
<b>Year :</b>	1999
<b>Title :</b>	Diet of otters ( <i>Lutra lutra</i> ) on Inishmore, Aran Islands, west coast of Ireland
<b>Author :</b>	Kingston, S.; O'Connell, M.; Fairley, J.S.
<b>Series :</b>	Biology and Environment: Proceedings of the Royal Irish Academy, 99B: 173-182

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

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**Title :** Poor water quality constrains the distribution and movements of twaite shad (*Alosa fallax fallax*, Lacepede, 1803) in the watershed of river Scheldt  
**Author :** Maas, J.; Stevens, M.; Breine, J.  
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- Year :** 2008  
**Title :** Flora of County Waterford  
**Author :** Green, P.  
**Series :** The National Botanic Gardens of Ireland, Dublin
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- Year :** 2010  
**Title :** Otter tracking study of Roaringwater Bay  
**Author :** De Jongh, A.; O'Neill, L.  
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- Year :** 2010  
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**Author :** Moorkens, E.  
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**Title :** Comparison of field- and GIS-based assessments of barriers to Atlantic salmon migration: a case study in the Nore Catchment, Republic of Ireland  
**Author :** Gargan, P.G.; Roche, W.K.; Keane, S.; King, J.J.; Cullagh, A.; Mills, P.; O'Keeffe, J.  
**Series :** Journal of Applied Ichthyology, 27 (Suppl. 3): 66-72
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- Year :** 2012  
**Title :** Rare and threatened bryophytes of Ireland  
**Author :** Lockhart, N.; Hodgetts, N.; Holyoak, D.  
**Series :** National Museums Northern Ireland
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- Year :** 2013  
**Title :** Aspects of brook lamprey (*Lampetra planeri* Bloch) spawning in Irish waters  
**Author :** Rooney, S.M.; O'Gorman, N.M.; Green, F.; King, J.J.  
**Series :** Biology and Environment: Proceedings of the Royal Irish Academy, 113B(1): 13-25
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- Year :** 2013  
**Title :** Management strategies for the protection of high status water bodies  
**Author :** Ní Chatháin, B.; Moorkens, E.; Irvine, K.  
**Series :** Strive Report Series No. 99. EPA, Wexford
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- Year :** 2013  
**Title :** Interpretation manual of European Union habitats- Eur 28  
**Author :** European Commission- DG Environment  
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- Year :** 2014  
**Title :** Assessing near-bed velocity in a recruiting population of the endangered freshwater pearl mussel (*Margaritifera margaritifera*) in Ireland  
**Author :** Moorkens, E.; Killeen, I.  
**Series :** Aquatic Conservation: Marine and Freshwater Ecosystems, 24(6): 853-862
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<b>Year :</b>	2015
<b>Title :</b>	Water quality in Ireland 2010-2012
<b>Author :</b>	Bradley, C.; Byrne, C.; Craig, M.; Free, G.; Gallagher, T.; Kennedy, B.; Little, R.; Lucey, J.; Mannix, A.; McCreesh, P.; McDermott, G.; McGarrigle, M.; Ní Longphuirt, S.; O'Boyle, S.; Plant, C.; Tierney, D.; Trodd, W.; Webster, P.; Wilkes, R.; Wynne, C.
<b>Series :</b>	EPA, Wexford
<b>Year :</b>	2015
<b>Title :</b>	Behaviour of sea lamprey ( <i>Petromyzon marinus</i> L.) at man-made obstacles during upriver spawning migration: use of telemetry to access efficacy of weir modifications for improved passage
<b>Author :</b>	Rooney, S.M.; Wightman, G.D.; O Conchuir, R.; King, J.J.
<b>Series :</b>	Biology and Environment: Proceedings of the Royal Irish Academy, 115B: 1-12
<b>Year :</b>	2015
<b>Title :</b>	River engineering works and lamprey ammocoetes; impacts, recovery, mitigation
<b>Author :</b>	King, J.J.; Wightman, G.D.; Hanna, G.; Gilligan, N.
<b>Series :</b>	Water and Environment Journal, 29: 482-488
<b>Year :</b>	2016
<b>Title :</b>	A narrative for conserving freshwater and wetland habitats in England
<b>Author :</b>	Mainstone, C.; Hall, R.; Diack, I.
<b>Series :</b>	Natural England Research Reports Number 064
<b>Year :</b>	2016
<b>Title :</b>	The Status of Irish Salmon Stocks in 2015 with Precautionary Catch Advice for 2016
<b>Author :</b>	SSCS (Standing Scientific Committee on Salmon)
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<b>Year :</b>	Undated
<b>Title :</b>	WFD111 (2a) Coarse resolution rapid-assessment methodology to assess obstacles to fish migration: Field manual level A assessment
<b>Author :</b>	SNIFFER (Scotland and Northern Ireland Forum for Environmental Research)
<b>Series :</b>	SNIFFER WFD111

## Spatial data sources

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

## Conservation Objectives for : Lower River Suir SAC [002137]

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

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

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

Vegetation composition: negative indicator species - <i>Spartina anglica</i>	Hectares	No significant expansion of common cordgrass ( <i>Spartina anglica</i> ), with an annual spread of less than 1% where it is known to occur	Based on data from McCorry and Ryle (2009). Common cordgrass ( <i>Spartina anglica</i> ) is present in the SAC, but swards are not a significant feature. See the coastal habitats supporting document for further details
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## Conservation Objectives for : Lower River Suir SAC [002137]

### 1410 Mediterranean salt meadows (*Juncetalia maritimi*)

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

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

## Conservation Objectives for : Lower River Suir SAC [002137]

### 3260 Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation

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

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

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

Fringing habitats	Hectares	Maintain marginal fringing habitats that support the typical species and vegetation composition of the habitat	Riparian habitats (including those along lake shores), particularly natural/semi-natural woodlands and wetlands, are an integral part of the structure and functioning of river systems, even where they do not form part of a natural floodplain. Fringing habitats can contribute to the aquatic food web (e.g. allochthonous matter such as leaf fall), provide habitat (refuge and resources) for certain life-stages of fish, birds and aquatic invertebrates, assist in the settlement of fine suspended material, protect banks from erosion and contribute to nutrient cycling. Shade may also be important in suppressing algal growth in enriched rivers and moderating temperatures. Equally, fringing habitats are dependent on rivers/lakes, particularly their water levels, and support wetland communities and species of conservation concern. See Mainstone et al. (2016). Alluvial and riparian woodland is important for the rivers in Lower River Suir SAC
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## Conservation Objectives for : Lower River Suir SAC [002137]

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

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels habitat has not been mapped in detail for Lower River Suir SAC and thus the total area of the qualifying habitat in the SAC is unknown. The lowland type communities of the habitat are considered to occur in association with the various areas of alluvial forest (91E0) within the SAC, notably at Fiddown, below Carrick-on-Suir and at Tibberaghny Marshes. This habitat type would also be expected to occur in association with other woodland types in fringe areas along the river and with areas of open marsh or wet grassland within the SAC (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See notes on area above
Hydrological regime: Flooding depth/height of water table	Metres	Maintain appropriate hydrological regime	This habitat requires winter inundation, which results in deposition of naturally nutrient-rich sediment
Vegetation composition: positive indicator species	Number of species at a representative number of monitoring stops	At least three positive indicator species present	Attribute and target based on O'Neill et al. (2013), where the list of positive indicator species is also presented
Vegetation composition: positive indicator species	Percentage cover at a representative number of monitoring stops	Cover of positive indicator species at least 40%	Attribute and target based on O'Neill et al. (2013), where the list of positive indicator species is also presented
Vegetation composition: non-native species	Percentage cover at a representative number of monitoring stops	Cover of non-native species not more than 1%	Attribute and target based on O'Neill et al. (2013). The spread of Japanese knotweed ( <i>Fallopia japonica</i> ) is noted as a threat at Tibberaghny (NPWS internal files)
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Cover of negative indicator species not more than 33%	Attribute and target based on O'Neill et al. (2013), where the list of negative indicator species is also presented
Vegetation composition: scrub, bracken and heath	Percentage at a representative number of monitoring stops	Cover of scrub, bracken ( <i>Pteridium aquilinum</i> ) and heath not more than 5%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: height	Height (centimetres) at a representative number of monitoring stops	Herb height at least 50cm	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare soil	Percentage at a representative number of monitoring stops	Cover of bare soil not more than 10%	Attribute and target based on O'Neill et al. (2013)
Physical structure: grazing and disturbance	Square metres in local vicinity of a representative number of monitoring stops	Area of the habitat showing signs of serious grazing or disturbance less than 20m <sup>2</sup>	Attribute and target based on O'Neill et al. (2013)

## Conservation Objectives for : Lower River Suir SAC [002137]

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

To restore the favourable conservation condition of Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles in Lower River Suir SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least 29.3ha for sites surveyed. See map 4	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> were surveyed in Lower River Suir SAC by Perrin et al. (2008) as part of the National Survey of Native Woodlands (NSNW) at Lyranearla (NSNW site code: 1834) and Inchinsquillib Wood (NSNW site code: 1898). The area of old oak woodlands in the surveyed sites within the SAC is estimated to be 29.3ha. It is important to note that further unsurveyed areas are present within the SAC, including at Portlaw Wood within the Curraghmore Estate and other small pockets within the SAC (NPWS internal files). Map 4 shows the old oak woodlands surveyed by Perrin et al. (2008)
Habitat distribution	Occurrence	No decline. Surveyed locations shown on map 4	Distribution shown based on Perrin et al. (2008). NB further unsurveyed areas are present within this SAC
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The target areas for individual woodlands aim to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). In some cases, topographical constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer	Described in Perrin et al. (2008) and NPWS internal files
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008) and NPWS internal files
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Oak ( <i>Quercus petraea</i> ) generally regenerates poorly. In suitable sites, ash ( <i>Fraxinus excelsior</i> ) can regenerate in large numbers although few seedlings reach pole size
Woodland structure: dead wood	m <sup>3</sup> per hectare; number per hectare	At least 30m <sup>3</sup> /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local distinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands (see Perrin and Daly, 2010), archaeological and geological features as well as red-listed and other rare or localised species. The rare lichen tree lungwort ( <i>Lobaria pulmonaria</i> ), an indicator of ancient woodlands, is found in Portlaw Wood (NPWS internal files)
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008) and NPWS internal files

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

## Conservation Objectives for : Lower River Suir SAC [002137]

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

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, at least 32.9ha for sites surveyed. See map 5	Alluvial forest was surveyed in Lower River Suir SAC by Perrin et al. (2008) as part of the National Survey of Native Woodlands (NSNW) at Fiddown (NSNW site code: 0022), Mountbolton (NSNW site code: 1823) and Ballycanvan Big (NSNW site code: 1839). Fiddown (0022) was also included in a national monitoring survey (O'Neill and Barron, 2013). The area of alluvial woodlands in the surveyed sites within the SAC is estimated to be 32.9ha. It is important to note that further unsurveyed areas of alluvial forest are present within the SAC, for example at islands below Carrick-on-Suir, at Shanbally (Coillte LIFE project site), Tibberaghny Marshes, along the lower stretches of the more westerly of the Suir tributaries and along both banks of the Suir as far east as the Dawn River (NPWS internal files). Map 5 shows the alluvial woodlands surveyed by Perrin et al. (2008)
Habitat distribution	Occurrence	No decline. Surveyed locations shown on map 5	Distribution shown based on Perrin et al. (2008). NB further unsurveyed areas are present within the SAC
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The target areas for individual woodlands aim to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). In some cases, topographical constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer	Described in Perrin et al. (2008) and NPWS internal files
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008) and NPWS internal files
Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Alder ( <i>Alnus glutinosa</i> ) and oak ( <i>Quercus</i> spp.) tend to regenerate poorly. Ash ( <i>Fraxinus excelsior</i> ) often regenerates in large numbers although few seedlings reach pole size
Hydrological regime: flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	Periodic flooding is essential to maintain alluvial woodlands along river floodplains, but not for woodland around springs/seepage areas
Woodland structure: dead wood	m <sup>3</sup> per hectare; number per hectare	At least 30m <sup>3</sup> /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 ( <i>Alnus glutinosa</i> ))	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources

Woodland structure: indicators of local distinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-listed and other rare or localised species. Perrin and Daly (2010) identify the site Ballycanvan Big (NSNW site code: 1839) as being "possible ancient woodland"
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008) and NPWS internal files
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including alder ( <i>Alnus glutinosa</i> ), willows ( <i>Salix</i> spp.), oak ( <i>Quercus</i> spp.), ash ( <i>Fraxinus excelsior</i> ) and birch ( <i>Betula pubescens</i> )	Species reported in Perrin et al. (2008) and NPWS internal files
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	Norway spruce ( <i>Picea abies</i> ) and sycamore ( <i>Acer pseudoplatanus</i> ) occur at Shanbally (NPWS internal files). Spread of Japanese knotweed ( <i>Fallopia japonica</i> ) is a problem at Tibberaghny (NPWS internal files). Cherry laurel ( <i>Prunus laurocerasus</i> ) and rhododendron ( <i>Rhododendron ponticum</i> ) have been reported as occurring in part of Ballycanvan Big (NSNW site code: 1839) by Perrin et al. (2008), but not within the alluvial woodland

## Conservation Objectives for : Lower River Suir SAC [002137]

### 91J0 *Taxus baccata* woods of the British Isles

To restore the favourable conservation condition of *Taxus baccata* woods of the British Isles\* in Lower River Suir SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	<i>Taxus baccata</i> woods of the British Isles habitat has not been mapped in detail for Lower River Suir SAC and thus the total area of the qualifying habitat is unknown. Yew ( <i>Taxus baccata</i> ) woodland is known to occur at Cahir Park in an area of c.500m by 50m. Cahir Park was included in a national monitoring survey of yew woodland (Cross and Lynn, 2013). NB further unsurveyed areas may be present within the SAC
Habitat distribution	Occurrence	No decline	A narrow stand of yew woodland occurs along the steep western flank of a limestone knoll at Cahir Park within Lower River Suir SAC. See Cross and Lynn (2013) for further details. NB further unsurveyed areas may be present within the SAC
Woodland size	Hectares	Area stable or increasing	Yew ( <i>Taxus baccata</i> ) has been planted on deeper soil on top of the knoll at Cahir Park. If the transplants survive, the area of yew woodland will be considerably expanded. See Cross and Lynn (2013) for further details
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and herb and bryophyte layer	See Perrin et al. (2008) and Cross and Lynn (2013) for further details
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	See Perrin et al. (2008) and Cross and Lynn (2013) for further details
Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Yew ( <i>Taxus baccata</i> ) regenerates poorly under its own canopy but can regenerate under a canopy of other species or in the open if the competition from the field layer is not too strong
Woodland structure: dead wood	m <sup>3</sup> per hectare; number per hectare	At least 30m <sup>3</sup> /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local distinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands (see Perrin and Daly, 2010), archaeological and geological features as well as red-data and other rare or localised species
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	See Perrin et al. (2008) and Cross and Lynn (2013) for further details
Vegetation composition: typical species	Occurrence	A variety of typical native species present, including yew ( <i>Taxus baccata</i> ) and ash ( <i>Fraxinus excelsior</i> )	See Perrin et al. (2008) and Cross and Lynn (2013) for further details

Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The most common invasive species in this woodland type is beech ( <i>Fagus sylvatica</i> ), although there is evidence to suggest that it actually facilitates regeneration of yew ( <i>Taxus baccata</i> ). Numerous exotic species, including cherry laurel ( <i>Prunus laurocerasus</i> ) in particular, have been reported from Cahir Park (Cross and Lynn, 2013)
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## Conservation Objectives for : Lower River Suir SAC [002137]

### 1029 Freshwater Pearl Mussel *Margaritifera margaritifera*

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

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

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

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

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

## Conservation Objectives for : Lower River Suir SAC [002137]

### 1092 White-clawed Crayfish *Austropotamobius pallipes*

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

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

## Conservation Objectives for : Lower River Suir SAC [002137]

### 1095 Sea Lamprey *Petromyzon marinus*

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

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	Artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting the species to lower stretches and restricting access to spawning areas (Gargan et al., 2011; Rooney et al., 2015). Float-over surveys by Inland Fisheries Ireland (IFI) point to little success of sea lamprey adults in passing the weirs in Clonmel in Lower River Suir SAC. Modifications to these weirs would facilitate upstream passage of sea lamprey. IFI has embarked on a programme of detailed survey of major barriers in SAC catchments, in the context of sea lamprey passage, using the SNIFFER (Scotland and Northern Ireland Forum for Environmental Research) WFDIII methodology
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor (2007). A catchment-wide larval lamprey survey was completed by IFI in 2016. The data are currently being analysed
Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Juvenile density at least 1/m <sup>2</sup>	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003). A catchment-wide larval lamprey survey was completed by IFI in 2016. The data are currently being analysed
Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by IFI. Lampreys spawn in clean gravels. Substantial areas of suitable spawning habitat are available from Cahir to Carrick-on-Suir, but access to areas upstream of Clonmel is problematic
Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King et al., 2015). However, it is vital that such sedimenting habitats are retained

## Conservation Objectives for : Lower River Suir SAC [002137]

### 1096 Brook Lamprey *Lampetra planeri*

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

Attribute	Measure	Target	Notes
Distribution	Percentage of river accessible	Access to all water courses down to first order streams	Artificial barriers can block or cause difficulties to lampreys' migration both up- and downstream, thereby possibly limiting species to specific stretches, restricting access to spawning areas and creating genetically isolated populations (Espanhol et al., 2007)
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor (2007). It is impossible to distinguish between brook and river lamprey juveniles in the field (Gardiner, 2003), hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Mean catchment juvenile density of brook/river lamprey at least 2/m <sup>2</sup>	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 <sup>2</sup> in optimal conditions and more than 2/m <sup>2</sup> on a catchment basis. A catchment-wide larval lamprey survey was completed by Inland Fisheries Ireland (IFI) in 2016. The data are currently being analysed
Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by IFI. Brook lampreys spawn in clean gravels where they excavate shallow nests and can spawn communally (Rooney et al., 2013)
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King et al., 2015). However, it is vital that such sedimenting habitats are retained

## Conservation Objectives for : Lower River Suir SAC [002137]

### 1099 River Lamprey *Lampetra fluviatilis*

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

Attribute	Measure	Target	Notes
Distribution	Percentage of river accessible	Access to all water courses down to first order streams	Artificial barriers can block river lampreys' migration both up- and downstream, thereby limiting species to specific stretches, restricting access to spawning areas and creating genetically isolated populations (Espanhol et al., 2007)
Population structure of juveniles	Number of age/size groups	At least three age/size groups of river/brook lamprey present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor (2007). It is impossible to distinguish between river and brook lamprey juveniles in the field (Gardiner, 2003), hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m <sup>2</sup>	Mean catchment juvenile density of brook/river lamprey at least 2/m <sup>2</sup>	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 <sup>2</sup> in optimal conditions and more than 2/m <sup>2</sup> on a catchment basis. A catchment-wide larval lamprey survey was completed by Inland Fisheries Ireland (IFI) in 2016. The data are currently being analysed
Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by Inland Fisheries Ireland (IFI). River lampreys spawn in clean gravels where they excavate shallow nests and can spawn communally in numbers (Rooney et al., 2013)
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King et al., 2015). However, it is vital that such sedimenting habitats are retained

## Conservation Objectives for : Lower River Suir SAC [002137]

### 1103 Twaite Shad *Alosa fallax fallax*

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

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	In some catchments, artificial barriers block twaite shads' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas
Population structure: age classes	Number of age classes	More than one age class present	
Extent and distribution of spawning habitat	m <sup>2</sup> and occurrence	No decline in extent and distribution of spawning habitats	
Water quality: oxygen levels	Milligrams per litre	No lower than 5mg/l	Attribute and target based on Maas et al. (2008)
Spawning habitat quality: Filamentous algae; macrophytes; sediment	Occurrence	Maintain stable gravel substrate with very little fine material, free of filamentous algal (macroalgae) growth and macrophyte (rooted higher plants) growth	See Maitland and Hatton-Ellis (2003) for further information

## Conservation Objectives for : Lower River Suir SAC [002137]

### 1106 Salmon *Salmo salar*

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

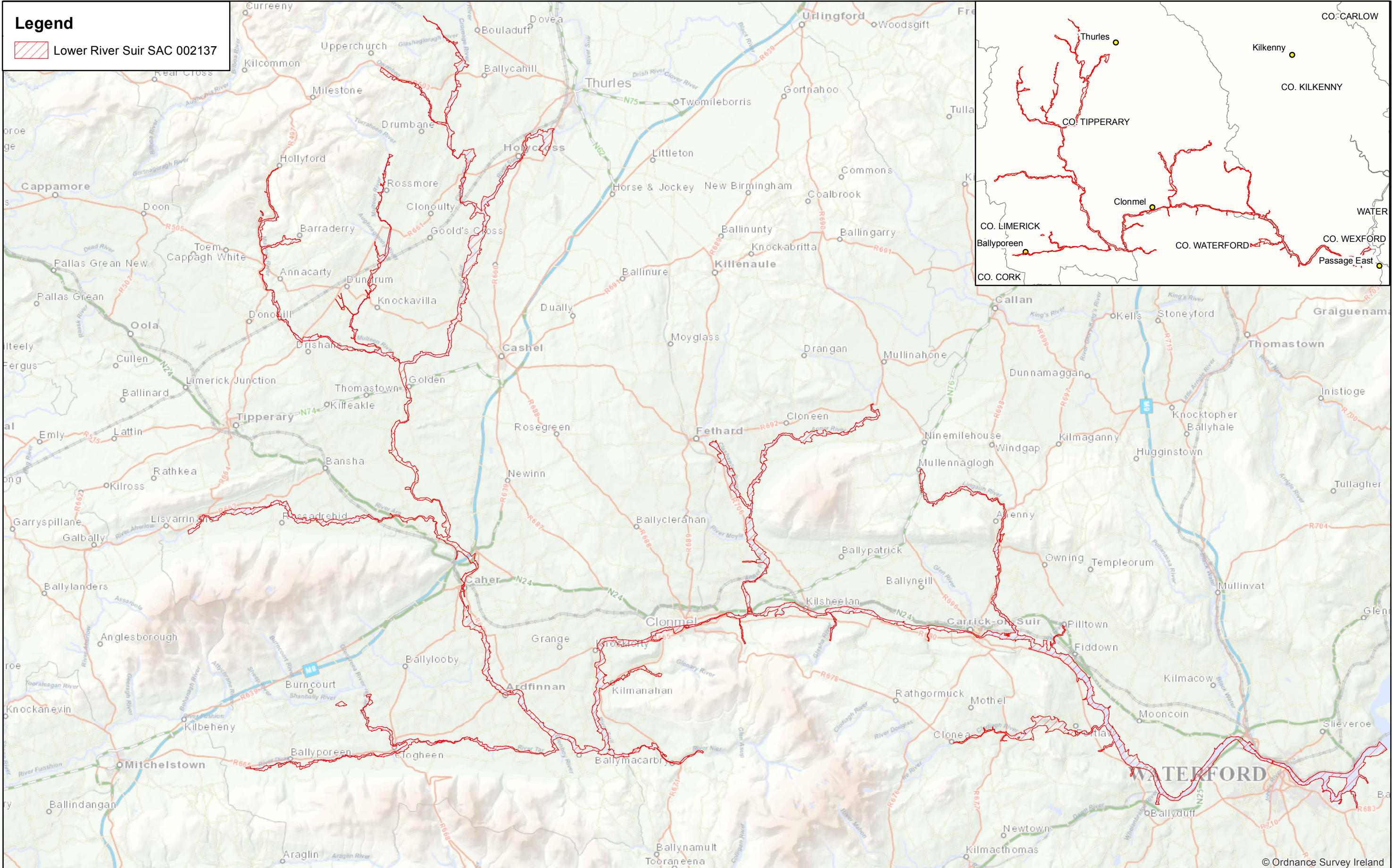
Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmon's upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas
Adult spawning fish	Number	Conservation limit (CL) for each system consistently exceeded	A conservation limit (CL) is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee on Salmon (SSCS) annual model output of CL attainment levels. See SSCS (2016). Attainment of CL estimates are derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The Suir is currently below CL, meeting 79% of CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling	The target is the threshold value for rivers currently exceeding their conservation limit (CL). The average electrofishing value for the Suir in 2016 was 10.2 salmon fry, which is below the 17 fry target
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice ( <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 generally not currently preventing salmon from accessing suitable spawning habitat in Lower River Suir SAC
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)

## Conservation Objectives for : Lower River Suir SAC [002137]

### 1355 Otter *Lutra lutra*

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

Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. Favourable Conservation Status (FCS) target, based on 1980/81 survey findings, is 88% in SACs. Current range is estimated at 93.6% (Reid et al. 2013)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 116.17ha above high water mark (HWM) and 726.61ha along river banks	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 712.27ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (Kruuk, 2006; NPWS, 2007)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 382.31km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk and Moorhouse, 1991; Kruuk, 2006)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006; Reid et al., 2013) and wrasse and rockling in coastal waters (Kingston et al., 1999)
Barriers to connectivity	Number	No significant increase	Otters will regularly commute across stretches of open water up to 500m e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed



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**MAP 1:  
 LOWER RIVER SUIR SAC  
 CONSERVATION OBJECTIVES  
 SAC DESIGNATION**

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

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

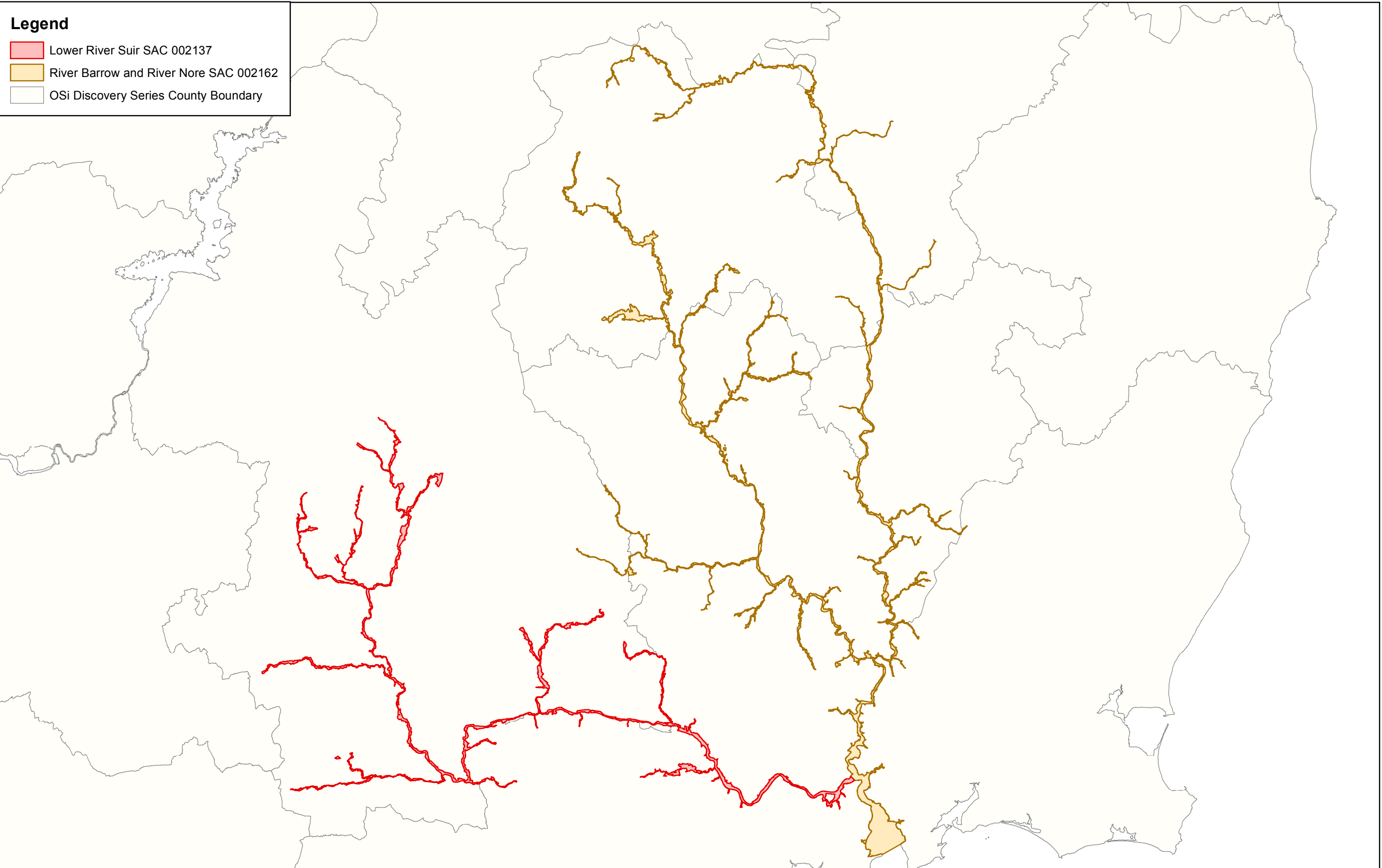
0 3 6 9 12 15 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.  
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuimhach ginearálta. Féadfar athbheithníthe a déanamh ar theorainneacha na gceantar comharthaíthe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

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**Map Version 1  
 Date: Oct 2016**

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**Legend**

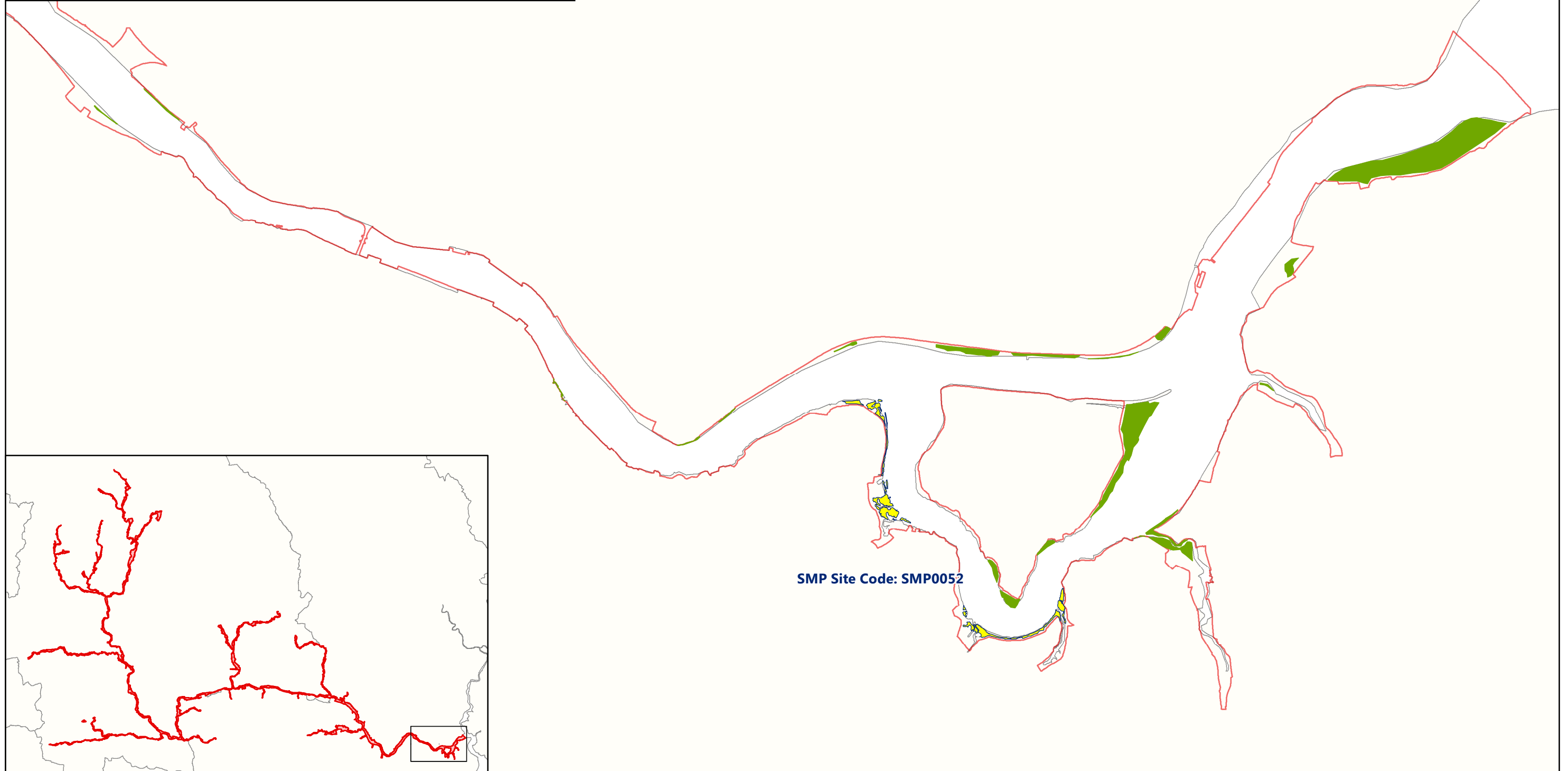
- Lower River Suir SAC 002137
- River Barrow and River Nore SAC 002162
- OSi Discovery Series County Boundary

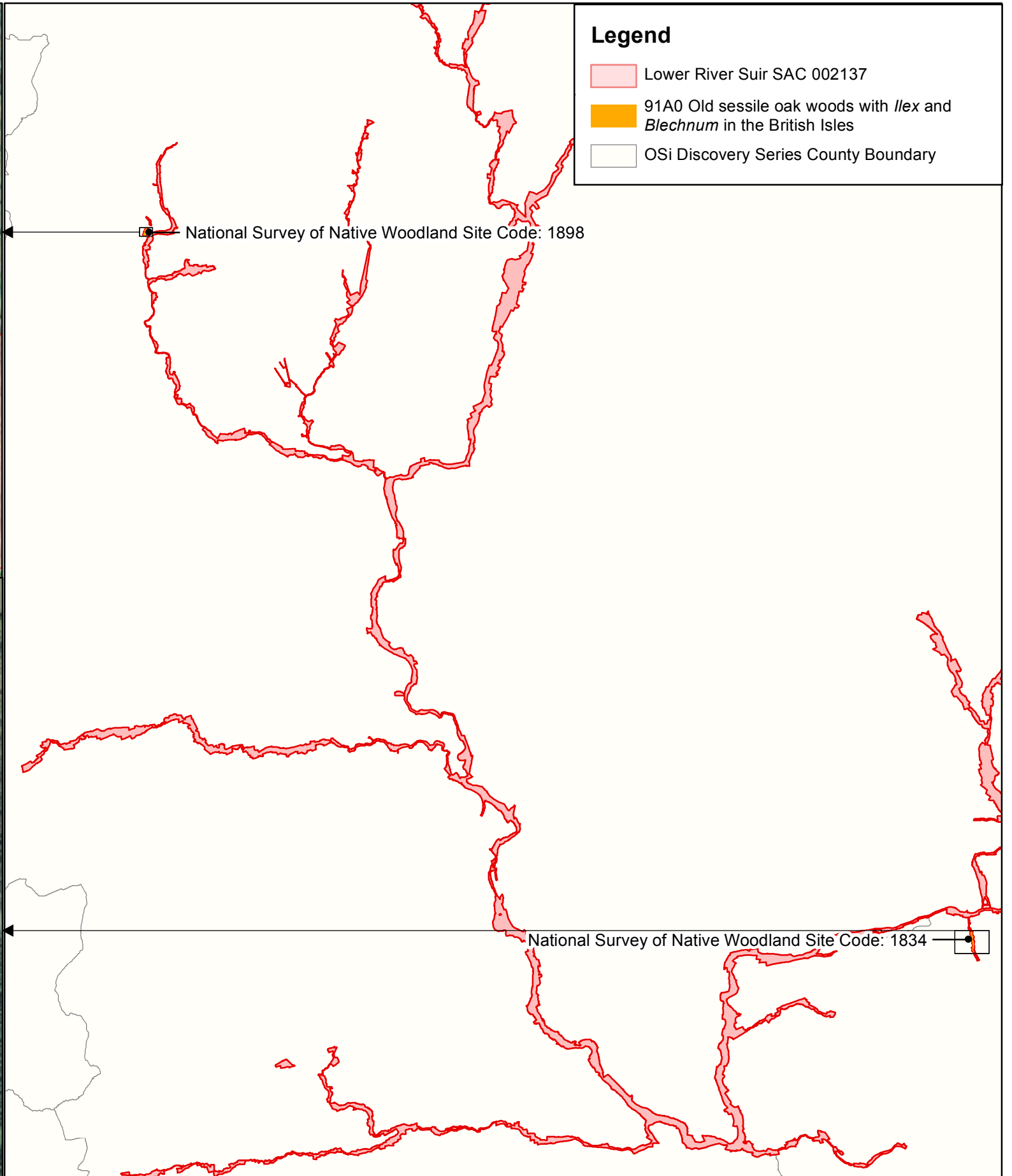
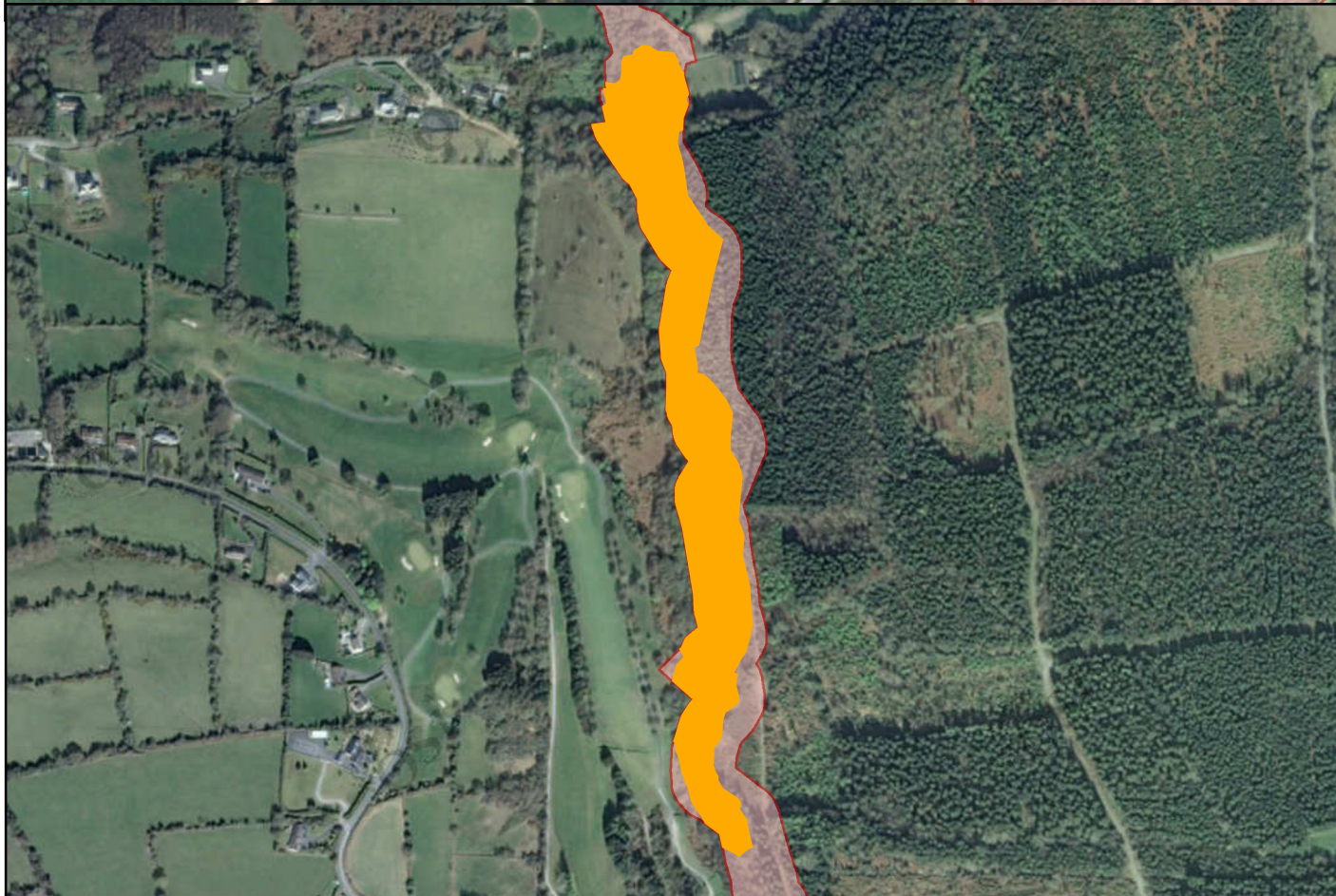
**Legend**

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

**Annex I Saltmarsh Habitats**

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

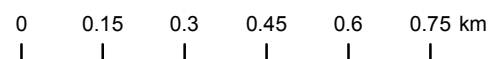
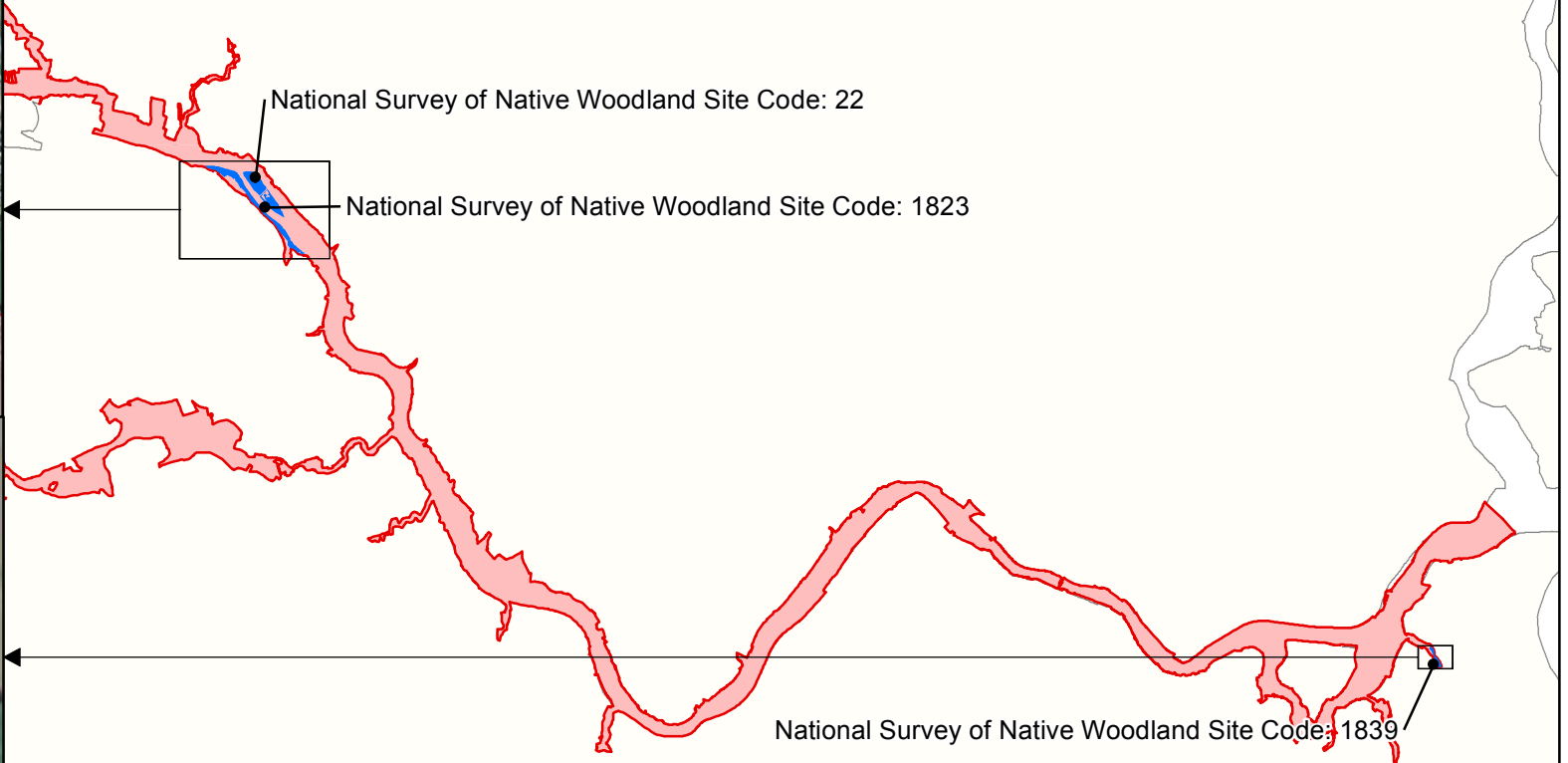


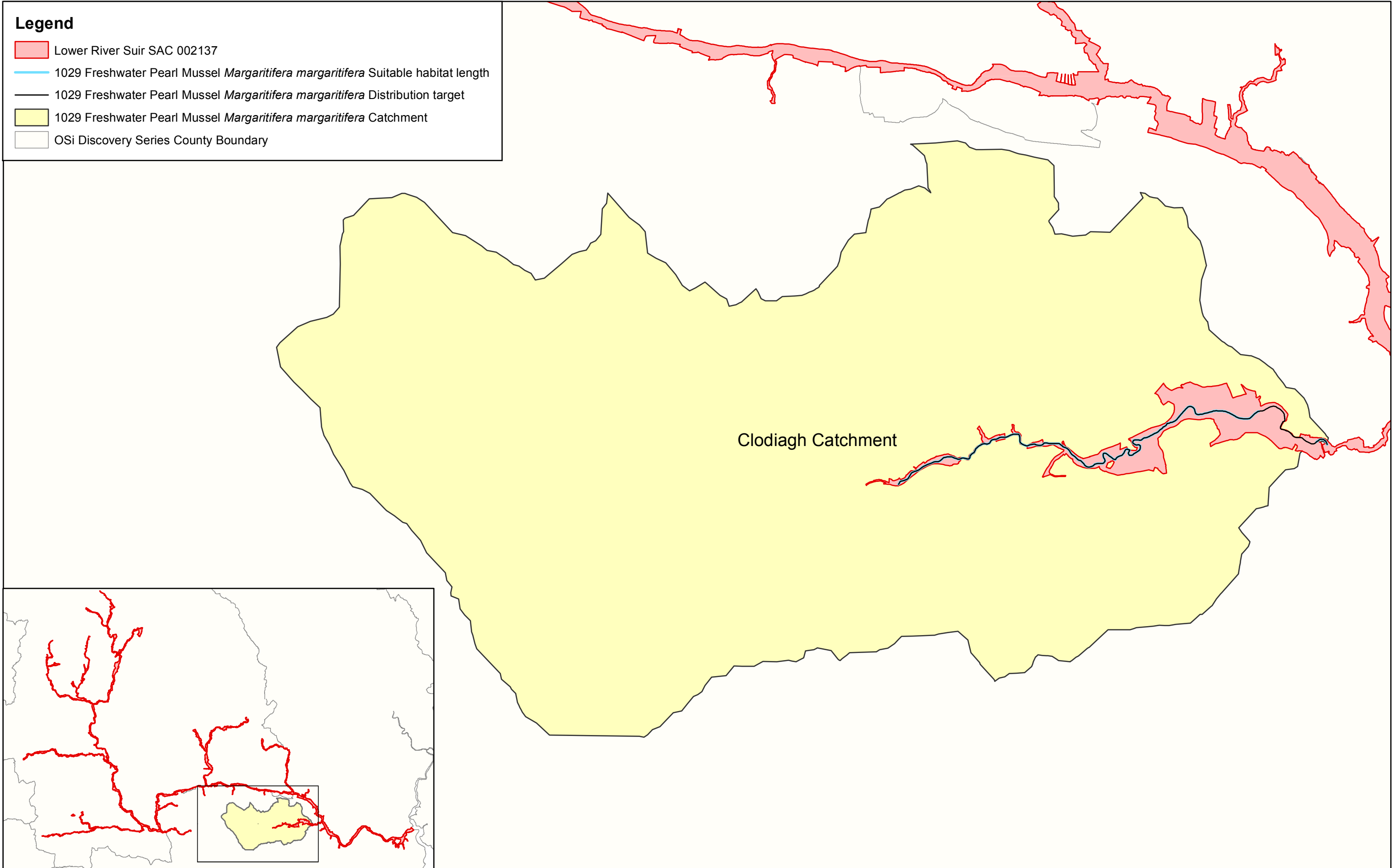




**Legend**

- Lower River Suir SAC 002137
- 91EO Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Pandion*, *Alnion incanae*, *Salicion albae*)
- OSi Discovery Series County Boundary






**Legend**

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

Clodiagh Catchment



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

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

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

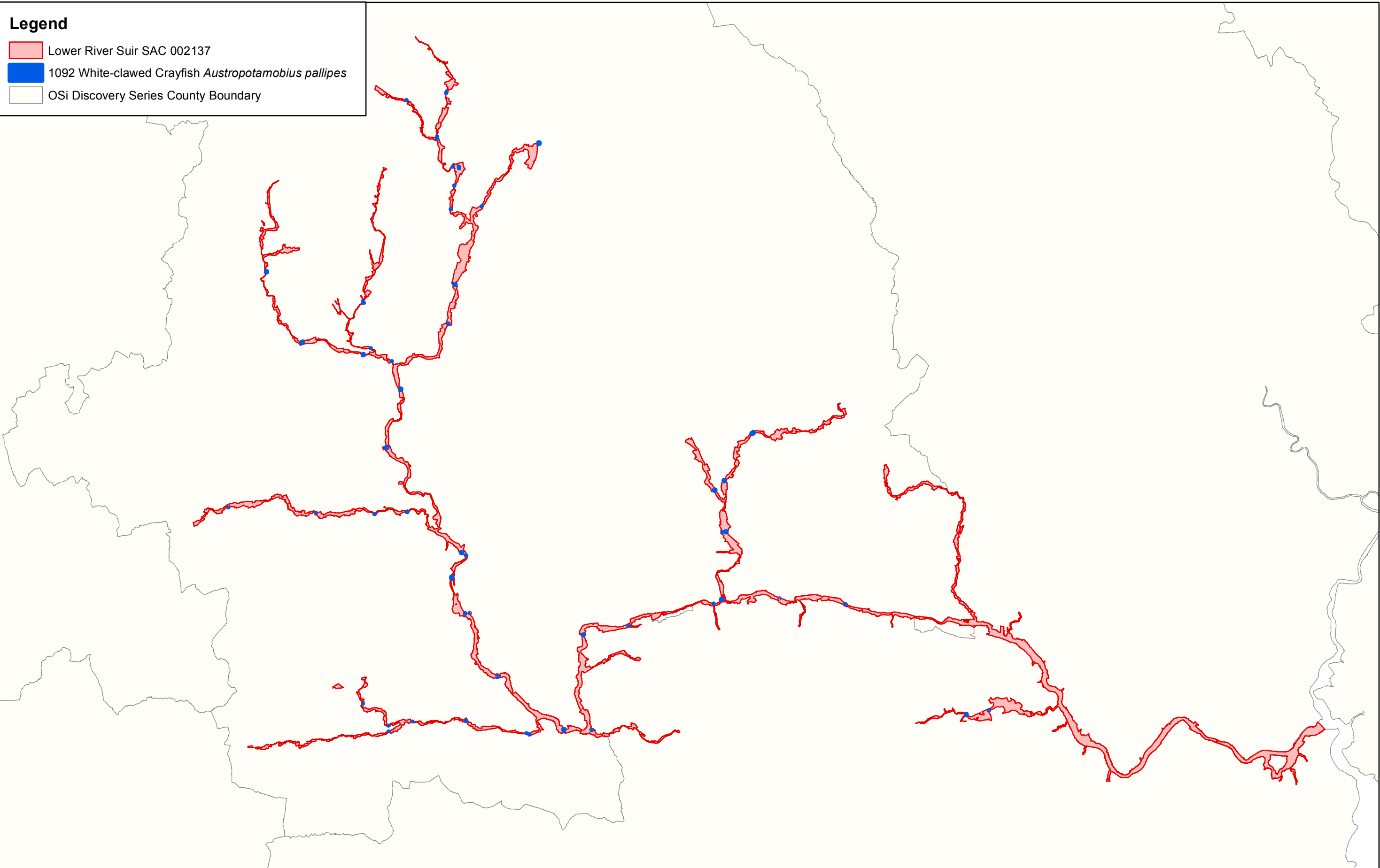
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**Map Version 1**  
**Date: Oct 2016**



# National Parks and Wildlife Service

## *Conservation Objectives Series*

### River Barrow and River Nore SAC 002162



**NPWS**

An tSeirbhís Páirceanna  
Náisiúnta agus Fiadhúlra  
National Parks and Wildlife  
Service

**National Parks and Wildlife Service,  
Department of Housing, Local Government and Heritage,  
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Web: [www.npws.ie](http://www.npws.ie)  
E-mail: [natureconservation@npws.gov.ie](mailto:natureconservation@npws.gov.ie)**

**Citation:**

**NPWS (2025) Conservation Objectives: River Barrow and River Nore SAC  
002162. Version 2. National Parks and Wildlife Service, Department of Housing,  
Local Government and Heritage.**

**Series Editors: Maria Long and Colin Heaslip  
ISSN 2009-4086**

## Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

### Notes/Guidelines:

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

## Qualifying Interests

\* indicates a priority habitat under the Habitats Directive

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002162	River Barrow and River Nore SAC
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 fallax</i>
1106	Salmon <i>Salmo salar</i>
1130	Estuaries
1140	Mudflats and sandflats not covered by seawater at low tide
1170	Reefs
1310	<i>Salicornia</i> and other annuals colonising mud and sand
1330	Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritima</i> )
1355	Otter <i>Lutra lutra</i>
1410	Mediterranean salt meadows ( <i>Juncetalia maritimi</i> )
1421	Killarney Fern <i>Trichomanes speciosum</i>
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
4030	European dry heaths
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
7220	Petrifying springs with tufa formation (Cratoneurion)*
91A0	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles
91E0	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)*

**Please note that this SAC is adjoins Lower River Suir SAC (002137), Blackstairs Mountains SAC (000770), Slieve Bloom Mountains SAC (000412) and overlaps with River Nore SPA (004233) and Slieve Bloom Mountains SPA (004160). See map 1a. The conservation objectives for this site should be used in conjunction with those for overlapping and adjoining site(s) as appropriate. IMPORTANT: This 'Version 2' document includes 1 additional QI (1170), 3 updates to existing QIs (1029/1130/1140) and 1 QI removal (1990). The conservation objectives for other pre-existing QIs have generally not been updated.**

## Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: [www.npws.ie/Publications](http://www.npws.ie/Publications)

### NPWS Documents

<b>Year :</b>	1995
<b>Title :</b>	Mapping of proposed SAC rivers for <i>Margaritifera margaritifera</i> . A report for the National Parks and Wildlife Service on work carried out from August to October 1995 (in two volumes). Volume 1
<b>Author :</b>	Moorkens, E.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	1998
<b>Title :</b>	Conservation management of the white-clawed crayfish, <i>Austropotamobius pallipes</i>
<b>Author :</b>	Reynolds, J.D.
<b>Series :</b>	Irish Wildlife Manuals, No. 1
<b>Year :</b>	2006
<b>Title :</b>	The distribution of Lamprey in the River Barrow SAC
<b>Author :</b>	King, J.J.
<b>Series :</b>	Irish Wildlife Manual No. 21
<b>Year :</b>	2006
<b>Title :</b>	Otter survey of Ireland 2004/2005
<b>Author :</b>	Bailey, M.; Rochford, J.
<b>Series :</b>	Irish Wildlife Manuals, No. 23
<b>Year :</b>	2006
<b>Title :</b>	Initiation of a monitoring program for the freshwater pearl mussel, <i>Margaritifera margaritifera</i> (L.) in the Mountain River (Barrow)
<b>Author :</b>	Ross, E.
<b>Series :</b>	Unpublished report to National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin
<b>Year :</b>	2007
<b>Title :</b>	A survey of juvenile lamprey populations in the Corrib and Suir catchments
<b>Author :</b>	O'Connor, W.
<b>Series :</b>	Irish Wildlife Manuals, No. 26
<b>Year :</b>	2008
<b>Title :</b>	All Ireland Species Action Plan - Killarney Fern
<b>Author :</b>	NPWS ; EHS-NI
<b>Series :</b>	Species Action Plan
<b>Year :</b>	2008
<b>Title :</b>	National survey of native woodlands 2003-2008
<b>Author :</b>	Perrin, P.M.; Martin, J.; Barron, S.; O'Neill, F.H.; McNutt, K.E.; Delaney, A.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2009
<b>Title :</b>	NS II Freshwater Pearl Mussel Sub-basin Management Plan: Fisheries Survey. Stage 1 Report
<b>Author :</b>	Johnston and Associates, P.
<b>Series :</b>	Unpublished Report to the National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin

<b>Year :</b>	2009
<b>Title :</b>	NS II Freshwater Pearl Mussel Sub-basin Management Plans: Monitoring of the Freshwater Pearl Mussel in the Ballymurphy
<b>Author :</b>	Moorkens, E.A.
<b>Series :</b>	Department of the Environment, Heritage and Local Government, Dublin
<b>Year :</b>	2009
<b>Title :</b>	NS II Freshwater Pearl Mussel Sub-basin Management Plans: Monitoring of the Freshwater Pearl Mussel in the Mountain
<b>Author :</b>	Moorkens, E.A.
<b>Series :</b>	Department of the Environment, Heritage and Local Government, Dublin
<b>Year :</b>	2009
<b>Title :</b>	NS II Freshwater Pearl Mussel Sub-basin Management Plans: Monitoring of the Freshwater Pearl Mussel in the Nore
<b>Author :</b>	Moorkens, E.A.
<b>Series :</b>	Department of the Environment, Heritage and Local Government, Dublin
<b>Year :</b>	2010
<b>Title :</b>	A provisional inventory of ancient and long-established woodland in Ireland
<b>Author :</b>	Perrin, P.M.; Daly, O.H.
<b>Series :</b>	Irish Wildlife Manuals, No. 46
<b>Year :</b>	2010
<b>Title :</b>	Irish semi-natural grasslands survey. Annual report No.3: Counties Donegal, Dublin, Kildare and Sligo
<b>Author :</b>	O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; McNutt, K.E.; Perrin, P.M.; Delaney, A.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2010
<b>Title :</b>	Second Draft Nore Freshwater Pearl Mussel Sub-basin Management Plan (2009-2015)
<b>Author :</b>	DEHLG
<b>Series :</b>	Unpublished Report to NPWS
<b>Year :</b>	2010
<b>Title :</b>	Second Draft Ballymurphy Freshwater Pearl Mussel Sub-basin Management Plan (2009-2015)
<b>Author :</b>	DEHLG
<b>Series :</b>	National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland
<b>Year :</b>	2010
<b>Title :</b>	Second Draft Mountain Freshwater Pearl Mussel Sub-basin Management Plan (2009-2015)
<b>Author :</b>	DEHLG
<b>Series :</b>	National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland
<b>Year :</b>	2011
<b>Title :</b>	River Barrow and River Nore SAC (002162): Conservation objectives supporting document - coastal habitats [Version 1]
<b>Author :</b>	NPWS
<b>Series :</b>	Conservation objectives supporting document
<b>Year :</b>	2011
<b>Title :</b>	River Barrow and River Nore SAC (002162): Conservation objectives supporting document - marine habitats [Version 1]
<b>Author :</b>	NPWS
<b>Series :</b>	Conservation objectives supporting document

<b>Year :</b>	2011
<b>Title :</b>	River Barrow and River Nore SAC (002162): Conservation objectives supporting document - woodland habitats [Version 1]
<b>Author :</b>	NPWS
<b>Series :</b>	Conservation objectives supporting document
<b>Year :</b>	2012
<b>Title :</b>	Monitoring Populations of the Freshwater Pearl Mussel <i>Margaritifera margaritifera</i> - A condition assessment survey of the freshwater pearl mussel in the Nore River, Counties Laois and Kilkenny. Spring 2012
<b>Author :</b>	Moorkens, E.A.
<b>Series :</b>	Department of Arts, Heritage and the Gaeltacht, Dublin
<b>Year :</b>	2014
<b>Title :</b>	Report on assisted breeding of the Nore pearl mussel
<b>Author :</b>	Moorkens, E.A.
<b>Series :</b>	Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland
<b>Year :</b>	2016
<b>Title :</b>	Population genetic analyses of the endangered freshwater pearl mussel ( <i>Margaritifera margaritifera</i> ) in Ireland
<b>Author :</b>	Feind, S.; Kuehn, R.; Geist, J.; Moorkens, E.A.; Killeen, I.J.
<b>Series :</b>	Unpublished report for the National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
<b>Year :</b>	2017
<b>Title :</b>	Survey and Condition Assessment of the population of the freshwater mussel <i>Margaritifera margaritifera</i> in the Mountain River, County Carlow
<b>Author :</b>	Moorkens, E.
<b>Series :</b>	Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland
<b>Year :</b>	2017
<b>Title :</b>	Survey and Condition Assessment of the population of the freshwater mussel <i>Margaritifera margaritifera</i> in the Nore River, County Laois
<b>Author :</b>	Moorkens, E.
<b>Series :</b>	Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland
<b>Year :</b>	2018
<b>Title :</b>	Electrofishing survey to identify fish hosts for the freshwater pearl mussel <i>Margaritifera margaritifera</i> in 12 populations in the Republic of Ireland. 2017 Survey
<b>Author :</b>	Johnston, P.M.; Moorkens, E.A.
<b>Series :</b>	Unpublished Report to the National Parks and Wildlife Service, DCHG, Dublin.
<b>Year :</b>	2020
<b>Title :</b>	Monitoring Populations of the Freshwater Pearl Mussel, <i>Margaritifera margaritifera</i> , Stage 3 and Stage 4 Survey
<b>Author :</b>	Moorkens, E.A. & Killeen, I.J.
<b>Series :</b>	Irish Wildlife Manuals No. 122
<b>Year :</b>	2020
<b>Title :</b>	2019 Survey and Condition Assessment of the population of the freshwater mussel <i>Margaritifera margaritifera</i> in the Nore River, County Laois
<b>Author :</b>	Moorkens, E.A.
<b>Series :</b>	Department of Culture, Heritage and the Gaeltacht, Ireland
<b>Year :</b>	2023
<b>Title :</b>	2022 Survey and Condition Assessment of the population of the freshwater mussel <i>Margaritifera margaritifera</i> in the Ballymurphy River, County Carlow
<b>Author :</b>	Wetland Surveys Ireland
<b>Series :</b>	Department of Housing, Local Government and Heritage, Dublin

**Year :** 2025  
**Title :** River Barrow and River Nore SAC (site code 2162). Conservation objectives supporting document - marine habitats [Version 2].  
**Author :** NPWS  
**Series :** Conservation objectives supporting document

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

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

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**Year :** 1991  
**Title :** The freshwater pearl mussels *Margaritifera margaritifera* in the South East of Ireland  
**Author :** Moorkens, E.A.  
**Series :** MSc Thesis, University of Dublin, Trinity College

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**Year :** 1994  
**Title :** Imminent extinction of the Nore freshwater pearl mussel (*Margaritifera durrovensis*) Phillips: a species unique to Ireland  
**Author :** Moorkens, E.A.; Costello, M.J.  
**Series :** Aquatic Conservation: Marine and Freshwater Ecosystems 4,363-365

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**Year :** 1996  
**Title :** Studies on the biology and ecology of *Margaritifera* in Ireland  
**Author :** Moorkens, E.  
**Series :** Unpublished Ph.D. thesis, University of Dublin, Trinity College

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**Year :** 1999  
**Title :** Diet of otters (*Lutra lutra*) on Inishmore, Aran Islands, west coast of Ireland  
**Author :** Kingston, S.; O'Connell, M.; Fairley, J.S.  
**Series :** Biology and Environment: Proceedings of the Royal Irish Academy, 99B: 173-182

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**Year :** 2000  
**Title :** A survey of broadleaf woodlands in 3 SACs: Barrow-Nore, River Unshin & Lough Forbes  
**Author :** Browne, A.; Dunne, F.; Roche, N.  
**Series :** Unpublished Report to NPWS

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**Year :** 2002  
**Title :** Reversing the habitat fragmentation of British woodlands  
**Author :** Peterken, G.  
**Series :** WWF-UK, London

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**Year :** 2002  
**Title :** A survey of the white-clawed crayfish, *Austropotamobius pallipes* (Lereboullet), and of water quality in two catchments of eastern Ireland  
**Author :** Demers, A.; Reynolds, J.D.  
**Series :** Bulletin Francais de la Peche et de la Pisciculture, 367: 729-740

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<b>Year :</b>	2003
<b>Title :</b>	Monitoring the river, brook and sea lamprey, <i>Lampetra fluviatilis</i> , <i>L. planeri</i> and <i>Petromyzon marinus</i>
<b>Author :</b>	Harvey, J.; Cowx, I.
<b>Series :</b>	Conserving Natura 2000 Rivers Monitoring Series No. 5. English Nature, Peterborough
<b>Year :</b>	2003
<b>Title :</b>	Ecology of watercourses characterised by <i>Ranunculum fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation
<b>Author :</b>	Hatton-Ellis, T.W.; Grieve, N.
<b>Series :</b>	Conserving Natura 2000 Rivers Ecology Series No. 11. English Nature, Peterborough
<b>Year :</b>	2003
<b>Title :</b>	Ecology of the allis and twaite shad
<b>Author :</b>	Maitland, P.S.; Hatton-Ellis, T.W.
<b>Series :</b>	Conserving Natura 2000 Rivers Ecology Series No. 3. English Nature, Peterborough
<b>Year :</b>	2004
<b>Title :</b>	Pilot Project for Monitoring Populations of the Freshwater Pearl Mussel. Baseline survey of the Nore River SAC, Counties Laois and Kilkenny
<b>Author :</b>	Moorkens, E.
<b>Series :</b>	Unpublished Report to NPWS
<b>Year :</b>	2004
<b>Title :</b>	A survey of freshwater pearl mussels in the south eastern river basin district
<b>Author :</b>	Moorkens, E.A.; Killeen, I.; Kurz, I.
<b>Series :</b>	Unpublished report for the Heritage Council
<b>Year :</b>	2005
<b>Title :</b>	The ecology and conservation of the gametophyte generation of the Killarney Fern ( <i>Trichomanes speciosum</i> Willd.) in Ireland
<b>Author :</b>	Kingston, N.; Hayes, C.
<b>Series :</b>	Biology and Environment: Proceedings of the Royal Irish Academy 105B(2): 71-79
<b>Year :</b>	2006
<b>Title :</b>	Otters - ecology, behaviour and conservation
<b>Author :</b>	Kruuk, H.
<b>Series :</b>	Oxford University Press
<b>Year :</b>	2006
<b>Title :</b>	The status of host fish populations and fish species richness in European freshwater pearl mussel ( <i>Margaritifera margaritifera</i> ) streams
<b>Author :</b>	Geist, J.; Porkka, M.; Kuehn, R.
<b>Series :</b>	Aquatic Conservation: Marine and Freshwater Ecosystems, 16: 251-266
<b>Year :</b>	2007
<b>Title :</b>	Assessment of fish passage and the ecological impact of migration barriers on the River Nore catchment
<b>Author :</b>	Sullivan, A.
<b>Series :</b>	Nore Suir Rivers Trust & OPW
<b>Year :</b>	2008
<b>Title :</b>	A survey of mudflats and sandflats in Ireland. An intertidal soft sediment survey of Waterford Estuary
<b>Author :</b>	Aquatic Services Unit
<b>Series :</b>	Unpublished Report to Marine Institute & NPWS

<b>Year :</b>	2008
<b>Title :</b>	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
<b>Author :</b>	ARMS
<b>Series :</b>	Unpublished Report to NPWS
<b>Year :</b>	2008
<b>Title :</b>	Poor water quality constrains the distribution and movements of twaite shad ( <i>Alosa fallax fallax</i> , Lacepede, 1803) in the watershed of river Scheldt
<b>Author :</b>	Maas, J.; Stevens, M.; Breine, J.
<b>Series :</b>	Hydrobiologia, 602: 129-143
<b>Year :</b>	2008
<b>Title :</b>	Assessment of the Risk of Barriers to Fish Migration in the Nore Catchment, Southern Regional Fisheries Board
<b>Author :</b>	CFB; Compass Informatics
<b>Series :</b>	Unpublished Report to CFB
<b>Year :</b>	2009
<b>Title :</b>	The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. [S.I. 296 of 2009]
<b>Author :</b>	Government of Ireland
<b>Series :</b>	Irish Statute Book
<b>Year :</b>	2010
<b>Title :</b>	Report of the standing scientific committee to the DCENR. The status of Irish salmon stocks in 2010 and precautionary catch advice for 2011
<b>Author :</b>	SSC
<b>Series :</b>	Unpublished Report to DCENR
<b>Year :</b>	2010
<b>Title :</b>	Site investigations for Sabellaria alveolata (Honey-comb worm) biogenic reefs in Ireland
<b>Author :</b>	NPWS
<b>Series :</b>	Unpublished Report to NPWS
<b>Year :</b>	2010
<b>Title :</b>	Addressing the conservation and rehabilitation of <i>Margaritifera margaritifera</i> populations in the Republic of Ireland within the framework of the habitats and species directive
<b>Author :</b>	Moorkens, E.
<b>Series :</b>	Journal of Conchology, 40: 339
<b>Year :</b>	2014
<b>Title :</b>	Assessing near-bed velocity in a recruiting population of the endangered freshwater pearl mussel ( <i>Margaritifera margaritifera</i> ) in Ireland
<b>Author :</b>	Moorkens, E.; Killeen, I.
<b>Series :</b>	Aquatic Conservation: Marine and Freshwater Ecosystems, 24(6): 853-862
<b>Year :</b>	2017
<b>Title :</b>	Water quality – Guidance standard on monitoring freshwater pearl mussels ( <i>Margaritifera margaritifera</i> ) populations and their environment
<b>Author :</b>	NSAI
<b>Series :</b>	I.E. EN 16859:2017
<b>Year :</b>	2018
<b>Title :</b>	Genetic structure of Irish freshwater pearl mussels ( <i>Margaritifera margaritifera</i> and <i>Margaritifera durrovensis</i> ): Validity of subspecies, roles of host fish, and conservation implications
<b>Author :</b>	Geist, J.; Moorkens, E.; Killeen, I.; Feind, S.; Stoeckle, B.C.; O Connor, Á.; Kuehn, R.
<b>Series :</b>	Aquatic Conservation: Marine and Freshwater Ecosystems, 28: 923-933

**Year :** 2019  
**Title :** The European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2019. [S.I. No. 77 of 2019]  
**Author :** Government of Ireland  
**Series :** Irish Statute Book

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## Spatial data sources

<b>Year :</b>	Revision 2025
<b>Title :</b>	Margaritifera Sensitive Areas data
<b>GIS Operations :</b>	Relevant catchment boundaries identified. Expert opinion used as necessary to resolve any issues arising
<b>Used For :</b>	1029
<b>Year :</b>	2010
<b>Title :</b>	EPA transitional waterbody data
<b>GIS Operations :</b>	Clipped to SAC boundary
<b>Used For :</b>	1130 (map 2)
<b>Year :</b>	Interpolated 2011 and 2025
<b>Title :</b>	Intertidal and subtidal surveys 2008, 2010 and 2024
<b>GIS Operations :</b>	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data
<b>Used For :</b>	Marine community types, 1140, 1170 (maps 3, 4 and 4a)
<b>Year :</b>	2005
<b>Title :</b>	OSi Discovery series vector data
<b>GIS Operations :</b>	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
<b>Used For :</b>	Marine community types base data (map 4a)
<b>Year :</b>	Revision 2010
<b>Title :</b>	Saltmarsh Monitoring Project 2007-2008. Version 1
<b>GIS Operations :</b>	QIs selected; clipped to SAC boundary; overlapping regions with Sand Dune data investigated and resolved with expert opinion used
<b>Used For :</b>	1310, 1330, 1410 (map 5)
<b>Year :</b>	Derived 2011
<b>Title :</b>	Internal NPWS files
<b>GIS Operations :</b>	Dataset created from spatial reference contained in files
<b>Used For :</b>	7220 (map 6)
<b>Year :</b>	Revision 2010
<b>Title :</b>	National Survey of Native Woodlands 2003-2008. Version 1
<b>GIS Operations :</b>	QIs selected; clipped to SAC boundary
<b>Used For :</b>	91A0, 91E0 (map 6)
<b>Year :</b>	2011 and 2025
<b>Title :</b>	NPWS rare and threatened species database
<b>GIS Operations :</b>	Dataset created from spatial references in database records
<b>Used For :</b>	1016, 1092, 1421, 1029 (maps 7 and 8)
<b>Year :</b>	2005
<b>Title :</b>	OSi Discovery series vector data
<b>GIS Operations :</b>	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
<b>Used For :</b>	1355 (no map)

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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	Conserve the following community types in a natural condition: Muddy estuarine community complex; Sand to muddy fine sand community complex; Fine sand with <i>Fabulina fabula</i> community; Sheltered to moderately exposed intertidal reef community complex. See map 4a	The likely area of sediment community types was derived from a combination of intertidal and subtidal surveys undertaken in 2008, 2009, 2010 and 2024. See marine supporting document for further details
Community structure: extent	Hectares and distribution	Conserve the extent of <i>Sabellaria alveolata</i> reef community, subject to natural processes. See map 4a	Based on site-specific surveys undertaken in 2010 and 2024 (NPWS internal files), most of the suitable habitat was colonised overlying the rocky substrate. See the marine supporting document for further details
Community structure: quality	Honeycomb reef structure	Conserve the high quality of the <i>Sabellaria alveolata</i> reef community, subject to natural processes. See map 4a	Based on site-specific surveys in 2010 and 2024 (NPWS internal files), there was a high percentage of clearly defined and intact honeycomb reef structures. See the marine supporting document for further details

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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	Conserve the following community types in a natural condition: Muddy estuarine community complex; Sand to muddy fine sand community complex. See map 4a	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

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 1170 Reefs

To maintain the Favourable conservation condition of Reefs in 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 area is stable or increasing, subject to natural processes. See map 4	Habitat area estimated as 17.20ha based on information from site-specific survey in February 2024 (NPWS internal files) and orthophotography. See the River Barrow and River Nore SAC conservation objectives supporting document for marine habitats and species for further details
Distribution	Occurrence	The distribution of reefs is stable or increasing, subject to natural processes. See map 4	Based on information from a site-specific survey in February 2024 and orthophotography. Map 4a shows the mapped geological features, which are used as indicators of the distribution of the reefs habitat. See the marine supporting document for further details
Community extent	Hectares	Conserve the following community type in a natural condition: Sheltered to moderately exposed intertidal reef community complex in a natural condition, subject to natural processes. See map 4a	Based on a site-specific survey undertaken in February 2024. See the marine supporting document for further details
Community structure: extent	Hectares and distribution	Conserve the extent of <i>Sabellaria alveolata</i> reef community, subject to natural processes. See map 4a	Based on site-specific surveys undertaken in 2010 and 2024 (NPWS internal files), most of the suitable habitat was colonised overlying the rocky substrate. See the marine supporting document for further details
Community structure: quality	Honeycomb reef structure	Conserve the high quality of the <i>Sabellaria alveolata</i> reef community, subject to natural processes. See map 4a	Based on site-specific surveys in 2010 and 2024 (NPWS internal files), there was a high percentage of clearly defined and intact honeycomb reef structures. See the marine supporting document for further details

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 1310 *Salicornia* and other annuals colonising mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonising mud and sand in 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 zonation 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

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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 zonation 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

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 3260 Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation

To maintain the Favourable conservation condition of Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-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 fo
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
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 <sub>3</sub> <sup>-</sup> ) 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 n

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

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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 perigrina</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 t
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)
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)
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>Orobancha 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</i>
Vegetation structure: disturbed bare ground	Percentage cover	Cover of disturbed bare ground less than 10% (but if peat soil less than 5%)	Based on NPWS NHA Survey Site Notes and Natura 2000 Form Explanatory Notes - May 2006 and on a modified verison of the dry heath habitat condition assessment methodology of Perrin et al. (2010)
Vegetation structure: burning	Occurrence	No signs of burning within sensitive areas	Perrin et al. (2010) defines sensitive areas

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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)

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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 <sup>3</sup> per hectare; number per hectare	At least 30m <sup>3</sup> /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-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 <sup>3</sup> per hectare; number per hectare	At least 30m <sup>3</sup> /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
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> )

**Conservation Objectives for : River Barrow and River Nore SAC [002162]****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:**

<b>Attribute</b>	<b>Measure</b>	<b>Target</b>	<b>Notes</b>
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)

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 1029 Freshwater Pearl Mussel *Margaritifera margaritifera*

**To restore the Favourable conservation condition of the Freshwater pearl mussel (*Margaritifera margaritifera*) in River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:**

Attribute	Measure	Target	Notes
Distribution: Ballymurphy	Kilometres	Restore distribution at 3.91km. See map 8	The conservation objective applies to the Ballymurphy, Mountain and Nore freshwater pearl mussel populations, which are listed on the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (Statutory Instrument No. 296 of 2009). The target is for the species to be sufficiently widespread to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems (see further information below and, for all attributes, Moorkens and Killeen, 2020). The Ballymurphy population is confined to the Ballymurphy (or Ballyroughan Little) River, a tributary of the Barrow River. The population is distributed from above Earl's Bridge down to the bridge at Clashganna. Given the severe decline since 2004 and the scattered distribution it is highly likely the species range has contracted. See DEHLG (2010) and Wetland Surveys Ireland (2023) for further information
Distribution: Mountain	Kilometres	Restore distribution at 9.45km. See map 8	The conservation objective applies to the Ballymurphy, Mountain and Nore freshwater pearl mussel populations, which are listed on the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (Statutory Instrument No. 296 of 2009). The target is for the species to be sufficiently widespread to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems (see further information below and, for all attributes, Moorkens and Killeen, 2020). The Mountain population is confined to the Mountain River, a tributary of the Barrow River. The population is distributed from just upstream of its confluence with the Kiledmond River down to where the Mountain joins the main channel of the Barrow River. The best habitat for the species is upstream of Borris. Given the continuing decline in mussel numbers it is highly likely that there has been an upstream contraction. See DEHLG (2010) for further information
Distribution: Nore	Kilometres	Restore distribution at 21.13km. See map 8	The conservation objective applies to the Ballymurphy, Mountain and Nore freshwater pearl mussel populations, which are listed on the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (Statutory Instrument No. 296 of 2009). The target is for the species to be sufficiently widespread to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems (see further information below and, for all attributes, Moorkens and Killeen, 2020). The Nore population stretches from Poorman's Bridge to Lismaine Bridge, with most of the population found between Poorman's Bridge and the just upstream of the bridge at Ballyragget (Moorkens, 1996). However, given the severe decline upstream of New Bridge, it is more likely that the range has contracted (Moorkens, 2016). See DEHLG (2010) for further information

Population size: Ballymurphy	Number of adult mussels	Restore Ballymurphy population to at least 1,000 adult mussels	Mussels were first recorded from the Ballymurphy by Moorkens (1991) and were found to be common (301-1,500 per 100m). A detailed survey in 2004 counted a total of 183 adult mussels (Moorkens, Killeen and Kurz, 2004). The population estimate in 2009 was less than 300 mussels (DEHLG, 2010). In 2022, the population within a section was recounted and the total number of mussels recorded was 14 adults, 89% less than that recorded in 2009 (Wetland Surveys Ireland, 2023). The population in 2024 was estimated to be 30 adult mussels. The target is for the species to be sufficiently abundant to maintain itself on a long-term basis as a viable component of the Ballymurphy system
Population size: Mountain	Number of adult mussels	Restore Mountain population to at least 4,000 adult mussels	A 3km stretch of the Mountain from the ford adjacent to the ruins of Kiltennell Church downstream to the bridge near Brook Lodge was estimated in 1995 as having a population of 4,000 adult mussels (Moorkens, 1995). Ross (2006) estimated that the population in the entire Mountain system was 1,898 adult mussels. In 2009, the Mountain population was estimated as 740 - 1,000 adult mussels (DEHLG, 2010). The 2016 survey revealed that the adult population had declined by at least 50% since 2009. The continual decline in numbers and no evidence of recruitment together with the 2016 monitoring results suggests that the population in the Mountain is unlikely to exceed 200 individual mussels in 2024. The target is for the species to be sufficiently abundant to maintain itself on a long-term basis as a viable component of the Mountain system
Population size: Nore	Number of adult mussels	Restore Nore population to at least 5,000 adult mussels	Genetic research has placed the Nore population (formerly <i>Margaritifera durrovensis</i> , Species code 1990) within the <i>Margaritifera margaritifera</i> taxon (Feind et al., 2016; Geist et al., 2018). Surveys carried out since 2010 show that the number of individuals has declined dramatically (Moorkens, 2012, 2014, 2017 and 2020). The total counts from all post-2014 surveys estimate the freshwater pearl mussel population in the Nore at 100 individuals, unless some of the short term captive bred individuals released in 2014 have survived (Moorkens, 2017 and 2020). The target is for the species to be sufficiently abundant to maintain itself on a long-term basis as a viable component of the Nore system
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 '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. See the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 and I.S. EN 16859:2017. A profile created from 362 dead shells collected from the Ballymurphy in 2004 had no mussels ≤70mm in length (Moorkens et al., 2004). No mussels ≤65mm were found in the Mountain River in either 2009 or 2016 (DEHLG, 2010; Moorkens, 2017). The species is known not to have reproduced successfully in the River Nore since 1970 (Moorkens and Costello, 1994; Moorkens, 2004, 2012, 2017, 2020). These three populations are unsustainable owing to lack of survival of juvenile mussels. The target is for sufficient juvenile recruitment to allow the species to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems

Population structure: adult mortality. Ballymurphy	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 the population as dead shells is considered to be indicative of natural losses. The target is for sufficient survival of adults to allow the species to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems. The Ballymurphy failed the live adult target in 2009, with a c.15% loss in surveyed sections of the main population area compared to the 2004 survey. The number of living mussels had declined by a further 91% in 2022 to just 10 individuals based on repeated counts of 100m of approximately the same section of river (Wetland Survey Ireland, 2023). The Ballymurphy failed the target for dead shells in 2009 with hundreds of dead shells on the river bed (DEHLG, 2010) and again in 2022 when a further 44 dead shells were recorded
Population structure: adult mortality. Mountain	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 the population as dead shells is considered to be indicative of natural losses. The target is for sufficient survival of adults to allow the species to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems. The Mountain failed the live adult target as the population declined by up to 61% in stretches of the Mountain between 2006 and 2009 (DEHLG, 2010), and by >50% between 2009 and 2016 (Moorkens, 2017) based on repeated counts of a 100m section. The Mountain failed the target for dead shells in 2009 (DEHLG, 2010) but passed in 2016 (Moorkens, 2017)
Population structure: adult mortality. Nore	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 the population as dead shells is considered to be indicative of natural losses. The target is for sufficient survival of adults to allow the species to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems. The Nore failed the live adult target as the population declined by between 23% and 67% in stretches between 2004 and 2009 (Moorkens, 2009). No discernible decline in number was observed in 2011 or 2016, however no live mussel was observed in the 2019 (Moorkens, 2012, 2017 and 2020). The Nore failed the target for dead shells in 2009 (DEHLG, 2010) but it was unknown if the dead shells observed belonged to mussels that recently died or to mussels that died several years earlier because, as the Nore River water is highly calcareous, the dead shells do not erode quickly
Suitable habitat: extent	Kilometres	Restore suitable habitat in more than 3.91km in the Ballymurphy, 5.3km in the Mountain and 16.72km in the Nore system (see map 8) and any additional stretches necessary for salmonid spawning	The habitat for the species is currently unsuitable for the survival of adult mussels or the recruitment of juveniles (DEHLG, 2010; Moorkens, 2009, 2012, 2017, 2020; Wetland Survey Ireland, 2023). Mussel habitat in the Ballymurphy, Mountain and Nore Rivers is impacted from catchment-wide intensification of agriculture and forestry, with multiple severe pressures that result in negative cumulative effects on hydromorphology, sedimentation and nutrient enrichment. While, the Mountain River was found to have extensive areas of physically good juvenile habitat, it is intermittently compromised by siltation to the extent that juveniles are killed and adults are stressed (Moorkens, 2017). The target is for the species' habitat to be sufficiently widespread to allow the species to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems

Suitable habitat: condition	Kilometres	Restore condition of suitable habitat	The species' habitat is a combination of the area of 1) habitat adult and juvenile mussels can occupy; 2) spawning and nursery habitats host fish can occupy. Fish nursery and mussel habitat typically overlap. Fish spawning habitat is generally adjacent to mussel habitat, but may lie upstream of the generalised mussel distribution. Only spawning areas that regularly contribute juvenile fish to adult mussel habitat should be considered. Mussel and fish habitat availability is determined by flow and substratum conditions, and is sensitive to hydromorphological, sedimentation and enrichment pressures from throughout the catchment. The target is based on the stretches of river identified as having habitat for the species however further habitat characterisation and condition mapping is recommended. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems
Water quality: macroinvertebrates and phytobenthos (diatoms)	Ecological quality ratio (EQR)	Restore water quality- macroinvertebrates: EQR greater than 0.90 (Q4-5 or Q5); phytobenthos: EQR greater than 0.93	These EQR correspond to high ecological status for these two Water Framework Directive biological quality elements. They represent high water quality with low nutrient concentrations (oligotrophic conditions). Reaching these targets does not, however, guarantee achieving the targets for the other attributes. See also The European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2019, DEHLG, 2010 and EPA sources for further information. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems
Substratum quality: filamentous algae (macroalgae); macrophytes (rooted higher plants)	Percentage	Restore substratum quality- filamentous algae: absent or trace (less than 5%); macrophytes: absent or trace (less than 5%)	The habitat in the Ballymurphy River passed the macroalgae standard during 2009 sampling for the sub-basin management plans (DEHLG, 2010) but failed both macroalgae and macrophyte standards in 2022 (Wetlands Survey Ireland, 2023). The habitat in the Mountain River passed the macroalgae standard but failed the macrophyte standard in both 2009 and 2016 (DEHLG, 2010; Moorkens, 2017). Macrophyte cover was up to 70% in the Mountain during the 2017 assessment. The habitat in the Nore River passed the macroalgae standard but failed the macrophyte standard in 2012, 2016 and 2019 (Moorkens, 2012, 2017 and 2020); macrophytes occurred in 56% of quadrats and with up to 100% cover in the open centre of the channel. High abundance of macroalgae was recorded during 2009 sampling (DEHLG, 2010). The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems

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 in the Ballymurphy, Mountain and Nore systems is currently unsuitable for the recruitment of juveniles owing to sedimentation of the substratum and significant cover of silt. In many locations, it is also unsuitable for the survival of adult mussels. Significant sedimentation has been recorded during all recent mussel monitoring surveys in the Ballymurphy, Mountain, and Nore systems (Moorkens et al., 2004; Ross, 2006; DEHLG, 2010; Moorkens, 2004, 2012, 2017, 2020; Wetlands Survey Ireland, 2023). In the Mountain, 48% of the quadrats contained habitat suitable for juvenile mussels but while the physical habitat is still present the habitat is intermittently impacted by sedimentation preventing survival of juvenile mussels (Moorkens, 2017). The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems
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. See I.S. EN 16859:2017. The redox potential loss at 5cm depth in the Ballymurphy in 2009 was 31.75% (DEHLG, 2010); the Mountain in 2009 was 40% and 17-28% in 2016 (DEHLG, 2010; Moorkens 2017); and the Nore in 2009 was 58-64%, in 2011 was 24-34%, in 2016 was 16-22% and in 2019 was 11-31% (DEHLG, 2010; Moorkens, 2012, 2017, 2019). The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems
Hydrological regime: flow variability	Metres per second	Restore appropriate hydrological regime	The availability of suitable freshwater pearl mussel habitat is largely determined by flow (catchment geology is the other key 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) high flows are not artificially increased so as to cause excessive scour of mussel habitat; 3) low flows do not exacerbate the deposition of fine sediments or growth of algae/macrophytes and 4) low flows do not cause stress to mussels in terms of exposure, water temperatures, food availability or aspects of the reproductive cycle. Groundwater inflow to a river contributes to water-cycling. See Moorkens and Killeen (2014) and I.S. EN 16859:2017 for further information. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of Ballymurphy, Mountain and Nore systems

Host fish	Number	Maintain sufficient juvenile salmonids to host glochidial larvae	Salmonid fish are host to the larval stage of the freshwater pearl mussel and thus, they are essential to completion of the life cycle. 0+ and 1+ fish are typically used, both because of habitat overlaps and the development of immunity with age in fish. Fish presence is considered sufficient, as higher densities and biomass is indicative of enriched conditions in mussel rivers. Geist et al. (2006) found that higher densities of host fish coincided with eutrophication, poor substrate quality and a lack of pearl mussel recruitment, while significantly lower densities and biomass of host fish were associated with high juvenile mussel numbers. Fish movements must be such that 0+ fish remain in the mussel habitat until their 1+ summer. No fish stocking should occur within the mussel habitat, nor any works that may change the salmonid balance or residency time. Encystment on trout was recorded in the Mountain and Nore Rivers, but on neither salmonid in the Ballymurphy system
Fringing habitat: area and condition	Hectares	Restore the area and condition of fringing habitats necessary to support the population	Semi-natural and natural riparian habitats, even where they do not form part of a natural floodplain, are an integral part of the structure and functioning of river systems. Open wetlands, such as wet heath and blanket bog, are particularly critical to the hydrological regime of mussel rivers. Fringing habitats assist in the settlement of fine suspended material, protect banks from erosion and contribute to nutrient cycling, as well as contributing to the aquatic food web (e.g. allochthonous matter from poor fens and flushes) and providing habitat (refuge and resources) for life-stages of fish, birds and aquatic invertebrates. Equally, fringing habitats are dependent on rivers/lakes, particularly their water levels, and support wetland communities and species of conservation concern. The target is for sufficient habitat in favourable condition to allow the species to maintain itself on a long-term basis as a viable component of the Ballymurphy, Mountain and Nore systems

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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 <sup>2</sup>	Juvenile density at least 1/m <sup>2</sup>	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 <sup>2</sup> 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

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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 <sup>2</sup>	Mean catchment juvenile density of brook/river lamprey at least 2/m <sup>2</sup>	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 <sup>2</sup> in optimal conditions and more than 2/m <sup>2</sup> on a catchment basis
Extent and distribution of spawning habitat	m <sup>2</sup> 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

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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 <sup>2</sup>	Mean catchment juvenile density of brook/river lamprey at least 2/m <sup>2</sup>	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 <sup>2</sup> in optimal conditions and more than 2/m <sup>2</sup> on a catchment basis
Extent and distribution of spawning habitat	m <sup>2</sup> 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 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:**

<b>Attribute</b>	<b>Measure</b>	<b>Target</b>	<b>Notes</b>
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 <sup>2</sup> 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 Salmon *Salmo salar*

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
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)

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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:

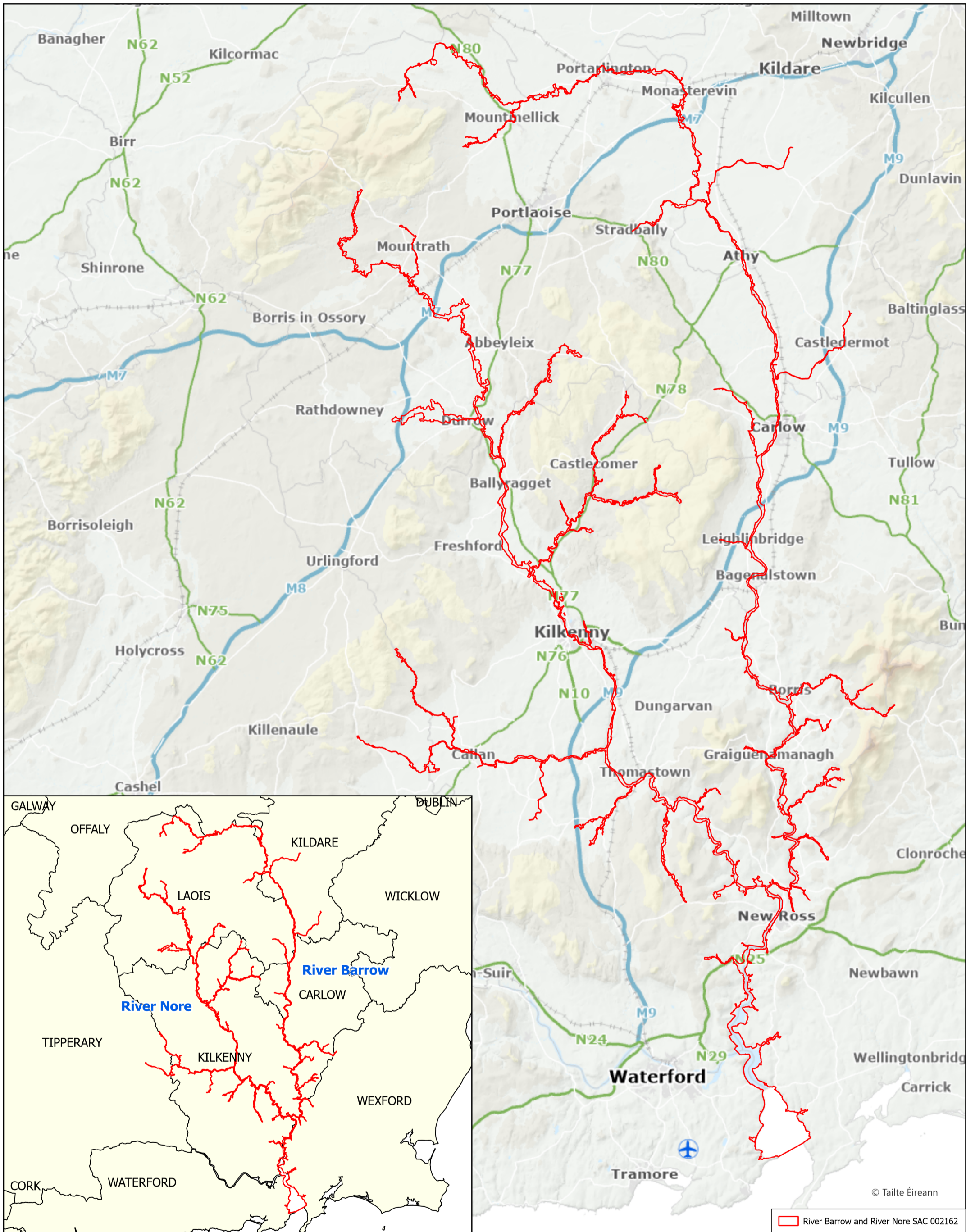
Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. FCS target, based on 1980/81 survey findings, is 88% in SACs. Current range in south-east estimated at 73% (Bailey and Rochford, 2006)
Extent of terrestrial 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)

## Conservation Objectives for : River Barrow and River Nore SAC [002162]

### 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 <sup>2</sup>	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



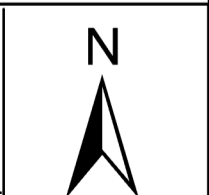
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River Barrow and River Nore SAC 002162

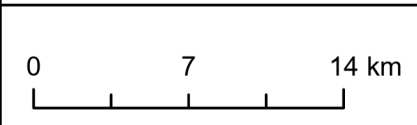


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**CO. KILKENNY, CO. LAOIS,**  
**CO. OFFALY, CO. TIPPERARY,**  
**CO. WATERFORD, CO. WEXFORD**

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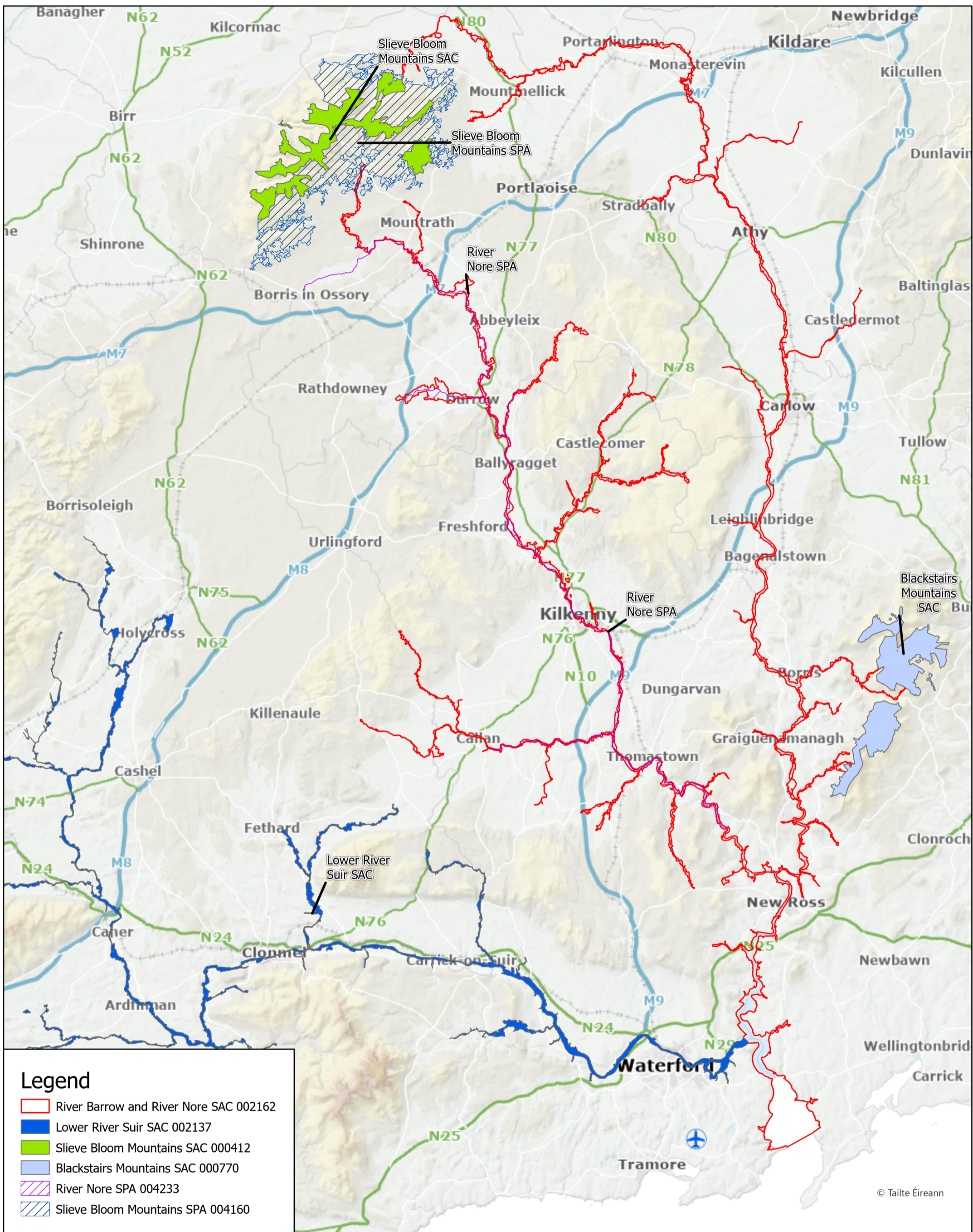


**MAP 1: RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES SAC DESIGNATION**



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

**Map Version 2**  
**Date: May 2025**



**Legend**

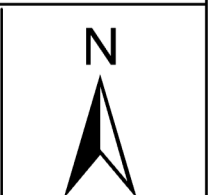
- River Barrow and River Nore SAC 002162
- Lower River Suir SAC 002137
- Slieve Bloom Mountains SAC 000412
- Blackstairs Mountains SAC 000770
- River Nore SPA 004233
- Slieve Bloom Mountains SPA 004160

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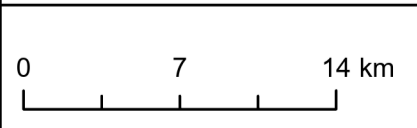


**SITE CODE: 002162  
SAC; Version 3.04;  
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CO. KILKENNY, CO. LAOIS,  
CO. OFFALY, CO. TIPPERARY,  
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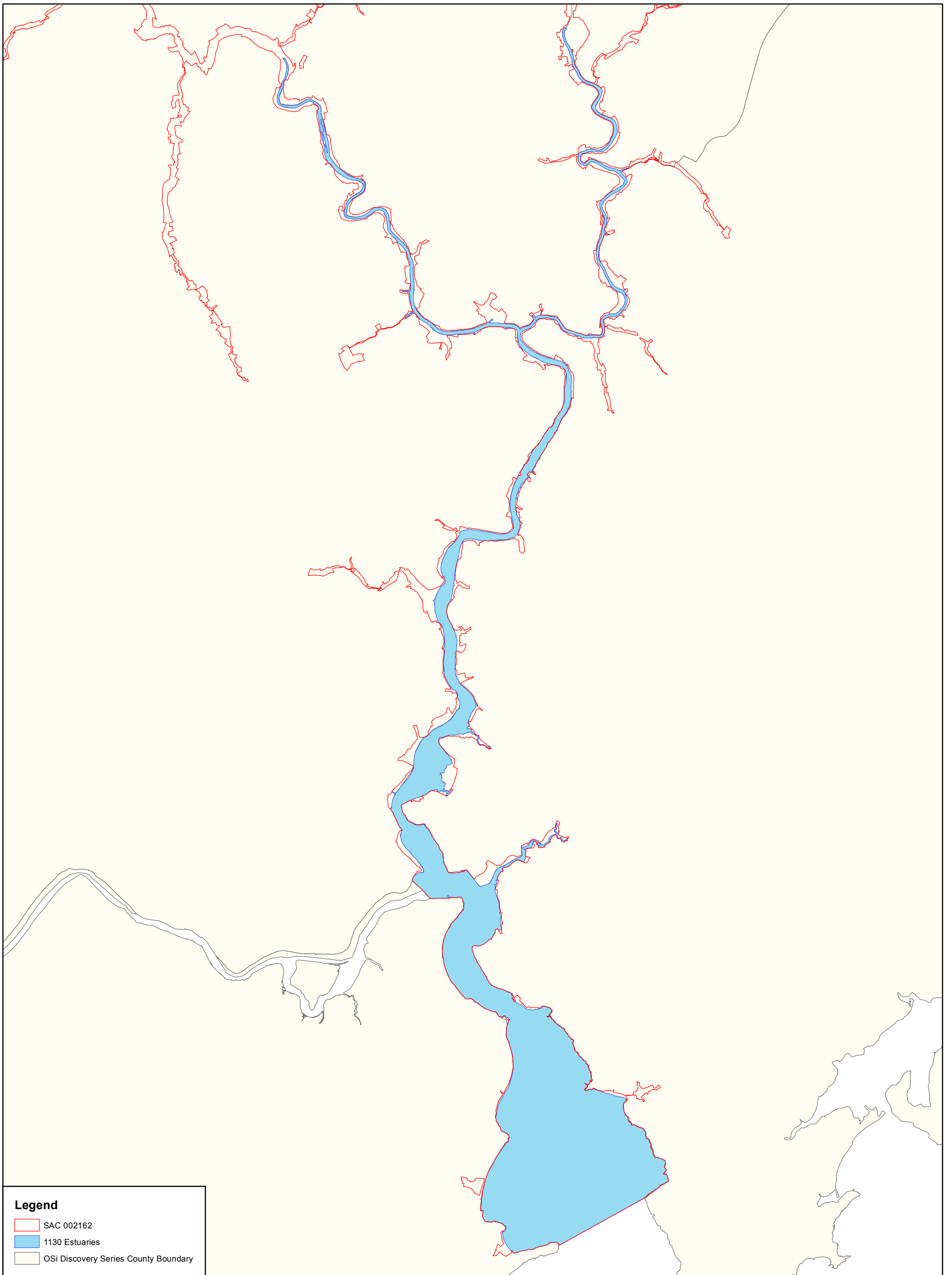


**MAP 1a: RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES OVERLAPPING AND ADJACENT SITES**



Map Version 1  
Date: May 2025

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



**Legend**

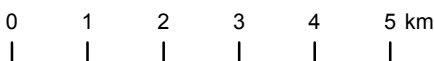
- SAC 002162
- 1130 Estuaries
- OSi Discovery Series County Boundary



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

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

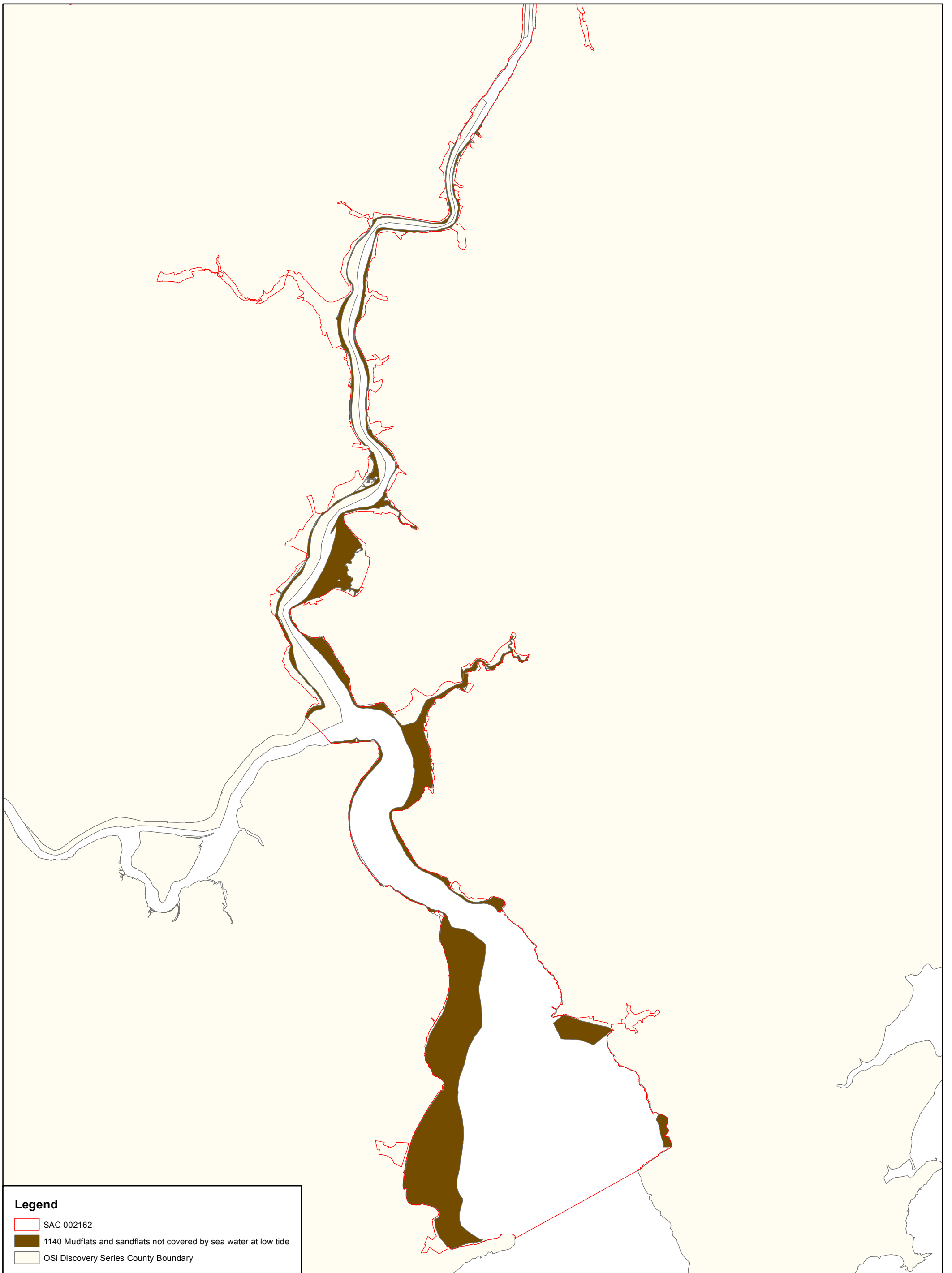
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 CO. CARLOW; version 1.03, CO. KILDARE; version 1.04,  
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 CO. OFFALY; version 1.01, CO. TIPPERARY; version 1.01,  
 CO. WATERFORD; version 1.01, CO. WEXFORD; version 1.01



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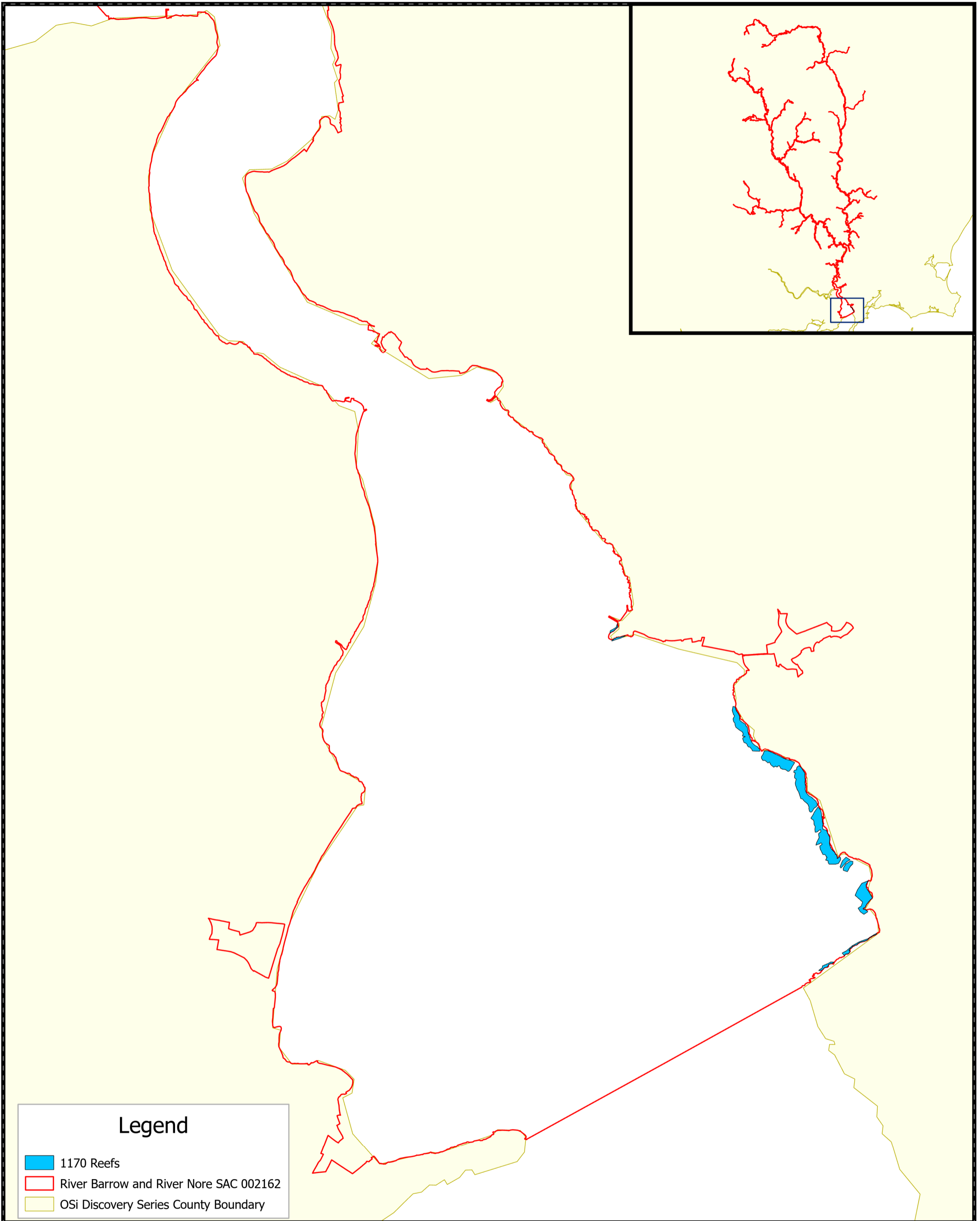


**Map Version 1  
Date: April 2011**





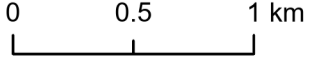
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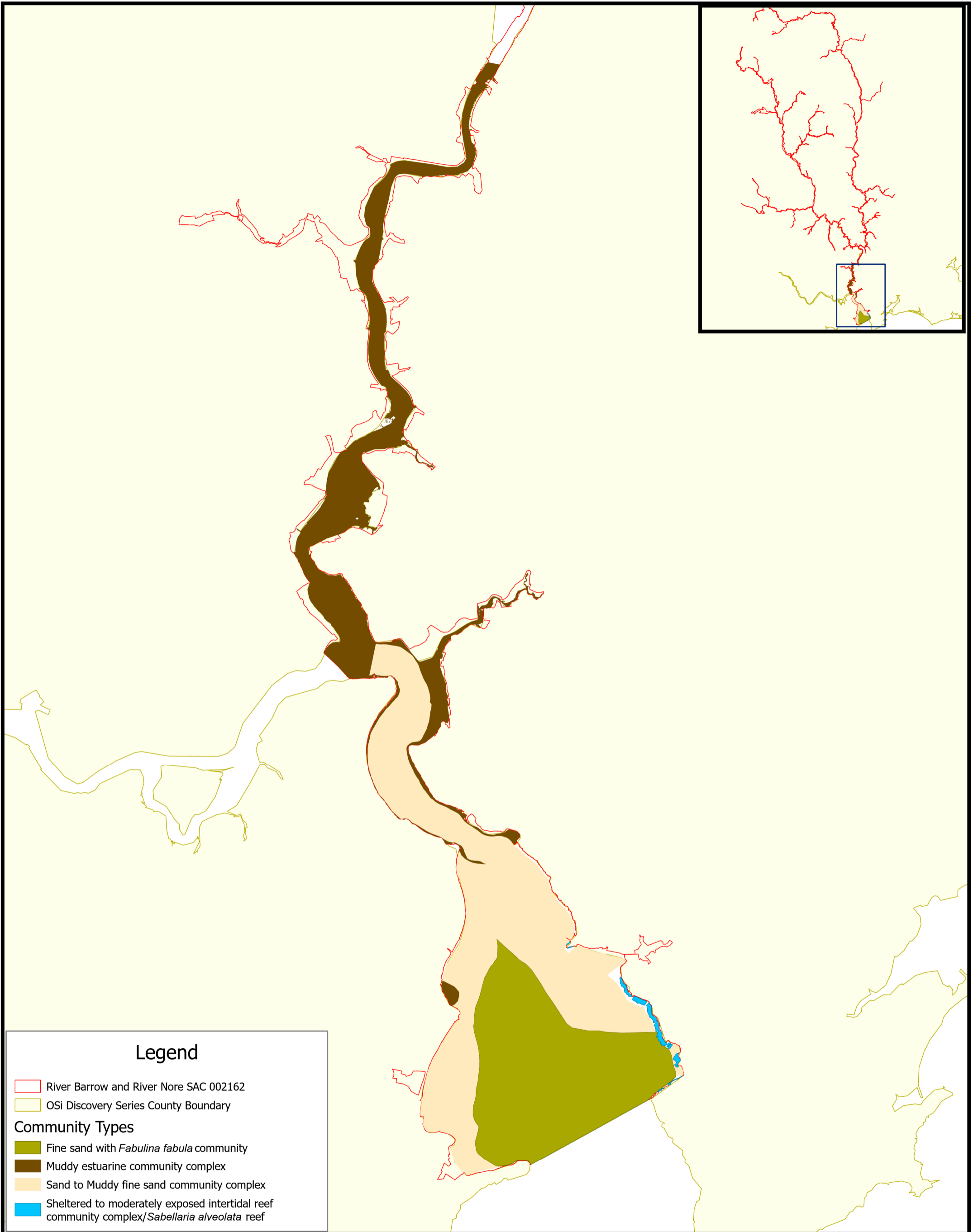
- SAC 002162
- 1140 Mudflats and sandflats not covered by sea water at low tide
- OSi Discovery Series County Boundary



**Legend**

- 1170 Reefs
- River Barrow and River Nore SAC 002162
- OSi Discovery Series County Boundary

	<p><b>NPWS</b> An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra National Parks and Wildlife Service</p>	<p><b>SITE CODE: 002162</b> <b>SAC; Version 3.04;</b> <b>CO. CARLOW, CO. KILDARE,</b> <b>CO. KILKENNY, CO. LAOIS,</b> <b>CO. OFFALY, CO. TIPPERARY,</b> <b>CO. WATERFORD, CO. WEXFORD</b></p>	<p>The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059208). Nil sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)</p>	<p><b>N</b></p> 
<p><b>MAP 4: RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES REEFS</b></p>		<p>0      0.5      1 km</p> 	<p><b>Map Version 1</b> <b>Date: March 2025</b></p>	



### Legend

- River Barrow and River Nore 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
- Sheltered to moderately exposed intertidal reef community complex/*Sabellaria alveolata* reef



**NPWS**

An tSeirbhís Páirceanna  
Náisiúnta agus Fiadhúlra  
National Parks and Wildlife  
Service

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CO. OFFALY, CO. TIPPERARY,  
CO. WATERFORD, CO. WEXFORD**

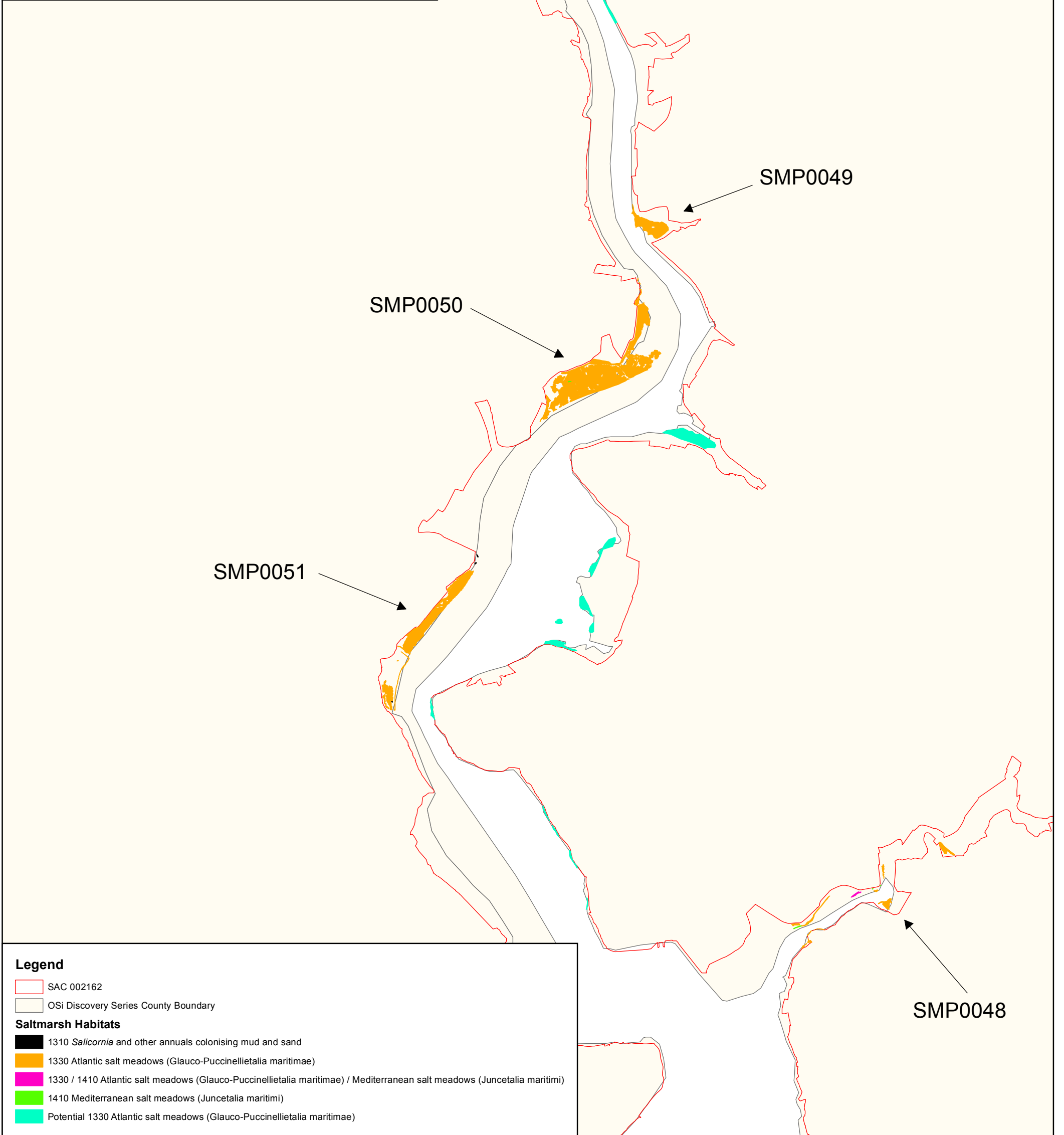
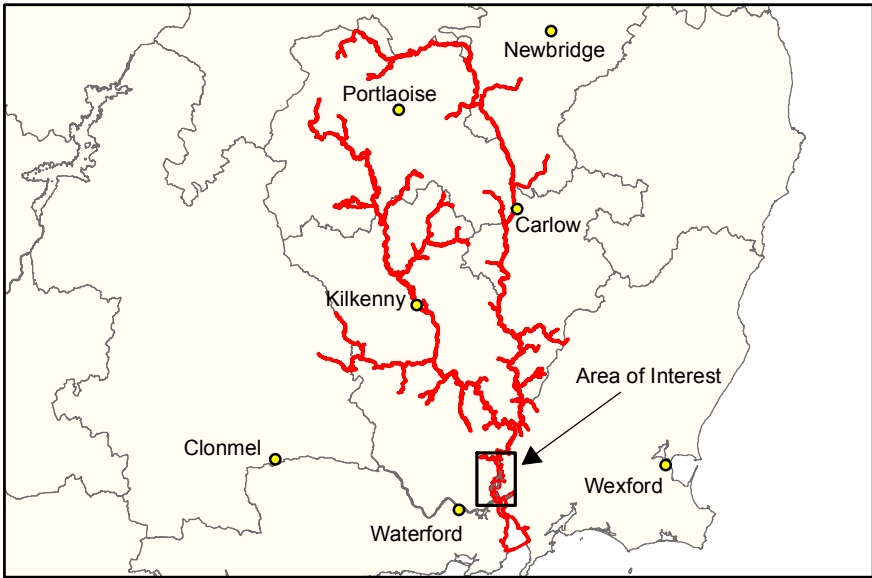
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**MAP 4a: RIVER BARROW AND RIVER NORE SAC  
CONSERVATION OBJECTIVES  
MARINE COMMUNITY TYPES**

0 1.5 3 km

**Map Version 2  
Date: March 2025**

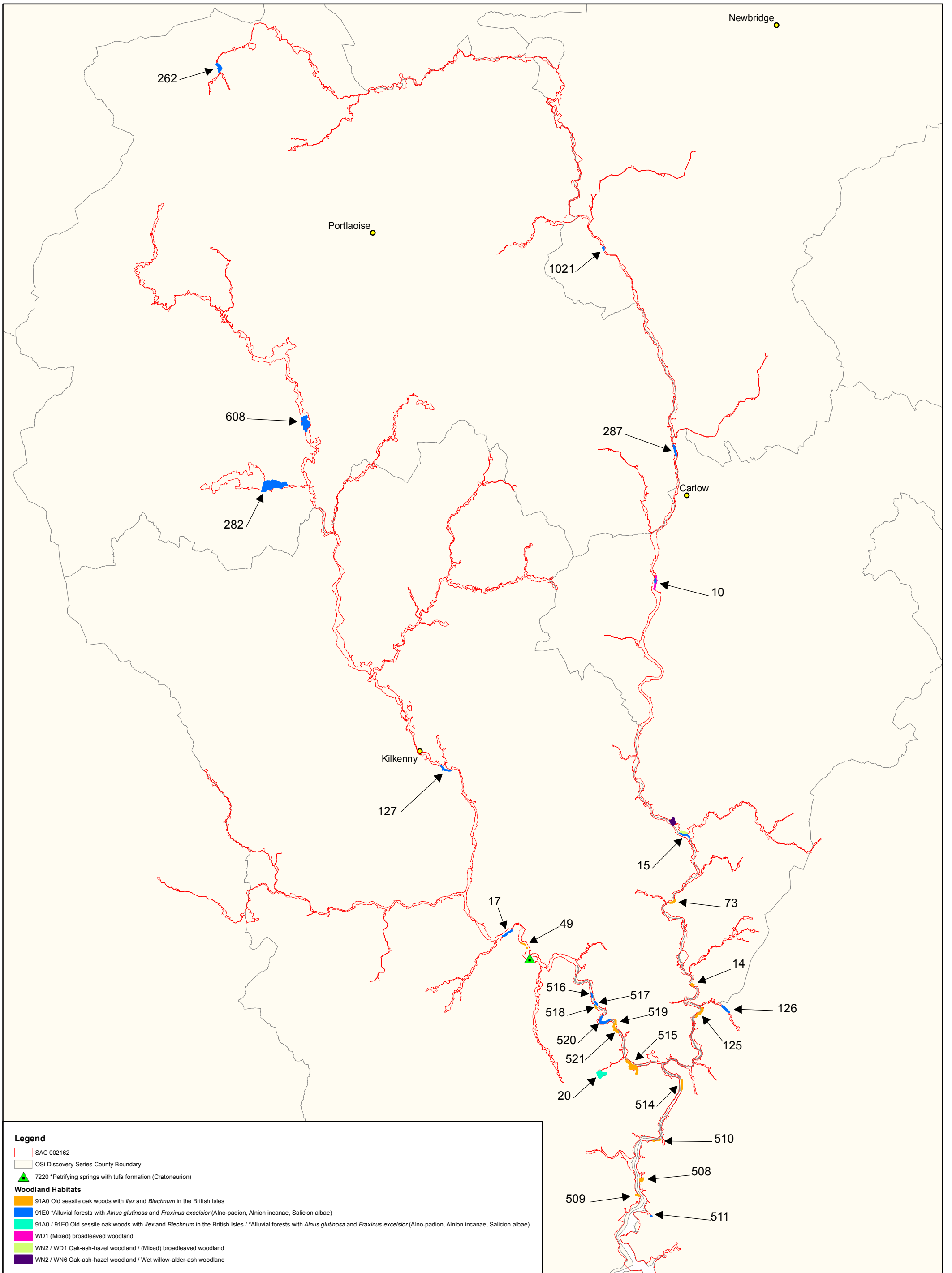


**Legend**

- 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)

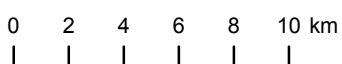
**Woodland Habitats**

- 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

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

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

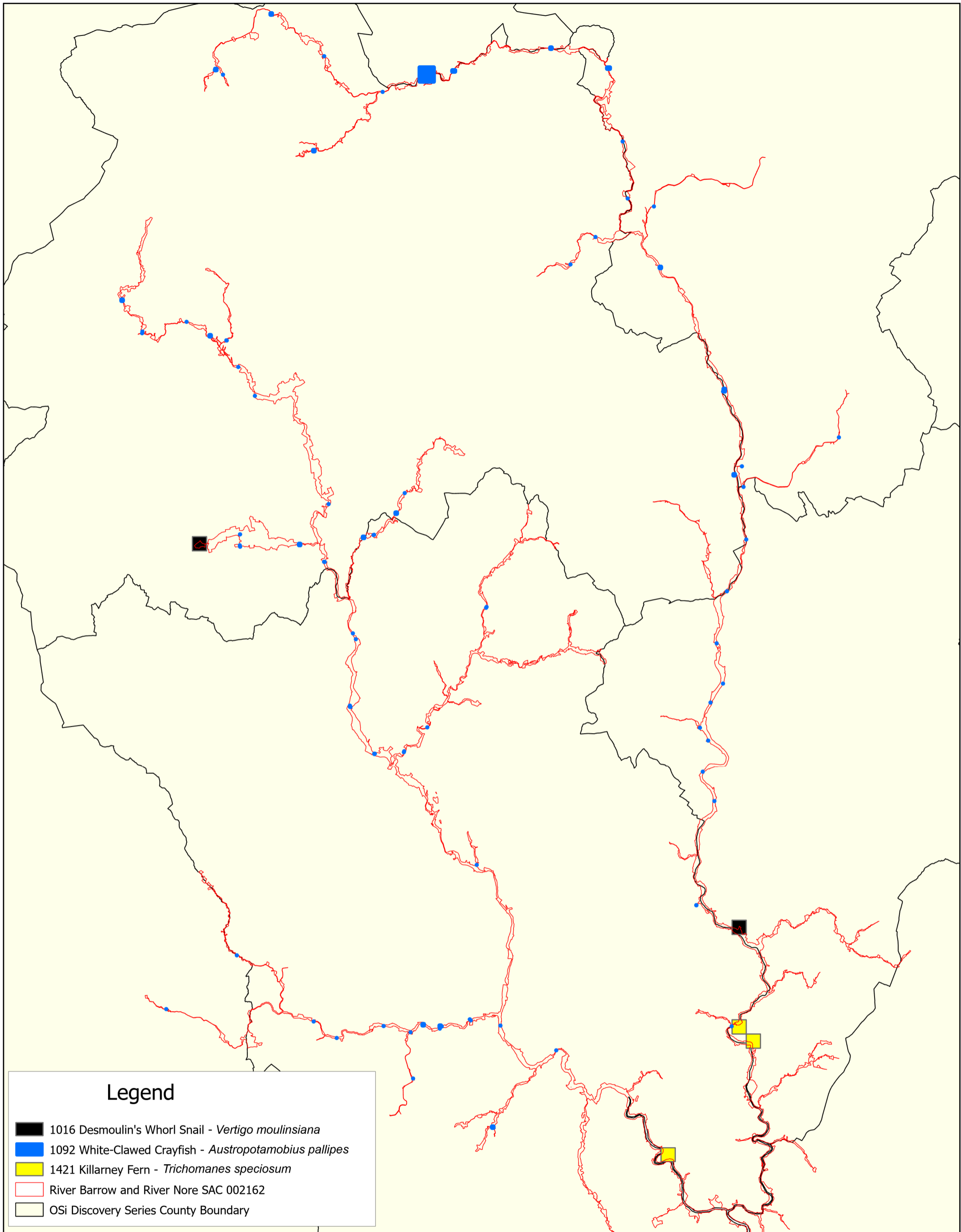
SITE CODE: SAC 002162  
CO. CARLOW; version 1.03, CO. KILDARE; version 1.04,  
CO. KILKENNY; version 1.1, CO. LAOIS; version 1.07,  
CO. OFFALY; version 1.01, CO. TIPPERARY; version 1.01,  
CO. WATERFORD; version 1.01, CO. WEXFORD; version 1.01



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**Map Version 1  
Date: April 2011**



### Legend

- 1016 Desmoulin's Whorl Snail - *Vertigo moulinsiana*
- 1092 White-Clawed Crayfish - *Austropotamobius pallipes*
- 1421 Killarney Fern - *Trichomanes speciosum*
- River Barrow and River Nore SAC 002162
- OSi Discovery Series County Boundary

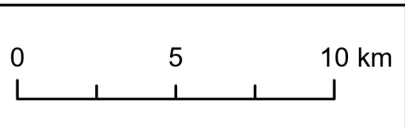


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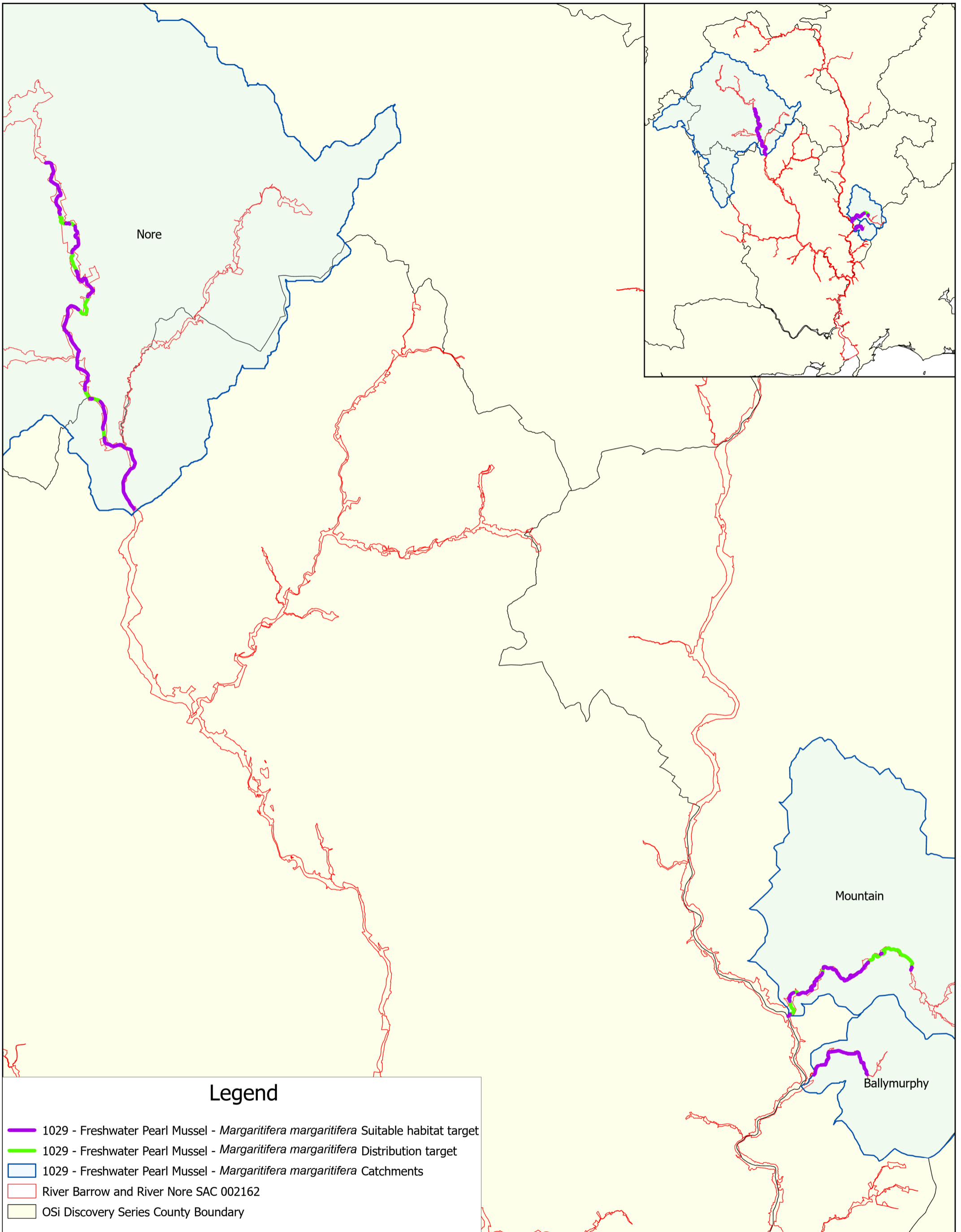


**MAP 7: RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES DESMOULIN'S WHORL SNAIL, WHITE-CLAWED CRAY FISH & KILLARNEY FERN**



**Map Version 2**  
**Date: May 2025**

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



**Legend**

- 1029 - Freshwater Pearl Mussel - *Margaritifera margaritifera* Suitable habitat target
- 1029 - Freshwater Pearl Mussel - *Margaritifera margaritifera* Distribution target
- 1029 - Freshwater Pearl Mussel - *Margaritifera margaritifera* Catchments
- River Barrow and River Nore SAC 002162
- OSi Discovery Series County Boundary

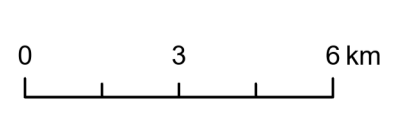


**SITE CODE: 002162**  
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**MAP 8: RIVER BARROW AND RIVER NORE SAC CONSERVATION OBJECTIVES FRESHWATER PEARL MUSSEL**



**Map Version 1**  
**Date: May 2025**

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

**APPENDIX 2**  
**Biodiversity Evaluation Scheme**  
**(amended after NRA 2009 and Nairn & Fossitt 2004)**

## Biodiversity Evaluation Scheme<sup>8</sup>.

<b>Biodiversity Evaluation Criteria</b>
<p><b>International Importance:</b></p> <ul style="list-style-type: none"><li>▪ 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.</li><li>▪ Proposed Special Protection Area (pSPA).</li><li>▪ Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).</li><li>▪ Features essential to maintaining the coherence of the Natura 2000 Network.</li><li>▪ Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.</li><li>▪ Resident or regularly occurring populations (assessed to be important at the national level*) of the following:<ul style="list-style-type: none"><li>- Species of bird listed in Annex I and/or referred to in Article 4(2) of the Birds Directive and/or;</li><li>- Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.</li></ul></li><li>▪ Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).</li><li>▪ World Heritage Site (Convention for the Protection of World Cultural &amp; Natural Heritage, 1972).</li><li>▪ Biosphere Reserve (UNESCO Man &amp; The Biosphere Programme).</li><li>▪ Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).</li><li>▪ Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).</li><li>▪ Biogenetic Reserve under the Council of Europe.</li><li>▪ European Diploma Site under the Council of Europe.</li><li>▪ Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).</li><li>▪ Major salmon river fisheries.</li></ul>
<p><b>National Importance:</b></p> <ul style="list-style-type: none"><li>▪ Site designated or proposed as a Natural Heritage Area (NHA).</li><li>▪ Statutory Nature Reserve.</li><li>▪ Refuge for Fauna and Flora protected under the Wildlife Acts.</li><li>▪ National Park.</li><li>▪ Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.</li><li>▪ Resident or regularly occurring populations (assessed to be important at the national level*) of the following:<ul style="list-style-type: none"><li>- Species protected under the Wildlife Acts; and/or</li><li>- Species listed on the relevant Red Data list.</li></ul></li><li>▪ Site containing 'viable areas'*** of the habitat types listed in Annex I of the Habitats Directive.</li><li>▪ Major trout river fisheries.</li><li>▪ Commercially important coarse fisheries.</li><li>▪ Waterbodies with major amenity fishery value.</li></ul>

<sup>8</sup> amended after NRA 2009 and Nairn & Fossitt 2004

<b>Biodiversity Evaluation Criteria</b>
<p><b>County Importance:</b></p> <ul style="list-style-type: none"> <li>▪ Area of Special Amenity<sup>^</sup>.</li> <li>▪ Area subject to a Tree Preservation Order<sup>^</sup>.</li> <li>▪ Area of High Amenity<sup>^</sup>, or equivalent, designated under the County Development Plan.</li> <li>▪ Resident or regularly occurring populations (assessed to be important at the County level*) of the following: <ul style="list-style-type: none"> <li>- Species of bird listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;</li> <li>- Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;</li> <li>- Species protected under the Wildlife Acts; and/or</li> <li>- Species listed on the relevant Red Data list.</li> </ul> </li> <li>▪ Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.</li> <li>▪ County important populations of species, or viable areas** of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plan (BAP) if this has been prepared.</li> <li>▪ Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.</li> <li>▪ Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.</li> <li>▪ Small waterbodies with known salmonid populations or with good potential salmonid habitat.</li> <li>▪ Large waterbodies with some coarse fisheries value.</li> </ul>
<p><b>Local Importance (higher value):</b></p> <ul style="list-style-type: none"> <li>▪ Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP if this has been prepared.</li> <li>▪ Resident or regularly occurring populations (assessed to be important at the Local level*) of the following: <ul style="list-style-type: none"> <li>- Species of bird listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;</li> <li>- Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;</li> <li>- Species protected under the Wildlife Acts; and/or</li> <li>- Species listed on the relevant Red Data list.</li> </ul> </li> <li>▪ Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality.</li> <li>▪ Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.</li> <li>▪ Small waterbodies with some coarse fisheries value or some potential salmonid habitat.</li> <li>▪ Waterbodies with unpolluted 'High' water quality status (Q4-5, Q5).</li> </ul>
<p><b>Local Importance (lower value):</b></p> <ul style="list-style-type: none"> <li>▪ Sites containing small areas of semi-natural habitat that are of some local importance for wildlife.</li> <li>▪ Sites or features containing non-native species that are of some importance in maintaining habitat links.</li> </ul>

**Biodiversity Evaluation Criteria**

- Waterbodies with no current fisheries value, no significant potential fisheries value, poor fisheries habitat.

\* A general suggestion is that 1% of the national population of such species qualifies as an internationally or nationally or county or locally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

\*\* A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

^ It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.