

Natura Impact Statement

Galway Bay South East

Natura Impact Statement

For

River Basin (29) Galway Bay South East Flood Risk Management Plan

Areas for Further Assessment included in the Plan:

<i>Baile Átha an Rí</i>	<i>Athenry</i>
<i>An Gort</i>	<i>Gort</i>
<i>Cinn Mhara</i>	<i>Kinvarra</i>
<i>Baile Locha Riach</i>	<i>Loughrea</i>
<i>Órán Mór</i>	<i>Oranmore</i>

Flood Risk Management Plans prepared by the Office of Public Works 2018

In accordance with

European Communities (Assessment and Management of Flood Risks) Regulations 2010 and 2015

Purpose of this Report

As part of the National Catchment-based Flood Risk Assessment & Management (CFRAM) programme, the Commissioners of Public Works have commissioned expert consultants to prepare Strategic Environmental Assessments, Appropriate Assessment Screening Reports and, where deemed necessary by the Commissioners of Public Works, Natura Impacts Assessments, associated with the national suite of Flood Risk Management Plans.

This is necessary to meet the requirements of both S.I. No. 435 of 2004 European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (as amended by S.I. No. 200/2011), and S.I. No. 477/2011 European Communities (Birds and Natural Habitats) Regulations 2011.

Expert Consultants have prepared these Reports on behalf of the Commissioners of Public Works to inform the Commissioners' determination as to whether the Plans are likely to have significant effects on the environment and whether an Appropriate Assessment of a plan or project is required and, if required, whether or not the plans shall adversely affect the integrity of any European site.

The Report contained in this document is specific to the Flood Risk Management Plan as indicated on the front cover.

Copyright

Copyright - Office of Public Works. All rights reserved. No part of this report may be copied or reproduced by any means without prior written permission from the Office of Public Works.

Maps in the Statement include Ordnance Survey of Ireland (OSI) data reproduced under licence.

Acknowledgements

The Office of Public Works (OPW) gratefully acknowledges the assistance, input and provision of data by a large number of organisations towards the implementation of the National CFRAM Programme. In particular, the OPW acknowledges the assistance of JBA Consulting Engineers and the valuable input and support of the Local Authorities at project level in each of the study areas.

The OPW also acknowledges the participation of members of the public, representative organisations and other groups throughout each stage of consultation.

Flood Risk Management Plan

The various documents and maps that make up the Plan are as follows:

- Flood Risk Management Plan (Volume I)
- **SEA Environmental Report and the Natural Impact Statement (Volume II)**
 - SEA Environmental Report including Non-Technical Summary (Volume IIa)
 - **Natura Impact Statement (Volume IIa – Appendix B) – this report**
 - Addendum to the Environmental Report (Volume IIb)
 - SEA Statement (Volume IIc)

Galway Bay South East Catchment Flood Risk Management Plan, Galway Bay South East River Basin Natura Impact Statement

Revision History

Revision Ref / Date Issued	Amendments	Issued to
Draft / June 2016		Office of Public Works
Draft Final / August 2016	Amendments following OPW comments	Office of Public Works
Version 4.0 / 28 July 2017	Final Report for DEPR Adoption	John Martin, Paul Stewart, OPW
Version 6.0 / 01 December 2017	Revisions in response to further comments from DEPR review.	John Martin, Paul Stewart, OPW
V7.0 / 14 December 2017	Minor updates	John Martin, Paul Stewart, OPW
V8.0/ 30 January 2018	NIS Updates	Paul Stewart, OPW

Contract

This report describes work commissioned by The Office of Public Works (OPW), by a letter dated (28/07/11). The Office of Public Works' representative for the contract was Michael Duffy. Tanya Slattery, Niamh Sweeney and Anne Murray of JBA Consulting carried out this work.

Prepared by Tanya Slattery BSc MSc MRes

Ecologist

Niamh Sweeney BSc MSc

Senior Ecologist

Reviewed by Anne Murray BSc MCIEEM

Senior Ecologist

Niamh Sweeney BSc MSc

Senior Ecologist

B.1 Introduction

JBA Consulting has been appointed by the Office of Public Works to carry out an assessment of the Catchment Flood Risk Assessment and Management (CFRAM) Plan (the Plan) measures proposed for the Galway Bay South East Unit of Management (UoM) or River Basin.

The Galway Bay South East Unit of Management River Basin lies within County Galway and a number of Natura 2000 sites, designated under the EU Birds Directive (2009/147/EC) and Habitats Directive (92/43/EEC), are located within the zone of influence of the proposed Plan. Therefore, the plan needs to go through the appropriate assessment (AA) process at a plan level in accordance with Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora).

B.1.1 Legislative Context

The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) aims to maintain or restore the favourable conservation status of habitats and species of community interest across Europe.

The requirements of Articles 6(3) and 6(4) of the Habitats Directive have been transposed into Irish legislation by means of the Habitats Regulations, 1997 (S.I. No. 94 of 1997) and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 / 2011).

Under the Directive a network of sites of nature conservation importance have been identified by each Member State as containing specified habitats or species requiring to be maintained or returned to favourable conservation status. In Ireland, the network consists of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), and also candidate sites, which form the Natura 2000 network.

Article 6(3) of the Habitats Directive requires that, in relation to European designated sites (i.e. SACs and SPAs that form the Natura 2000 network), *"any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to **appropriate assessment** of its implications for the site in view of the site's conservation objectives"*.

A competent authority (e.g. Local Authority) can only agree to a plan or project after having determined that it will not adversely affect the integrity of the site concerned.

Under article 6(4) of the Directive, if adverse impacts are likely, and in the absence of alternative options, a plan or project must nevertheless proceed for imperative reasons of overriding public interest (IROPI), including social or economic reasons, a Member State is required to take all compensatory measures necessary to ensure the overall integrity of the Natura 2000 site. The European Commission have to be informed of any compensatory measures adopted, unless a priority habitat type or species is present and in which case an opinion from the European Commission is required beforehand (unless for human health or public safety reasons, or of benefit to the environment).

The Planning and Development Act 2000, and amendments, consolidates all planning legislation from 1963 to 1999 and is the basis for the Irish planning code, setting out the detail of regional planning guidelines, development plans and local area plans as well as the basic framework of the development management and consent system. The Act sets out the requirement of a Natura Impact Report for a land use plan, to meet the requirements of article 6(3) of the Habitats Directive, the consideration of in-combination effects and classify any implications in view of the conservation objectives of Natura 2000 sites.

B.1.2 Appropriate Assessment Process

Guidance on the Appropriate Assessment (AA) process was produced by the European Commission in 2002, which was subsequently developed into guidance specifically for Ireland by

the Department of Environment, Heritage and Local Government (DEHLG) (2009). These guidance documents identify a staged approach to conducting an AA, as shown Figure B-1.

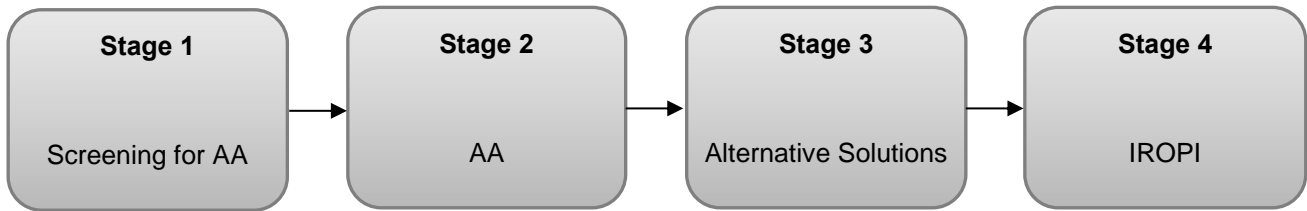


Figure B-1: The Appropriate Assessment Process (from: Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities, DEHLG, 2009)

Stage 1 - Screening for AA

The initial, screening stage of the Appropriate Assessment is to determine:

- a. whether the proposed plan or project is directly connected with or necessary for the management of the European designated site for nature conservation
- b. if it is likely to have a significant adverse effect on the European designated site, either individually or in combination with other plans or projects

For those sites where potential adverse impacts are identified, either alone or in combination with other plans or projects, further assessment is necessary to determine if the proposals will have an adverse impact on the integrity of a European designated site, in view of the sites conservation objectives (i.e. the process proceeds to Stage 2).

The key to determining if Stage 2 AA of a plan is required, should be based on an assessment of whether the plan and its policies and objectives are likely to have a significant affect on a Natura 2000 site. The decision will be influenced by the nature and extent of the development likely to be proposed in the plan, and the plan area's in situ, ex situ and in combination relationship to adjoining Natura 2000 sites and the wider Natura 2000 network.

Stage 2 - AA

This stage requires a more in-depth evaluation of the plan or project, and the potential direct and indirect impacts of them on the integrity and interest features of the European designated site(s), alone and in-combination with other plans and projects, taking into account the site's structure, function and conservation objectives. Where required, mitigation or avoidance measures will be suggested.

The competent authority can only agree to the plan or project after having ascertained that it will not adversely affect the integrity of the site(s) concerned. If this cannot be determined, and where mitigation cannot be achieved, then alternative solutions will need to be considered (i.e. the process proceeds to Stage 3).

Stage 3 - Alternative Solutions

Where adverse impacts on the integrity of Natura 2000 sites are identified, and mitigation cannot be satisfactorily implemented, alternative ways of achieving the objectives of the plan or project that avoid adverse impacts need to be considered. If none can be found, the process proceeds to Stage 4.

Stage 4 - IROPI

Where adverse impacts of a plan or project on the integrity of Natura 2000 sites are identified and no alternative solutions exist, the plan will only be allowed to progress if imperative reasons of

overriding public interest (IROPI) can be demonstrated. In this case compensatory measures will be required.

The process only proceeds through each of the four stages for certain plans or projects. For example, for a plan or project, not connected with management of a site, but where no likely significant impacts are identified, the process stops at stage 1. Throughout the process, the precautionary principle must be applied, so that any uncertainties do not result in adverse impacts on a site.

B.1.3 Methodology

This Natura Impact Report has been prepared with regard to the following documents:

- DoEHLG (2009 rev 2010) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government.
- European Communities (EC) (2000) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission.
- EC (2002) 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, Office for Official Publications of the European Communities, Luxembourg. European Commission.
- EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. European Commission.
- EC (2007) Interpretation Manual of European Union Habitats. Version EUR 27. European Commission.
- National Parks and Wildlife Service (NPWS) (2008).The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- NPWS (2014).The Status of EU Protected Habitats and Species in Ireland. Habitats Assessment Volume 2. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- NPWS (2014).The Status of EU Protected Habitats and Species in Ireland. Species Assessment Volume 3. Habitats Assessment Volume 2. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

B.2 Galway Bay South East CFRAM Plan

Unit of Management (UoM) 29, also referred to as Galway Bay South East or the River Basin, is predominantly within County Galway but also incorporates small areas of County Clare. River Basin 29 covers an area of 1,270 km² of the Western River Basin District (RBD). The main settlements in this River Basin are Athenry, Gort, Kinvarra, Loughrea and Oranmore.

B.2.1 Objectives of the Western CFRAM Programme

The Galway Bay South East CFRAM Plan forms part of the Western CFRAM Programme. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.

The objectives of Western CFRAM programme are outlined below;

- Produce detailed flood mapping in order to identify and map the existing and potential future flood hazard and risk areas within the Western RBD.
- Build the strategic information base necessary for making informed decisions in relation to managing flood risk.
- Identify viable structural and non-structural measures and options for managing the flood risks for localised high-risk areas and within the catchment as a whole.
- Prepare a Flood Risk Management Plans for each Unit of Management (UoM) or River Basin within the Western RBD that sets out the measures and policies, including guidance on appropriate future development, that should be pursued by the local authorities, the OPW and other stakeholders to achieve the most cost effective and sustainable management of flood risk within the study area taking account of the effects of climate change and complying with the requirements of the Water Framework Directive (WFD).
- Prepare a Strategic Environmental Assessment (SEA) and an Appropriate Assessment (AA) for the FRMP for the Unit of Management.
- Implement the requirements of EU Directive 2007/60/EC on the assessment and management of flood risks.

B.2.2 Management measures

The development of management measures was achieved by assessing the applicability of measures across four different Spatial Scales of Assessment (SSA):

- The Unit of Management or River Basin;
- Each Sub-Catchment of Coastal Area within the River Basin;
- Areas for Further Assessment (AFA) Level;
- Flood Cell Level, where appropriate.

A 'measure' describes one approach to reduce flood risk in a single location, for example a flood wall along a river or channel excavation for a certain reach. An 'option' describes the full suite of measures required to manage flood risk in a specified AFA or flood cell, for example channel excavation in conjunction with a flood wall.

The NIS considers impacts posed by measures on all scales. Further details on the assessment of measures at all SSAs is discussed in the Preliminary Options Report for River Basin 29.

Unit of Management Level

At this scale measures that could provide benefits to multiple AFAs within the River Basin and other areas were considered, along with the spatial and temporal coherence of measures being considered at smaller spatial scales. FRM measures applicable at this spatial scale included:

- Planning Policy Requirements
- Flood Forecasting and Warning Systems
- Sustainable Urban Drainage systems (SUDs)
- Land Use Management, where applicable
- Measures implemented under other legislation
- Requirements for additional monitoring (rain and river level / flow gauges)
- Provision of maintenance

Sub-Catchment Level

The sub-catchment SSA refers to the catchment of the principal river on which an AFA sits, and as such alternative AFAs upstream or downstream which may benefit from a catchment level solution. Methods that could provide benefits to multiple AFAs include upstream storage or flood forecasting systems. Methods proposed for an individual AFA also need to consider the positive and negative impacts at a catchment level.

AFA Level

At this scale, methods benefitting only the particular AFA in question were considered, even if the implementation of a given measure includes works or activities outside of the AFA, i.e., elsewhere in the sub-catchment or UoM. Examples of where this might apply would be storage options upstream of the AFA, or flood forecasting and warning systems, that provide no benefits to other AFAs, as well as all other FRM measures and options, such as protection measures, conveyance improvement, etc.

Flood Cell Level

Within an AFA there may be discreet areas of flood risk, called 'Flood Cells' that are hydraulically independent from other areas at risk within the AFA. The viability of measures will be assessed at a flood cell only if an AFA wide solution is not viable.

B.2.3 Alternatives to the Plan

The development of the draft FRMP for River Basin 29 included the consideration of a range of flood management measures at different spatial scales within River Basin 29. The potential measure provides alternatives to the measures presented in the draft FRMP. The process of choosing the preferred measures went through a number of steps starting off with the Preliminary Options Report. This report assessed the technical, social, economic and environmental impacts of a range of measures. Alternatives we considered at the spatial scales and different measures were considered at the AFA stage.

The 'Do Nothing' alternative, whereby the status quo remains and no Flood Risk Management Plan for River Basin 29 would be adapted, has been assessed.

Certain controls would remain in place for example the Guidelines on the Planning System and Flood Risk Management and preparation of Local Adaptation Plans. A number of the current Local Area Plans and the Galway County Development has objectives dealing with spatial planning in flood risk areas, adaptation to climate change etc. The Department of the Environment's requirements for Local Authorities to prepare climate change adaptation plans would, at a minimum, ensure that future flood levels would be considered in future planning. The impacts of the 'do nothing' alternative would be neutral for all of the environmental objectives but would have

a long term negative impact on humans and local economy particularly in the AFAs liable to flooding.

There are no other viable alternatives to the FRMP. Section 12 of the SEA describes in technical detail, the alternatives considered at the spatial scale and the types of measures considered.

B.2.4 Potential impacts of the Plan

As outlined in the EC guidance on the assessment of plans and projects affecting Natura 2000 sites (EC, 2002), impacts that could potentially occur through the implementation of the proposed Plan are as follows;

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

B.2.5 Flood risk management methods (FRMP) in River Basin 29

Following a comprehensive multi-criterion option assessment process, preferred flood risk management options were recommended in the CFRAM Plan for each River Basin and AFA. The AFAs of flood risk in River Basin 29 were Athenry, Gort, Kinvarra, Loughrea and Oranmore. Athenry and Loughrea were screened out due to no properties being at risk in the 1% AEP fluvial event and therefore were not carried forward to the screening stage. Gort, Kinvarra and Oranmore were assessed for viable structural flood risk management methods.

The management options were assessed against the following criteria; technical, economic, environmental, social and cultural, health and safety, and adaptability for the future. The options were considered further in the SEA of the Flood Risk Management Plan for River Basin 29. A number of viable structural flood risk management methods were proposed for River Basin 29, which are detailed in Table B-14-2. None of the recommended methods were found to be economically viable with respect to current levels of flood risk. There are no potentially viable flood relief works for Gort, Kinvara, Oranmore, Athenry or Loughrea and no further analysis was undertaken.

Measures that may be applied under the Plan and require further assessment fall under one of three categories:

1. Measures that are applicable to all areas within the River Basin under prevention, protection and preparedness;
2. Catchment or sub-catchment measures that may cover more than one AFA (an Area for Further Assessment);
3. AFA scale measures (typically a town) that may be required to be assessed in further detail at a project level.

Measures that are applicable to all areas are assessed for potential significant impacts to Natura 2000 sites in Table B-14-1. Structural flood risk management methods that have been proposed and assessed for viability in River Basin 31 are in Table B-14-2.

The AFAs within the Galway Bay South East River Basin are hydraulically independent and as such there are no catchment or sub-catchment structural measures that will provide benefit to multiple AFAs.

Table B-14-1 Assessment of significance of impact of measures to be applied within the River Basin

Methods	Significance of impact	Reasoning
Prevention: Sustainable Planning and Development Management	Potential significant impact	Application of guidelines that support sustainable development will promote positive impacts during operation but may cause negative impacts during implementation at a project level.
Prevention: Sustainable Drainage Systems (SUDS)	Potential significant impact -	SUDS when implemented should improve water quality resulting in a positive impact. However, the implementation of SUDS could have adverse ecological effects on waterbodies, their structure and function, and on sensitive species that they support. Individual projects that seek to implement SUDS must be assessed individually for Appropriate Assessment.
Protection: Voluntary Home Relocation Scheme	Potential significant impact -	Homes that are abandoned due to flooding will require decommissioning. This, in conjunction with selection of areas for relocation, may cause significant impact to Natura 2000 sites and will require Appropriate Assessment at a project level.
Prevention: Local Adaption Planning	Potential significant impact	Local Authorities considering potential impacts of climate change on flooding and flood risk in local adaption planning, in particular in the area of planning and designing infrastructure. Individual plans may require separate Appropriate Assessment.
Prevention: Land Use Management and Natural Flood Risk Management Methods	Potential significant impact	The WFD and Habitats Directive have many common goals and links. Measures that are implemented that may promote positive impacts to biodiversity and towards achieving Good water status for waterbodies, may have a significant positive impact upon Natura 2000 sites. However, proposals for implementation will require assessment to determine their suitability and appropriateness regarding the conservation objectives of the relevant Natura 2000 sites.
Protection: Minor Works Scheme	Potential significant impact	Using precautionary principle, minor works schemes will likely involve physical works and therefore has the potential to cause a significant impact on Natura 2000 sites. Projects under the Minor Works Scheme will require Appropriate Assessment.
Protection: Maintenance of Arterial Drainage Schemes	Potential significant impact	There is one Arterial Drainage Scheme within Galway Bay South East River Basin at Gort.

Methods	Significance of impact	Reasoning
		Arterial Drainage Schemes within waterbodies have the potential to physically alter the structure and function of waterbodies and directly and indirectly impact upon water dependent species. The above Arterial Drainage Scheme has been subjected to and continues to be subjected to Appropriate Assessment at a project level.
Protection: Maintenance of Drainage Districts	Potential significant impact	Drainage Districts at Lavally, Dunkellin, Annagh, Kilchreest and Oranhill can involve clearance, alteration and protection works that may impact upon protected habitats and species and so, will require Appropriate Assessment at a project level.
Maintenance of Channels Not Part of a Scheme	Potential significant impact	Outside of the Arterial Drainage and Drainage District Schemes, landowners who have watercourses on their lands have a responsibility for their maintenance. Unregulated drainage maintenance could cause significant negative impacts to Natura 2000 sites and so, requires Appropriate Assessment.
Preparedness: Flood Forecasting	None anticipated	This service will involve the issuing of flood forecasts and general alerts at both national and catchment scales. It will not result in physical actions and therefore is not likely to cause significant impacts to Natura 2000 sites.
Preparedness: Review of Emergency Response Plans for Severe Weather	Potential significant impact	Review of plans are not likely to cause significant impacts on Natura 2000 sites, however, plans or actions that may occur as a result of this review, including Major Emergency Management Plans, may require assessment at a plan or project level.
Preparedness: Promotion of Individual and Community Resilience	Potential significant impact	Promotion of resilience to include the requirement for environmental assessment. Promotion of resilience unlikely to cause significant impacts, however, preparatory actions that may arise as a result of preparedness may require assessment at a project level.
Preparedness: Individual Property Protection	Potential significant impact	Actions that may arise in the protection of individual property from flooding may cause significant impact to Natura 2000 sites and requires assessment at a project level.
Preparedness: Flood-Related Data Collection	Potential significant impact	Collection of data not likely to cause significant impact as hydrometric data collection network already in place across the country in general, however, the scarcity of sub-daily rainfall gauges in the west of Ireland

Methods	Significance of impact	Reasoning
		will require improvements and installation of new gauges. Plans or projects involved in these processes will require further assessment.
Flood forecasting and warning systems	Potential significant impact	Previously installed gauges that have no disruption to flow and are installed sensitively to avoid damage and disruption to habitats and species, will not require further assessment. Installation of new gauges or flood forecasting systems could have a significant impact to Natura 2000 sites and require further assessment at a project level.

Table B-14-2 Summary of proposed structural flood risk management methods in River Basin 29

AFA Name	Options for screening	Conclusion
Gort	Widening Gort River. This option will widen Gort River on the left bank, extending upstream to join the Kinincha River left bank floodplain.	Not economically viable - no further assessment required.
	Dredging Gort River. This option will excavate bed rock from the Gort River where the bed currently rises.	Not economically viable- no further assessment required
	Walls and embankments to Crowe Street and WWTP. This option will construct embankments and walls around the outskirts of the floodplain for both the Crowe Street and WWTP flood cells.	Not economically viable- no further assessment required
	Walls and embankments to Crowe Street only. This option will construct embankments and walls around the outskirts of the floodplain for the Crowe Street flood cells only.	Not economically viable- no further assessment required
	Rehabilitation of existing wall, construction of new walls in quay area, demountables for pier access and road realignment. This option would rehabilitate the existing walls to the north and provide 220m of new walls along the marina.	Not economically viable- no further assessment required
Oranmore	Construction of flood containment methods. This option would include construction of wall in front of Botharsnup property and embankments to protect main street properties and Renville house property	Not economically viable- no further assessment required

B.3 Stage 1 - Screening for Appropriate Assessment

B.3.1 Introduction

Assessment of the potential impacts of the measures within the Plan as described, are required under regulation 42 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011).

This section aims to identify whether the measures are likely to have a significant impact, either alone, or in-combination with other projects and plans, on the Natura 2000 sites within the zone of influence.

The 'screening' process addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3) of the Habitats Directive:

- Is the plan or programme directly connected to or necessary for the management of the site; and
- Will the plan or programme, alone or in-combination with other plans and projects, have a significant effect on a Natura 2000 site in view of its conservation objectives.

If the effects are deemed to be significant, potentially significant or uncertain, then the plan or programme that is under assessment is subject to a Stage 2 Appropriate Assessment, reported in the form of a Natura Impact Statement.

The measures of the Plan are not directly connected to the management of any Natura 2000 sites, however, they could have potential to cause significant effects on Natura 2000 sites.

The screening assessment will determine the likelihood of potential impacts on Natura 2000 sites caused by the proposed measures.

B.3.2 Screening Methodology

In accordance with DEHLG guidance, the key to determining if an Appropriate Assessment is required for a Plan, is in the assessment of whether the plan and its policies and objectives are likely to have a significant effect on a Natura 2000 site.

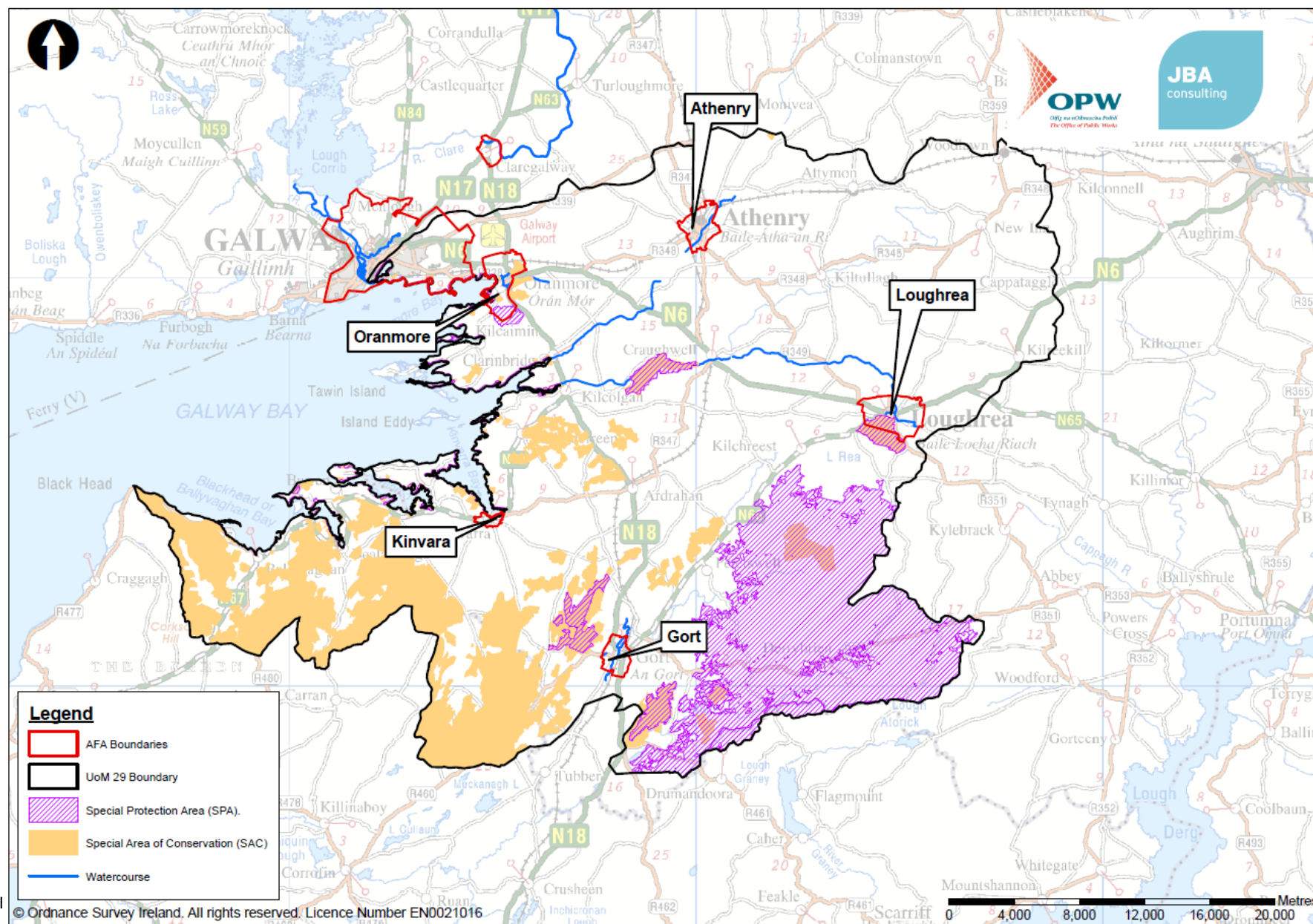
For this process, the screening of this plan has been broken down into 4 steps.

1. Description of the programme (Section B.2);
2. Screening of Natura 2000 sites within the various zones of influence of the plan dependant on the presence of potential pathways and nature of the qualifying interests (Table B-14-3).
3. Assessing the measures to identify potential impacts. Determining the significance of these potential impacts and the requirement for follow up assessments. This is presented in Table B-14-1.
4. Screening Statement with conclusions. This is presented in Section B.6.

B.4 Study Area

The following section describes the screening methods used at various scales to ensure inclusion of all Natura 2000 sites that may be potentially impacted by all objectives and measures of the Plan. Figure 14-1 displays the Natura 2000 sites within UoM 29, however, it is not inclusive of all potential Natura 2000 sites that have been screened in as potentially being impacted by the plan. Natura 2000 sites outside of the boundary of UoM 29 will also be considered in line with the screening methodology at the relevant scales. Figure 3-1

Figure 14-1.Natura 2000 sites within UoM 29



B.4.1 Identification of Relevant Natura 2000 Sites

The relevant Natura 2000 sites were identified dependant on several factors. This included those within the River Basin, those within 15km and those connected hydrologically either through groundwater or surface water pathways as defined by the WFD and EPA. Natura 2000 sites containing Freshwater Pearl Mussel (FWPM) *Margaritifera margaritifera* or *Margaritifera durrovensis* within 35km were included as were Natura 2000 sites that contained Groundwater Dependant Terrestrial Ecosystems that were hydrologically connected. Consultation was carried out with EPA staff in relation to the method for screenings of GWDTEs.

Data for this process was obtained from the WFD and NPWS website and JBA derived data, then visualised and assessed using ArcGIS and Microsoft Excel. Further details of the relevant Natura 2000 sites within the likely zones of impact of the Plan are presented in tables in Section B.5.

The potential zones of impact of consideration for potential impacts on Natura 2000 sites are discussed here:

River Basin or UoM scale

Natura 2000 sites that are within the River Basin, and therefore within the area of the Plan, are at risk of direct and indirect impacts as a result of the objectives and measures of the Plan.

15km Scale

A buffer area of 15km was used for selection of Natura 2000 sites, based on DEHLG Guidance (DEHLG, 2010), which is the distance considered appropriate for Plans. This 15km buffer also addresses the potential land and air pathways, as the distances defined in Ryan Hanley, 2014b for land and air pathways, are well accommodated within 15km. This distance was evaluated on a case by case basis, dependent on the nature of the Qualifying Interests present. The method used in this current assessment is a slight variation on the method of Ryan Hanley (2014b), as it uses more up to date information regarding potential pathways present in a catchment. The Ryan Hanley method, if it were used, would remove Natura 2000 sites with no surface water connectivity to a River Basin, but which are situated within the catchment of a River Basin and this may result in the exclusion of a Natura 2000 sites that may be potentially impacted by land and air pathways. Therefore, the use of the River Basin and 15km buffer will, by default, include Natura 2000 sites potentially impacted by land and air pathways.

Hydrologically connected

Hydrological connections between the River Basin and Natura 2000 sites were identified through the use of WFD defined active aquifers and EPA defined river network. These connections can increase or reduce the number of Natura 2000 sites at risk from potential impacts as a result of the objectives and measures of the Plan.

Groundwater pathways with the potential to transport impact to Groundwater Dependent Terrestrial Ecosystem (GWDTE) of Natura 2000 sites, are defined by the use of active groundwater bodies shapefiles from the EPA Envision Maps, 2017. This method is based upon the WFD risk assessments and WFD GWDTE maps. According to the WFD assessment guidance, the impact of pollutants or nutrients within the zone of influence varies according to a number of factors including aquifer vulnerability. As current catchment areas for GWDTEs is still undergoing determinations (Matthew Smith EPA, personal communication. 22nd November, 2016), a precautionary approach to the cumulative impacts of schemes and potential works, was taken for this assessment.

Freshwater Pearl Mussel (FWPM) and Groundwater Dependant Terrestrial Ecosystems (GWDTE)

In order to take into account freshwater pearl mussel (*Margaritifera margaritifera* and/or *Margaritifera durrovensis*) populations, all Natura 2000 sites within 35km of the River Basin (adapted from Ryan Hanley 2014) were selected to include for Natura 2000 sites containing freshwater pearl mussel populations. In relation to freshwater pearl mussel, Natura 2000 sites that have FWPM as a qualifying interest were assessed and then on a case by case basis, the location of possible FWPM populations were examined.

Natura 2000 sites located outside of the River Basin's surface water and groundwater catchments were screened out on the basis that there would be no impact on Natura 2000 sites outside of the catchment. Those sites within River Basin then proceeded to a more detailed review by an ecologist in JBA Ireland and were either screened in or out on the basis of the following criteria:

- Distance from the River Basin at various levels based upon an adapted methodology from Ryan Hanley (2014b) including the WFD surface, 15km buffer and groundwater catchments and the 35km downstream buffer for FWPM;
- Hydrological connectivity to River Basin;
- Qualifying interests and special conservation interests for which the site was selected and their sensitivities e.g. GWDTEs; and
- The conservation objectives for those sites.

B.5 Findings of the Screening Process

Thirty-eight Natura 2000 sites were screened for potential impacts as they were determined to be within at least one of the previously described zones (Table B-14-3). Thirty-two of these sites are within River Basin 29. These 32 sites will be required to be assessed further for potential impacts.

Of the six Natura 2000 sites located outside of the River Basin, all six are within 15 km. Connemara Bog Complex SAC, Ross Lake and Woods SAC, Lower River Shannon SAC and Connemara Bog Complex SPA are not hydrologically connected so can be excluded from further assessment. Lough Corrib is connected to the River Basin through the Clare River and groundwater connectivity, so both the SAC and SPA are included in the final assessment of sites for consideration.

In total, 34 sites may be impacted by measures implemented within the River Basin and so may require further assessment depending on the nature of the potential impacts, as determined in Table B-14-1 and Table B-14-2. These Natura 2000 sites are presented in Table B-14-4.

Table B-14-3 Natura 2000 sites screened and screening criteria

Site code	Natura 2000 sites	Within UoM	Distance (km)	Groundwater connected	Surface water connected	GWDTE	FWPM
IE0002244	Ardrahan Grassland	X		X	X		
IE0002295	Ballinduff Turlough	X		X	X	X	
IE0000996	Ballyvaughan Turlough	X		X	X	X	
IE0000020	Black Head-Poulsallagh Complex	X		X	X	X	
IE0000238	Caherglassaun Turlough	X		X	X	X	
IE0002294	Cahermore Turlough	X		X	X	X	
IE0002293	Carrowbaun, Newhall And	X		X	X	X	

Site code	Natura 2000 sites	Within UoM	Distance (km)	Groundwater connected	Surface water connected	GWDTE	FWPM
	Ballylee Turloughs						
IE0000242	Castletaylor Complex	X		X	X	X	
IE0002034	Connemara Bog Complex		12			X	
IE0000252	Coole-Garryland Complex	X		X	X	X	
IE0002181	Drummin Wood	X		X	X		
IE0001926	East Burren Complex	X		X	X	X	
IE0000268	Galway Bay Complex	X		X	X	X	
IE0002180	Gortacarnaun Wood	X		X	X		
IE0000286	Kiltartan Cave (Coole)	X		X	X		
IE0001285	Kiltiernan Turlough	X		X	X	X	
IE0000297	Lough Corrib			X	X	X	X
IE0002117	Lough Coy	X		X	X	X	
IE0000299	Lough Cutra	X		X	X		
IE0000606	Lough Fingall Complex	X		X	X	X	
IE0000304	Lough Rea	X		X	X		
IE0000054	Moneen Mountain	X		X	X	X	
IE0002352	Monivea Bog	X		X	X	X	
IE0000318	Peterswell Turlough	X		X	X	X	
IE0000322	Rahasane Turlough	X		X	X	X	
IE0001312	Ross Lake And Woods		14				
IE0001913	Sonnagh Bog	X		X	X	X	
IE0001321	Termon Lough	X		X	X	X	
IE0002165	Lower River Shannon SAC		15			X	X
IE0004181	Connemara Bog Complex SPA		14			X	
IE0004107	Coole-Garryland SPA	X		X	X	X	
IE0004142	Cregganna Marsh SPA	X		X	X	X	
IE0004031	Inner Galway Bay SPA	X		X	X	X	
IE0004042	Lough Corrib SPA		3			X	
IE0004056	Lough Cutra SPA	X		X	X	X	
IE0004134	Lough Rea SPA	X		X	X	X	
IE0004089	Rahasane Turlough SPA	X		X	X	X	

Site code	Natura 2000 sites	Within UoM	Distance (km)	Groundwater connected	Surface water connected	GWDTE	FWPM
IE0004168	Slieve Aughty Mountains SPA	X		X	X	X	

Table B-14-4 Table of Natura 2000 sites requiring further assessment for potential

Site code	Site name	Appropriate Assessment required	Reasoning
IE0002244	Ardrahan Grassland	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0002295	Ballinduff Turlough	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0000996	Ballyvaughan Turlough	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0000020	Black Head-Poulsallagh Complex	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0000238	Caherglassaun Turlough	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0002294	Cahermore Turlough	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts

IE0002293	Carrowbaun, Newhall And Ballylee Turloughs	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0000242	Castletaylor Complex	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0000252	Coole-Garryland Complex	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0004107	Coole-Garryland SPA	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0004142	Cregganna Marsh SPA	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0002181	Drummin Wood	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0001926	East Burren Complex	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0000268	Galway Bay Complex	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0002180	Gortacarnaun Wood	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts

IE0004031	Inner Galway Bay SPA	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0000286	Kiltartan Cave (Coole)	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0001285	Kiltiernan Turlough	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0000297	Lough Corrib	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0004042	Lough Corrib SPA	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0002117	Lough Coy	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0000299	Lough Cutra	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0004056	Lough Cutra SPA	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0000606	Lough Fingall Complex	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts

IE0000304	Lough Rea	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0004134	Lough Rea SPA	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant adverse impacts
IE0000054	Moneen Mountain	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts
IE0002352	Monivea Bog	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts
IE0000318	Peterswell Turlough	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts
IE0000322	Rahasane Turlough	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts
IE0004089	Rahasane Turlough SPA	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts
IE0004168	Slieve Aughty Mountains SPA	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts
IE0001913	Sonnagh Bog	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts
IE0001321	Termon Lough	Required	Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts
IE0002034	Connemara Bog Complex	Not required	Outside UoM and no pathways present - not

			at risk from potentially significant impacts
IE0004181	Connemara Bog Complex SPA	Not required	Outside UoM and no pathways present - not at risk from potentially significant impacts
IE0002165	Lower River Shannon SAC	Not required	Outside UoM and no pathways present - not at risk from potentially significant adverse impacts
IE0001312	Ross Lake And Woods	Not required	Outside UoM and no pathways present - not at risk from potentially significant impacts

B.5.1 Qualifying Interests

The qualifying interests for the Natura 2000 sites that were screened in are provided in Appendix B.12. Designated habitats and species within the screened in SACs and SPAs have the potential to be affected by the implementation of the proposed Plan.

B.5.2 Conservation objectives

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. 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.

Conservation objectives for SACs and SPAs (i.e. sites within the Natura 2000 network) are required for the habitats and species for which the sites are selected. Detailed site-specific conservation objectives have been provided for the majority of SACs and SPAs, which can be found within the Conservation Objectives document for each site on the NPWS website. Generic conservation objectives have been compiled for the remaining SAC and SPAs.

The overall aim of conservation objectives is for the maintenance or restoration of the favourable conservation conditions of the Annex I habitats and/or the Annex II species for which a SAC has been selected, under which the site-specific objectives contain more detailed attributes, measures and targets.

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

The conservation objectives for SPAs are also to maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for SPAs, which are defined by the following list of attributes and targets;

- Population trend; Measure of percentage change and whether the long term population trend stable or increasing.
- Distribution: Number, range, timing and intensity of use of areas. There is to be no significant decrease in the range, timing or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation.

The conservation objective for non-breeding birds Special Conservation Interests for SPAs are as follows;

- To maintain the favourable conservation condition of the non-breeding waterbird Special Conservation Interest species listed for a SPA.

- To maintain the favourable conservation condition of the wetland habitat for a SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

The conservation objectives were considered when carrying out the AA screening process for the Plan and any measures or potential flood relief works that may potentially impact on Natura 2000 sites.

B.5.3 Cumulative Impacts

A key part of the SEA process is to determine the plan and policy context in which the Western CFRAM proposed activities will be implemented. The Western CFRAM objectives are incorporated into the River Basin 29 FRMP, which in turn is informed by the current spatial planning in the towns and counties of that River Basin. The Western CFRAM proposed activities, and hence the River Basin 29 FRMP, will influence and will in turn be influenced by a number of external statutory and non-statutory plans, strategies and policies and ongoing studies. The interaction of the environmental protection objectives within these documents, with the proposals of the Western CFRAM proposed activities, must therefore be considered. A number of plans, strategies and legislation were examined as part of the SEA process, which are also detailed in Appendix A of the SEA document. A selection of these plans and policies, most relevant to those that could potentially affect Natura 2000 sites in-combination with the River Basin 29 FRMP, are detailed in Table B-14-5.

Cumulative impacts are impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project or plan (Walker and Johnson, 1999). As most of the measures that are proposed at this level are not spatially specific, effects on particular European sites cannot reasonably be identified or assessed. Cumulative impacts that may occur between relevant plans and/or projects in combination with Western CFRAM activities are identified in as much detail as is possible at this level in Table B-14-5.

Table B-14-5: Plans and policies relevant to River Basin 29, a brief description and their potential cumulative impacts with the Plan.

Plans and Policies	Description	Potential cumulative impacts
Galway County Development Plan 2015-2021	Sets out an overall strategy for the proper planning and sustainable development of County Galway. The strategic aims of the Plan include the protection of the environment and natural resources of the County, with objectives of the protection of Natura 2000 sites and flood risk management and assessment.	The strategic aims of the Plan include the protection of the environment and natural resources of the County, with objectives of the protection of Natura 2000 sites and flood risk management and assessment. Objectives of Development Plans and FRM are aligned in their aim to provide sustainable development regarding flood risk. Positive cumulative impacts will be designed into each Plan at a project level and so, must be assessed at a project level. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Galway City Development Plan 2011-2017 and Draft Galway City Development Plan 2017-2023	The city development plans set the agenda for the development of the local authority's area over its six year lifespan.	Development, whether it be residential, industrial, commercial or amenity, must generally take place in accordance with the development plan. The plan is therefore a blueprint for the economic and social development of the city, town or county for which it has been made, all of which may impact upon the Conservation Objectives of the Natura 2000 sites present. Any development taking place within the city as a result of this Plan, will be required to undergo screening for AA. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
County Galway Wind Energy Strategy 2015-2021	Provides strategic direction to encourage renewable energy and to guide the siting and design of wind energy developments in appropriate locations within the County. The strategy aims to comply with the EU SEA Directive and Habitats Directive. The Strategy outlines management guidelines to ensure appropriate siting, design and construction that will not cause adverse environmental impacts.	The strategy aims to comply with the EU SEA Directive and Habitats Directive. The Strategy outlines management guidelines to ensure appropriate siting, design and construction that will not cause adverse environmental impacts. Cumulative impacts may occur at a project level through the development of physical flood relief structures and must be assessed at a project level. Impact interactions may occur during the construction and operational phases of projects that result from the measures outlined in this plan and so must be considered at a project level. Project level

Plans and Policies	Description	Potential cumulative impacts
		assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Actions for Biodiversity 2011-2016, Ireland's National Biodiversity Plan and National Species Action Plans	Aims to conserve and restore biodiversity and ecosystems, and halt their loss, through setting 7 objectives and associated action in order to achieve this on a national and international scale.	Implementation of NFRM measures could help achieve the aims of the National Biodiversity Plan through optimisation of biodiversity benefits in FRM planning. A number of actions that will result from the National Species Action Plans will relate to works within Watercourses. Actions that arise as a result of Ireland's National Biodiversity Plan and National Species Plans must be screened for AA at a project level. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Galway City Biodiversity Action Plan	Aims to promote, protect and enhance biodiversity and key habitats and species within Galway City.	Local area biodiversity action plans mirror the objectives of the National Biodiversity Plan and therefore, cumulative and interactive impacts must be assessed similarly at a project level. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Newport Local Biodiversity Action Plan	Aims to promote, protect and enhance biodiversity and key habitats and species within Newport.	
Clifden Tidy Towns Biodiversity Plan 2014 - 2018	Aims to promote, protect and enhance biodiversity and key habitats and species within Clifden.	
National Peatland Strategy	Outlines principles and actions for the conservation and management of Ireland's peatlands.	Identifies the restoration of functioning wetlands as beneficial for the attenuation of water during low-medium intensity rainfall events. Channel maintenance could impact the aim of the National Peatland Strategy, but implementation of NFRM measures could also contribute to the aim of the strategy in improving bogs. Measures that result from the Plan for River Basin 29 must be screened for in-combination and interactive impacts that may occur with actions that arise as a result of the National Peatland Strategy at a project level. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Forestry Programme 2014-2020: Ireland	Aims to develop a competitive and sustainable forest sector through the implementation of measures, in particular afforestation, woodland creation and the prevention and	Forestry Programme - Interaction between land cover, land use and management, drainage maintenance and flood risk. NFRM approaches consider hydrological processes across a

Plans and Policies	Description	Potential cumulative impacts
	restoration of damage to forests.	whole catchment of a river in order to determine measures that can be used as means of flood management using natural processes. Potential for impact interactions between Plan and Programme upon implementation of proposed measures. Plan and Programme must consider cumulative impacts and impact interactions in further detail when assessing measures at a project level. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
River Basin Management Plan (RBMP) for the Western River Basin District in Ireland (2009-2015)	The Western RBMP has been produced in accordance with the requirements of the WFD and outlines aims and objectives for achieving these within the Western RBD.	The plan aims to achieve good status for 74% of rivers by 2015, with 100% compliance to be achieved by 2027. The RBMP identifies a programme of measures to protect and restore water status by addressing the main pressures in the RBD. The CFRAM programme gives full regard to the objectives of the RBMP and its measures and no negative impact interactions should occur. Cumulative impacts at a plan level will be positive. Cumulative interactions from measures must be assessed at a project level. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Corrib Water Management Unit Action Plan	Details the pressures, risks and programme of actions for the Corrib Water Management Unit (WMU). The main pressures and risks to the WMU are nutrient enrichment, point source discharges from municipal and industrial discharges, quarries, agriculture, on-site domestic treatment systems, forestry, dangerous substances, morphology and abstractions.	The overall status of the WMU is 66% of rivers within the WMU are at high or good status with the remaining 34% at moderate or poor status. There are 20 lakes within the WMU with 60 % at high or good status and 40% at moderate status. Lough Corrib Upper and Lower is classified at moderate status. Cumulative impacts from proposed plan be positive and help achieve aims of Corrib WMU Plan. The proposed Plan should not result in the addition of nutrients to the system. However, the maintenance of channels could impact the aim re morphology. Impacts to Natura 2000 sites and qualifying interests will have to be examined at a project level. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination

Plans and Policies	Description	Potential cumulative impacts
		effects to Natura 2000 sites are expected.
Groundwater Protection Schemes	Groundwater Protection Schemes aim to maintain the quantity and quality of groundwater, and in some cases improve it, by applying a risk assessment-based approach to groundwater protection and sustainable development.	A scheme provides guidelines for the planning and licensing authorities in carrying out their functions, and a framework to assist in decision-making on the location, nature and control of developments and activities in order to protect groundwater. A framework has been developed for the assessment of Ground Water Dependant Terrestrial Ecosystems under the WFD in collaboration with the NPWS, however this has not been rolled out over the entirety of Ireland. Groundwater protection responses may involve hard structures or alterations to hydrology, and so could change water levels, impacting groundwater dependant Natura 2000 sites and ground water dependant Qualifying interests through Cumulative Impacts. Screening for AA will need to be carried out to determine impact interactions and cumulative impacts that may occur as a result of measures at a project level. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Water Services Strategic Plan 2015. (Irish Water).	Addressing 6 key themes, the most relevant being the effective management of wastewater, and the protection and enhancement of the environment.	The AA process that was conducted upon the Water Services Strategic Plan included the incorporation of changes to the plan, that ensure that no adverse effects occur upon Natura 2000 sites as a result of the plan. It is not likely to cause adverse impacts in-combination with this Plan at this level, however, it is possible that any actions that may arise as a result of this plan be assessed for significance of in-combination effects at a project level, in-combination with any projects that may arise as a result of the FRMP. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Rural Environmental Protection Scheme (REPS) / Agri-Environmental Options Scheme (AEOS) / Green-Low Carbon Agri-Environmental Scheme (GLAS)	The REPS offers payment rewards to farmers who undertake farming methods in an environmentally friendly way. AEOS was launched in 2010 to build on the REPS scheme, promoting Biodiversity, improve water quality and combat climate change. GLAS is the newest agri-environmental	The objectives of these schemes are the establishment of farming practices and production methods which reflect conservation issues, protect wildlife habitats and endangered species of flora and fauna and produce quality food in an extensive and environmentally friendly manner. This includes

Plans and Policies	Description	Potential cumulative impacts
	scheme, rewarding farmers for carrying out environmentally sound practices that meet the criteria set by the scheme.	the protection and maintenance of watercourses. The cumulative impact between these Schemes and the proposed Plan should have a positive impact on water quality, however, any impacts from measures that occur as a result of these schemes will need to be screened for AA at a project level. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Food Harvest 2020 and Food Wise 2025	Food Harvest 2020 plan is a strategy for the medium-term development of the agri-food (including drinks) fisheries and forestry sector for the period to 2020. It outlines the key actions needed to ensure that the sector contributes to the maximum possible extent to our export-led economic recovery and the full development of the smart economy. Food Wise 2025 sets out a cohesive, strategic plan for the development of the agri-food sector over the next decade.	Food Harvest – promotes productivity from land/ land improvement/ land drainage. Re-zoning of land and implementation of NFRM measures could impact this. Potential for cumulative impact with channel maintenance to drain lands. Both plans have the potential to increase pressure on water bodies through land management and therefore, could result in cumulative impacts to Natura 2000 sites. Execution of measures will need to consider cumulative impacts at a project level and will require AA screening. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
National Rural Development Programme 2014-2020 (DAFM)	Arising from the most recent reform of CAP agreed under the Irish Presidency of the EU, a new suite of rural development measures has been designed to enhance the competitiveness of the agri-food sector, achieve more sustainable management of natural resources and ensure a more balanced development of rural areas. There is a broad range of schemes and supports contained in Ireland's new RDP for the period 2014-20. Ireland's RDP was formally adopted by the EU Commission on 26th May 2015.	This plan recognises that agriculture can have significant impacts on the environment, including the provision of environmental services, such as biodiversity, flood and drought control, and as a carbon sink. Measures that may arise as a result of this plan may also potentially cause significant impacts that will have to be determined at a project level. The role agricultural land can play in flood control and mitigation will need to be considered as part of the CFRAM Scheme study, as will the importance of protecting key agricultural areas within the RBD. Cumulative impacts that may arise as a result of these schemes, relative to Natura 2000 sites and their designated features, will have to be determined at a project level through AA Screening. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.

Plans and Policies	Description	Potential cumulative impacts
Freshwater Pearl Mussel Sub-Basin Management Plans (various)	The purpose of the Freshwater Pearl Mussel Sub-Basin Management Plans is to address catchment-wide issues that are impacting upon mussel populations (physical modification, pollution, recreation, agricultural activities, forestry). The plans also contain Summary Action Programmes which contain the site specific measures needed to bring the populations back into favourable condition.	The Freshwater Pearl Mussel Sub-Basin Management Plans are directly connected to the conservation of freshwater Pearl Mussel within designated SACs. It recognises that there is potential to indirectly impact on other listed species in these SACs as a result of protection measures. Plans will undergo screening for AA at a project level. In order to determine cumulative impacts these will have to be screened against potential impacts that may occur as a result of Plan measures at a project level. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Environmental River Enhancement Programme (EREP)	The Environmental River Enhancement Programme (EREP) is an OPW funded project that is being co-ordinated and managed by Inland Fisheries Ireland. The programme focuses on the enhancement of drained salmonid rivers in Ireland.	The programme involves two different approaches to enhancement, these being capital enhancement and enhanced maintenance respectively. The EREP and the FRMPs developed as part of the CFRAM works potentially could work together to deliver further environmental benefits. Works at arise as a result of this Programme have the potential to impact other designated features and should be screened for AA. These can then be assessed with any potential impacts that may arise as a result of CFRAM measures at a project level. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Western River Basin District Eel Management Plan and National Report for Ireland on Eel Stock Recovery Plan (2008)	These plans give an overview of the status of eels in the Western River Basin and assess the status and threats to Eels in Ireland. The National Report contains a number of measures to allow the recovery of the stock of European eel. It also establishes the basis for the development of Eel Management Plans in river basin districts.	The management actions from the National Stock Recovery Plan are translated directly into the Western RBD Eel Management Plan. The main morphological pressures arise from channelisation and dredging impacting bed slope, side slope and flow changes. This plan contains a number of management actions to assist in the recovery of Eel stocks. CFRAM measures may occur within the same environment that these measures occur in and have the potential for conflict. Any potential impacts will have to be screened for AA to determine cumulative impacts with this Plan. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects

Plans and Policies	Description	Potential cumulative impacts
Shellfish Water Action Programmes	Shellfish Waters Directive translated into Irish Law by European Communities (Quality of Shellfish Waters) Regulations 2006 (SI No 268) establishes measures to protect shellfish waters, against pollution and to safeguard certain shellfish populations from various harmful consequences, resulting from the discharge of pollutant substances into the sea.	to Natura 2000 sites are expected. There are currently various Shellfish Waters with Shellfish Action Programmes in Ireland. Any proposed CFRAM works will have to ensure that the water quality of the Shellfish areas is not impacted upon by the flood risk management options proposed. Actions that may result through the Shellfish Water Action Programmes and have the potential to impact EU designated habitats and species cumulatively with this Plan must be screened for AA at a project level. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Coillte District Strategic Plans:	Coillte's estate is divided into 317 forests, which are combined into 13 forest management districts. Coillte has developed plans for each of these districts, known as District Strategic Plans (DSPs), which describe Coillte's forests in the area and set out the long-term vision for the management of these forests as well as short-term objectives for the district.	DSPs address a wide range of economic, social and environmental objectives. They specifically recognise the impact forestry can have on water quality, and propose measures such as the introduction of riparian buffer zones to protect watercourses. Measures have the potential to provide a positive cumulative impact to the conservation objectives of designated features, however, these impacts must be determined at a project level through AA screening. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Turf-cutting: Industrial scale and other	Included in this assessment at the request of DAHRRG following public consultation. Turf cutting at all scales can impact upon conservation objectives of European designated sites by effecting water quality, water levels, habitat area, habitat quality and key species.	This plan is being conducted at a strategic level and as no locations of works have been identified, no in-combination impacts can be identified at this level with turf cutting. However, it is likely that on a project level there could be in-combination impacts that could arise, therefore it is recommended that any project level works will include the assessment of potential in-combination impacts with local turf-cutting, both legal and illegal. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.
Local Area Plans	Local Area Plans provide more detailed planning policies at a	Local Area Plans are strategic and tend to highlight the

Plans and Policies	Description	Potential cumulative impacts
	<p>local level for either urban areas or wider urban and rural areas where significant development and change is anticipated.</p> <p>Relevant local area plans are:</p> <ul style="list-style-type: none"> - Gort Local Area Plan 2013-2019 - Claregalway Local Area Plan 2005-2011 - Oughterard Local Area Plan 2006-2012 - Tuam Local Area Plan 2011-2017 - Ballyhaunis Local Area Plan 2010-2016 - Ballinrobe Local Area Plan 2010-2016 - Claremorris Local Area Plan 2012-2018 	<p>importance of biodiversity within the area that they are relevant to. As they are strategic plans, any actions that may result from them will be subject to Appropriate Assessment processes.</p> <p>Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.</p>

B.6 Screening Conclusions and Summary

As outlined in Table B-14-1 and Table B-14-2, a number of prevention, protection and preparedness flood risk management measures are deemed to have a likely significant effect on Natura 2000 sites. Given that the implementation extent of these measures at Plan level is throughout the River Basin, those Natura 2000 sites listed in Table B-14-3 could potentially be impacted as a result.

The proposed Plan is not directly connected with or necessary to the management of Natura 2000 sites. It is, accordingly, necessary for the competent authority to assess whether the proposed Plan, either individually or in combination with other plans or projects, would be likely to have significant effects on any Natura 2000 site.

Cumulative impacts have been assessed. There may be an increase in ecological and environmental pressures upon designated features as a result of actions that will take place in the implementation of these plans, however, any potential impacts must be determined through AA screening at a project level. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative effects were determined to result from cumulative or in-combination impacts, between this River Basin's Plan and the plans and policies assessed.

Given the presence of pathways and the potential impacts posed by the proposed Plan on the 34 Natura 2000 sites (Table B-14-3), it is concluded by the authors of this report that it is not possible to rule out (screen out) likely significant effects on these Natura 2000 sites. Therefore, it is recommended by the authors of this report that the proposed Plan should be brought forward to the second stage of the Appropriate Assessment process. The resulting Natura Impact Statement follows.

B.7 Natura Impact Assessment

This Natura Impact Statement (NIS) aims to determine whether the proposed Plan would result in significant adverse impacts on the integrity of any Natura 2000 site with respect to the site's structure, function, and/ or conservation objectives. It also aims to provide supporting information for the competent authority to carry out an Appropriate Assessment of the proposed Plan.

B.7.1 Potential significant effects

The Plan for River Basin 29 is a high-level plan, which provides methods and measures for flood risk management. This proposed Plan does not detail specifics of the locations for the implementation of many of the measures that could cause significant effects on Natura 2000 sites. Thus, the potential significant effects are discussed below in terms of the measures being implemented throughout the River Basin.

As outlined in Section B.2.4, the potential impacts that could occur through the implementation of the Plan are;

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

Loss or reduction of habitat area

Direct habitat loss is caused where there is complete removal of a habitat type. Loss of habitat can also occur through the deterioration of habitat quality and therefore a loss of the function of that habitat. This can be due to factors such as land take requirements, physical alterations and introduction of invasive species.

There is potential that the Natura 2000 sites screened into this assessment may be adversely affected in this manner through the implementation of the proposed Plan. The measures of the proposed Plan, such as the review of development plans and resulting changes in land use management, minor works scheme, natural flood risk management measures, maintenance of channels and arterial drainage schemes, and individual property protection could result in the loss or reduction of habitat area. Protection and preparedness measures such as the voluntary home relocation and minor works scheme, and individual property protection will result in actions that will involve the development of physical structures, which could result in direct habitat loss with long term consequences.

Indirect habitat loss may also occur through disruption of hydrological links to a designated site that supports surface or ground water dependant habitats such as peatland and wetland habitats e.g. implementation of SuDs, diversion of water flows and maintenance of arterial drainage schemes.

The implementation of natural flood management measures, although primarily beneficial in the provision of refuges for species and the protection and restoration of bog and wetland habitats, may result in changes of land use within the River Basin. If measures are inappropriately implemented, habitat loss or degradation of habitat quality may occur.

As the measures of the proposed Plan are set at a high level, loss or reduction of habitat area of the Natura 2000 sites screened into this assessment cannot be ruled out at this stage. Therefore, the significance of potential habitat loss will be assessed at project level and will be dependent on the final locations and detailed design of the proposed measures.

Mitigation measures are detailed in Section B.9 to ensure the potential for habitat loss will not adversely affect the integrity of a Natura 2000 site due to the implementation of the proposed Plan.

Disturbance to key species

Key species are those species listed within the annexes of the Habitats Directive for which Natura sites are designated. Disturbance to species supported by a Natura site may result due to physical disturbance of a habitat that may result in direct mortalities or displacement of the species. Sources of disturbance may also take the form of increased noise, visual presence of people, vibration and increased illumination of areas. Increased disturbance levels within the sensitivity threshold of a species may cause the displacement or flight of a species from their respective habitat.

Of the SACs and SPAs screened into the assessment, the species that could be potentially disturbed are listed below in Table B-14-6.

Table B-14-6: Key species of the Screened-in SACs and SPAs (Natura 2000 sites)

Species	Natura 2000 site
Arctic Tern	Lough Corrib SPA
Atlantic salmon	Lough Corrib SAC
Bar-tailed Godwit	Inner Galway Bay SPA
Black-headed Gull	Inner Galway Bay SPA Lough Corrib SPA
Black-tailed Godwit	Rahasane Turlough SPA
Brook lamprey	Lough Corrib SAC
Common Gull	Inner Galway Bay SPA Lough Corrib SPA
Common Scoter	Lough Corrib SPA
Common Tern	Inner Galway Bay SPA Lough Corrib SPA
Coot	Lough Corrib SPA Lough Rea SPA
Cormorant	Inner Galway Bay SPA Lough Cutra SPA
Curlew	Inner Galway Bay SPA
Dunlin	Inner Galway Bay SPA
Freshwater pearl mussel	Lough Corrib SAC
Gadwall	Lough Corrib SPA
Golden Plover	Inner Galway Bay SPA Lough Corrib SPA Rahasane Turlough SPA
Great Northern Diver	Inner Galway Bay SPA
Greenland White-fronted Goose	Cregganna Marsh SPA Lough Corrib SPA Rahasane Turlough SPA
Grey Heron	Inner Galway Bay SPA
Harbor seal	Galway Bay Complex SAC
Hen Harrier	Lough Corrib SPA Slieve Aughty Mountains SPA
Lapwing	Inner Galway Bay SPA
Lesser horseshoe bat	Caherglassaun Turlough SAC East Burren Complex SAC Kiltartan Cave (Coole) SAC Lough Corrib SAC Lough Cutra SAC Lough Fingall Complex SAC Moneen Mountain SAC
Light-bellied Brent Goose	Inner Galway Bay SPA
Marsh fritillary	East Burren Complex SAC Moneen Mountain SAC
Merlin	Slieve Aughty Mountains SPA
Otter	East Burren Complex SAC

Species	Natura 2000 site
	Galway Bay Complex SAC Lough Corrib SAC
Petalwort	Black Head-Poulsallagh Complex SAC
Pochard	Lough Corrib SPA
Red-breasted Merganser	Inner Galway Bay SPA
Redshank	Inner Galway Bay SPA
Ringed Plover	Inner Galway Bay SPA
Sandwich Tern	Inner Galway Bay SPA
Sea lamprey	Lough Corrib SAC
Shoveler	Inner Galway Bay SPA Lough Corrib SPA Lough Rea SPA
Slender green feather-moss	Lough Corrib SAC
Slender naiad	Lough Corrib SAC
Teal	Inner Galway Bay SPA
Tufted Duck	Lough Corrib SPA
Turnstone	Inner Galway Bay SPA
White-clawed Crayfish	Lough Corrib SAC
Whooper Swan	Coole-Garryland SPA Rahasane Turlough SPA
Wigeon	Inner Galway Bay SPA Rahasane Turlough SPA

In relation to the proposed Plan, activities that may potentially disturb key species are those that will result in physical disturbance due to works being carried out, such as the implementation of natural flood risk management measures, the minor works scheme, maintenance of channels and installation of new gauges. These measures may pose sources of disturbance during construction of works and their operation. The works may also cause disturbance to the resting and/ or breeding places and foraging areas of these key species.

The measures of the proposed Plan have the potential to cause disturbance impacts to key species of the Natura sites screened in to this assessment. As these measures are set at a high level and the location has not been determined, the significance of disturbance to key species will be assessed at project level and will be dependent on the final locations and detailed design of the proposed measures.

Mitigation measures are detailed in Section B.9 to ensure that disturbance to key species will not adversely affect the integrity of a Natura 2000 site due to the implementation of the proposed Plan.

Fragmentation

Habitat and species fragmentation occurs when the connectivity between habitats and species is restricted or lost and impedes the natural movement of a species. This can result in singular habitat units being formed and isolated species communities. Fragmentation can arise as a result of barriers to migratory movements where important corridors exist, e.g. river, riparian and coastal corridors. The inappropriate installation of measures that may act as a barrier to free movement of a species and/ or physically separate a habitat, will result in fragmentation.

The implementation of measures such as natural flood management measures, minor scheme works and individual property protection may result in the installation of structures that may impeded movement of a species. For example, the inappropriate installation of a culvert may impede the movement of salmon within a river catchment and act as a migratory barrier. This may

in turn prevent salmon reaching freshwater pearl mussel located upstream, thus breaking the lifecycle of freshwater pearl mussel and creating an isolated population.

As the measures of the proposed Plan are not specific regarding location of implementation, fragmentation of the Natura 2000 sites screened into this assessment cannot be ruled out. Therefore, the significance of potential fragmentation will be assessed at project level and will be dependent on the final locations and detailed design of the proposed measures.

Mitigation measures are detailed in Section B.9 to ensure that fragmentation will not adversely affect the integrity of a Natura 2000 site due to the implementation of the proposed Plan.

Reduction in species density

Reduction in the density of species may arise due to the factors discussed above; habitat loss or degradation, disturbance and fragmentation. As outlined above, the measures of the proposed Plan have the potential to cause these impacts. The implementation of the voluntary home relocation scheme could also result in development in rural areas where species are sensitive to human activity. Factors that may influence the movement of species, resulting in further travel distances for species, will require a higher calorie intake that may not be available. Insufficient nutrition and calorie intake could result in an increase in unsuccessful breeding attempts, reducing species density. Species travelling outside their normal range to forage or seek displaced mating partners, may encounter unfamiliar hazards or result in territorial engagements increasing breeding adult mortalities.

As the measures of the proposed Plan are not specific regarding location of implementation, reduction in species density of the Natura 2000 sites screened into this assessment cannot be ruled out.

Therefore, the significance of potential reduction of species density will be assessed at project level and will be dependent on the final locations and detailed design of the proposed measures.

Mitigation measures are detailed in Section B.9 to ensure that reduction in species density will not adversely affect the integrity of a Natura 2000 site due to the implementation of the proposed Plan.

Changes in key indicators of conservation value

The key indicators of conservation value for the Natura sites likely to be affected by the implementation of the proposed Plan include surface water and groundwater quality and quantity. As outlined in the screening process and Table B-14-3, the Natura sites either fall within the area of the River Basin or are hydrologically connected to the area of the proposed Plan. Any deterioration in water quality could potentially result in adverse impacts, either directly or indirectly, on a range of habitats and species that are surface water or groundwater dependant, such as lakes, rivers, coastal lagoons and bays, seals, salmon, otter and freshwater pearl mussel. Maintaining the hydrological regime, e.g. recharge, flow rates and direction, of these habitats is also very important for the function and structure of the habitats and the species that they support.

The measures of the Plan, such as the review of development plans and resulting changes in land use management, implementation of SuDs, minor works scheme, natural flood risk management measures and maintenance of channels could potentially cause impacts to water quality and quantity. These pressures would mainly arise from the activity of both land-based and in-stream works, where there is the potential for discharge of silt laden runoff and pollutants such as hydrocarbons to coastal, freshwater and groundwater bodies. Hydrological alterations may also occur through the potential diversion of flows and implementation of SuDs and natural flood risk management measures. Therefore, all measures must be appropriately assessed for their suitability at a given location.

As the measures of the proposed Plan are not specific regarding location of implementation, changes in key indicators of conservation value of the Natura 2000 sites screened into this assessment cannot be ruled out. Therefore, the significance of potential changes in key indicators

will be assessed at project level and will be dependent on the final locations and detailed design of the proposed measures.

Mitigation measures are detailed in Section B.9 to ensure that changes in key indicators of conservation value will not adversely affect the integrity of a Natura 2000 site due to the implementation of the proposed Plan.

B.8 Implementation routes for physical works

Measures requiring physical works may either require planning consent or confirmation, or will be an exempted development.

Works that will require planning consent or confirmation, will be carried out by either the OPW or relevant Local Authority. Works may progress to construction stage as one of the following:

- Project led by OPW (or by a Local Authority on behalf of the OPW), under the Arterial Drainage Acts.
- Project led by the relevant Local Authority under the Planning and Development Regulations.
- Project led by the relevant Local Authority under the Strategic Infrastructure Act.

Project level assessments that may be required for all types of project include:

- Environmental Impact Assessment: For a project above the thresholds specified under Article 24 of the European Communities (Environmental Impact Assessment) Regulations, 1989 as amended or a project likely to have significant effects on the environment, having regard to the criteria specified for under Article 27 of the same EIA Regulations 1989 as amended.
- Appropriate Assessment: All projects will be screened for Appropriate Assessment and, where there is a potential for a significant effect on a European (Natura 2000) site, an Appropriate Assessment will be undertaken in accordance with the European Communities (Birds and Natural Habitats) Regulations 2011.

Exempted developments include those of limited scale and scope, that may fall under the category of Minor Flood Mitigation Works or Coastal Protection Scheme. Exempted developments may be carried out by Local Authorities under funding by the OPW, will be exempted in accordance with the Planning and Development Act 2000 (as amended) and will comply with all relevant environmental legislation. This could require the undertaking of an EIA or AA screening for physical works. Local Authorities must supply written confirmation of legislative compliance under condition of funding.

B.9 Mitigation Measures

Projects stemming from the Flood Risk Management Plans (FRMP) will apply a range of standard processes and measures that will mitigate potential environmental impacts. While the applicability of processes and particular measures will be dependent on the nature and scale of each project, examples of typical processes and measures that will be implemented where applicable at the different stages of project implementation are set out below.

B.9.1 Project Mitigation: Consenting Process

As set out in Section B.8 above, the consenting process for the progression of measures involving physical works will require the applicable environmental assessments. Also, the consenting authorities may set out specific environmental conditions as part of the project approval.

B.9.2 Project Mitigation: Pre-Construction / Detailed Design

For the detailed design of projects, where options are available, the design uses a hierarchy to mitigation measures along the following principles:

- Avoidance: avoid creating the potential impact where feasible.

- Mitigation: minimise the potential impact through mitigating measures
- Enhancement: Enhance the environment to better than pre-project conditions, where reasonably possible

The progression of a flood management project through the detailed design phase can entail a series of surveys to inform the design, where the scale of surveys would be proportionate to the complexity and potential impacts of the project. These can include:

- engineering structure surveys,
- topographical surveys,
- habitat & species surveys⁵
- ornithological surveys,
- bat surveys,
- fish surveys,
- water quality surveys,
- archaeological surveys,
- landscape and visual assessments,
- land valuation surveys and
- other surveys as deemed necessary to prepare a project.

Where necessary, Wildlife Derogation Licences and archaeological licences will be sought from Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

The scope of the EIS will contain a WFD assessment, which will include a hydro-morphological assessment, to more clearly consider and support the Water Framework Directive (WFD) objectives (see Section 6.5.4 of FRMP). This WFD assessment will inform the project level AA regarding likely significant effects and adverse impacts on the site integrity of Natura 2000 sites in respect of their conservation objectives and if necessary, appropriate mitigation measures will be implemented at project level to ensure adverse effects will not occur.

The aim of the detailed option design process, in tandem with project-level assessments, would be to result in no loss of QI habitat, including non-priority QI habitats. While it is anticipated that this would be the case for the majority of options, if a project-level assessment at detailed design fails to avoid adverse effects on the integrity of a European site following imposition of mitigation in AA, an Assessment of Alternatives would be undertaken to identify alternative options that would not lead to adverse effects on the integrity of any European site. This would be undertaken prior to any further decisions on how to address the flood risk in the relevant area or prior to progressing to further stages of AA.

⁵ In the context of ecological mitigation, the habitat and species surveys are conducted as required to assess the various aspects for the project, such as ecological surveys for:

- protected or notable habitats and species, including Annex 1 habitats, Annex II and Annex IV species,
- species protected under the Wildlife Acts,
- species protected under the Flora Protection Order,
- the resting and breeding places of relevant species and,
- invasive species, both plant and animal.

The potential role for non-structural measures for each flood risk area, including natural type flood management measures will be examined in more detail and incorporated into the scheme design if deemed appropriate.

B.9.3 Project Mitigation: Construction Stage

For large and complex projects and sites, where environmental management may entail multiple aspects, a project specific Construction Environmental Management Plan (CEMP) may be developed. This will form a framework for all environmental management processes, mitigation measures and monitoring and will include other environmental requirements such as invasive species management measures, if applicable.⁶

A designated environmental officer, project ecologist and project archaeologist will be appointed, as appropriate for the project.

B.9.4 Project Monitoring

The Plan, with its associated SEA and plan-level AA, sets out a series of monitoring requirements, in connection with the SEA objectives and the predicted effects of the Plan. For measures involving physical works, the project-level EIA and AA, where conducted, will set out the specific monitoring required for each measure.

B.10 Summary and Conclusion

Proposed prevention, protection and preparedness flood risk management measures of the Plan are likely to have a significant effect on Natura 2000 sites that were screened to be within the zone of influence of River Basin 29. This NIS has determined the potential impacts that may occur through the implementation of the Plan and has assessed each one of these potential impacts in as much detail as is possible with the level of detail that is available at this higher plan level. General mitigation measures have been provided in this NIS, however, where actions may occur in the implementation of these measures, project level assessment of works will be required.

No viable works were identified for the AFAs within this River Basin, so this Plan does not include any details of physical works that may be carried out as a result of the Plan. Any measures that may be implemented as a result of this Plan will be required to be assessed further at a project level.

Mitigation measures that are provided in the NIS will be implemented throughout the entire extent of the execution of projects that may stem from the Plan. This includes mitigation measures to be implemented at the Consenting Process Stage, Pre-Construction, Construction and Monitoring.

Providing the recommended mitigation measures are implemented, it can be concluded by the authors of this report that this Plan will not adversely impact on the site integrity of Natura 2000 sites, either alone or in-combination with other plans, projects or policies.

⁶ There are a range standard type mitigation measures consisting of good construction practices and good planning of works, that are used within flood management projects such as for example: Refuelling of plant and vehicles away from watercourses, Installation of wheel-wash and plant washing facilities, working only within environmental windows e.g. in-stream works in salmonid channels from May to September, Integrate fisheries in-stream enhancement through the Environmental River Enhancement Programme

B.11 Influence of NIS on the Plan

This NIS informs both the Adopted Flood Risk Management Plan and the SEA Statement and Monitoring Programme. The Plan template has changed in response to direct observations made in the NIS and following Public Consultation of the NIS. During the identification of preferred options through Multi-Criteria Analysis, the Plan has incorporated key objectives of the Habitats Directive, including the avoidance of significant effects to the Natura 2000 network, in its assessment.

The Plan has been revised and the outcome of the revision of the Plan, has been as a result of statutory consultation and the findings of this NIS. These revisions included clarifications to the consenting process, clarification on the process for the implementation of physical works and a refinement of the mitigation measures to be implemented. Specific comments relating to the draft NIS reports were raised by D/AHRRGA. Table B-14-7 outlines how these have been addressed in this final NIS report. On 28th January 2015 an Appropriate Assessment workshop was held at the OPW offices in Dublin, attended by representatives from all CFRAM consultants, the OPW and NPWS. The purpose of the workshop was to develop the approach to Appropriate Assessment for all projects and form the statutory consultation with NPWS. Some of the issues discussed at this meeting included procedural arrangements around the Natura Impact Assessments; AA Screenings; Plan-level mitigation; Source-pathway-receptor analysis for zones of influence; IROPI, etc.

The approval / adoption of the Plan has not and does not confer approval or permission for the installation or construction of any physical works, without AA Screening and Appropriate Assessment as necessary. Implementation of the Plan to the level as described at this stage, will require the inclusion of mitigation measures that have been detailed in this NIS. Following the approval of the Plan, the next stage is to progress the proposed flood risk management measures by undertaking more detailed assessment and design at project level, and for structural works, before submitting the proposal for Public Exhibition (under the Arterial Drainage Acts) or planning permission. For measures involving physical works, the project-level EIA and AA, where conducted, will set out the specific monitoring required for each measure. The need for on-site specific mitigation measures at a project level will be a requirement of the planning consent for physical project works. This NIS supports the recommendations of the Plan in this regard.

Table B-14-7: Specific comments on the draft NIS for UoM 29

Western CFRAM Specific Comments		
Dept. AHRRGA Responses		
ID	Description	Action
SUB-16-459 (UoM 29)	The suggestions made regarding woodland planting on the Slieve Aughties (Volume 1, Table 8-4) should be reviewed, with mitigation added if necessary, as open habitat is preferred by the Annex I bird species, and a special conservation interest of Slieve Aughty Mountains SPA (site code 004168), Hen Harrier.	Updated mitigation section of AA

Western CFRAM Specific Comments		
Dept. AHRRGA Responses		
ID	Description	Action
	Gort AFA is upstream of Coole-Garryland Complex cSAC (site code 000252) and Coole-Garryland SPA (site code 004107), and this is not acknowledged either in the draft FRMP or the NIS (although a map showing the overlap of AFAs and European sites is noted). Various references are made to arterial drainage schemes and the maintaining of channels (Table 8-5), and one option is to extend the OPW's scheme for the Gort Bridge area to cover the Gort River to a short distance downstream of the Kinincha and Gort River confluence, an additional 1.5km on the existing scheme. This poses risks to the downstream European sites, and requires planlevel mitigation. References to the following are also noted: <i>"In addition to the works noted in Gort substantial works were completed in 2010 under and Minor Works Scheme which consisted of 3km of channel maintenance downstream of Gort River Bridge and maintenance of the land drain from Lidl car park to the Gort River"</i> , but it is not clear if these works subject to any assessments.	screening and NIS
	Gort – Table 8-8: noting point 2 above, consideration should be given to the need for plan-level mitigation to address: a. the possible community scale option for property protection in Gort, b. any risks associated with ongoing management of flood risk within Gort and the maintenance of flood sensitive channels, streams and culverts and associated structures providing a flood defence function to maximise their flood risk benefits.	
	Kinvara AFA overlaps with Galway Bay Complex cSAC (site code 000268) and Inner Galway Bay SPA (site code 4031), and this is not acknowledged either in the draft FRMP or the NIS (although a map showing the overlap of AFAs and European sites is noted). Consideration should be given to the need for plan-level mitigation to address: a. maintenance which may include infilling small gaps and removing vegetation to prevent further degradation of the defence structures, b. rehabilitation of existing walls, construction of new walls in quay area, and demountables for pier access and road realignment, which would rehabilitate the existing walls to the north and provide 220m of new walls along the marina.	
	Oranmore AFA overlaps with Galway Bay Complex cSAC (site code 000268) and Inner Galway Bay SPA (site code 4031), and this is not acknowledged either in the draft FRMP or the NIS (although a map showing the overlap of AFAs and European sites is noted). Consideration should be given to the need for plan-level mitigation to address: a. any risks associated with ongoing management of flood risk within Oranmore and the maintenance of flood sensitive channels, streams and culverts and associated structures providing a flood defence function to maximise their flood risk benefits, b. while it is stated that the Ballynegeeha watercourse is not within a drainage district and maintenance is the responsibility of the riparian owner, the OPW should note that this watercourse passes through an area of alkaline fen, an Annex I habitat and qualifying interest of the Galway Bay Complex cSAC.	
	Loughrea AFA overlaps with Lough Rea cSAC (site code 000304) and Lough Rea SPA (site code 004134), and this is not acknowledged either in the draft FRMP or the NIS (although a map showing the overlap of AFAs and European sites is noted). Consideration should be given to the need for plan-level mitigation to address: a. any risks associated with ongoing management of flood risk within Loughrea and the maintenance of flood sensitive channels, streams and culverts and associated structures providing a flood defence function to maximise their flood risk benefits, b. maintenance of structures on the St Clearan's and Middle watercourses which are the responsibility of the riparian owner. Consideration should be given by the local authority to incorporating the key structures identified into a priority monitoring schedule as a mechanism for raising awareness with riparian owners of their responsibilities.	

Table B-14-8: Sites which have potential impacts, and from which scale of measure, with specific reference to AFA

		Screening summary for sites brought forward from Screening for NIS							Assessment summary for potential UoM impacts. See Section B.7.1 for details.					Assessment summary for potential AFA measures related impacts.	
Site code	Site name	Within UoM	Distance to UoM (km)	FWPM QI	Groundwater pathway present	GWDTE QI	Surface water pathway present	Requirement for Appropriate Assessment	At risk of Loss or reduction of habitat area	At risk of disturbance to key species	At risk of fragmentation	At risk of reduction in species density	At risk of changes in key indicators of conservation value	Within ZOI of AFA measures.	Potential impacts from AFA scale measures
IE0002244	Ardrahan Grassland	X	0		X		X	X	X		X	X	X	No	N/A
IE0002295	Ballinduff Turlough	X	0		X	X	X	X	X		X	X	X	No	N/A
IE0000996	Ballyvaughan Turlough	X	0		X	X	X	X	X		X	X	X	No	N/A
IE0000020	Black Head-Poulsallagh Complex	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0000238	Caherglassaun Turlough	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0002294	Cahermore Turlough	X	0		X	X	X	X	X		X	X	X	No	N/A
IE0002293	Carrowbaun, Newhall And Ballylee Turloughs	X	0		X	X	X	X	X		X	X	X	No	N/A
IE0000242	Castletaylor Complex	X	0		X	X	X	X	X		X	X	X	No	N/A
IE0000252	Coole-Garryland Complex	X	0		X	X	X	X	X		X	X	X	No	N/A
IE0004107	Coole-Garryland SPA	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0004142	Cregganna Marsh SPA	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0002181	Drummin Wood	X	0		X		X	X	X		X	X	X	No	N/A
IE0001926	East Burren Complex	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0000268	Galway Bay Complex	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0002180	Gortacarnaun Wood	X	0		X		X	X	X		X	X	X	No	N/A
IE0004031	Inner Galway Bay SPA	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0000286	Kiltartan Cave (Coole)	X	0		X		X	X	X	X	X	X	X	No	N/A
IE0001285	Kiltiernan Turlough	X	0		X	X	X	X	X		X	X	X	No	N/A
IE0000297	Lough Corrib		0	X	X	X	X	X	X	X	X	X	X	No	N/A
IE0004042	Lough Corrib SPA		3			X		X	X	X	X	X	X	No	N/A
IE0002117	Lough Coy	X	0		X	X	X	X	X		X	X	X	No	N/A
IE0000299	Lough Cutra	X	0		X		X	X	X	X	X	X	X	No	N/A
IE0004056	Lough Cutra SPA	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0000606	Lough Fingall Complex	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0000304	Lough Rea	X	0		X		X	X	X	X	X	X	X	No	N/A
IE0004134	Lough Rea SPA	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0000054	Moneen Mountain	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0002352	Monivea Bog	X	0		X	X	X	X	X		X	X	X	No	N/A
IE0000318	Peterswell Turlough	X	0		X	X	X	X	X		X	X	X	No	N/A
IE0000322	Rahasane Turlough	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0004089	Rahasane Turlough SPA	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0004168	Slieve Aughty Mountains SPA	X	0		X	X	X	X	X	X	X	X	X	No	N/A
IE0001913	Sonnagh Bog	X	0		X	X	X	X	X		X	X	X	No	N/A
IE0001321	Termon Lough	X	0		X	X	X	X	X		X	X	X	No	N/A

B.12 Appendix A: Natura 2000 sites screened in and their qualifying interests

Site code	Site name	Qualifying Interest
IE0000020	Black Head-Poulsallagh Complex SAC	Petalwort (<i>Petalophyllum ralfsii</i>)
		Alpine and Boreal heaths
		Fixed coastal dunes with herbaceous vegetation (grey dunes)
		Juniperus communis formations on heaths or calcareous grasslands
		Limestone pavements
		Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>)
		Perennial vegetation of stony banks
		Petrifying springs with tufa formation (<i>Cratoneurion</i>)
		Reefs
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)
		Submerged or partially submerged sea caves
		Water courses of plain to montane levels with the <i>Ranunculon fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation
IE0000054	Moneen Mountain SAC	Lesser horseshoe bat (<i>Rhinolophus hipposideros</i>)
		Marsh fritillary (<i>Euphydryas aurinia</i>)
		Alpine and Boreal heaths
		Juniperus communis formations on heaths or calcareous grasslands
		Limestone pavements
		Petrifying springs with tufa formation (<i>Cratoneurion</i>)
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)
IE0000238	Caherglassaun Turlough SAC	Turloughs
		Lesser horseshoe bat (<i>Rhinolophus hipposideros</i>)
		Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidention</i> p.p. vegetation
IE0000242	Castletaylor Complex SAC	Turloughs
		Alpine and Boreal heaths
		Juniperus communis formations on heaths or calcareous grasslands
		Limestone pavements
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)
IE0000252	Coole-Garryland Complex SAC	Turloughs
		Juniperus communis formations on heaths or calcareous grasslands
		Limestone pavements

Site code	Site name	Qualifying Interest
		Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation
		Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidention</i> p.p. vegetation
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)
		<i>Taxus baccata</i> woods of the British Isles
		Turloughs
IE0000268	Galway Bay Complex SAC	Harbor seal (<i>Phoca vitulina</i>)
		Otter (<i>Lutra lutra</i>)
		Alkaline fens
		Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>)
		Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>
		Coastal lagoons
		<i>Juniperus communis</i> formations on heaths or calcareous grasslands
		Large shallow inlets and bays
		Limestone pavements
		Mediterranean salt meadows (<i>Juncetalia maritimi</i>)
		Mudflats and sandflats not covered by seawater at low tide
		Perennial vegetation of stony banks
		Reefs
		Salicornia and other annuals colonising mud and sand
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)
		Turloughs
		Vegetated sea cliffs of the Atlantic and Baltic coasts
IE0000286	Kiltartan Cave (Coole) SAC	Lesser horseshoe bat (<i>Rhinolophus hipposideros</i>)
		Caves not open to the public
IE0000297	Lough Corrib SAC	Atlantic salmon (<i>Salmo salar</i>)
		Brook lamprey (<i>Lampetra planeri</i>)
		Freshwater pearl mussel (<i>Margaritifera margaritifera</i>)
		Lesser horseshoe bat (<i>Rhinolophus hipposideros</i>)
		Otter (<i>Lutra lutra</i>)
		Sea lamprey (<i>Petromyzon marinus</i>)
		Slender green feather-moss (<i>Drepanocladus vernicosus</i>)
		Slender naiad (<i>Najas flexilis</i>)
		White-clawed Crayfish (<i>Austropotamobius pallipes</i>)
		Active raised bogs

Site code	Site name	Qualifying Interest
		Alkaline fens
		Bog woodland
		Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>
		Degraded raised bogs still capable of natural regeneration
		Depressions on peat substrates of the Rhynchosporion
		Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
		Limestone pavements
		Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>)
		Old sessile oak woods with Ilex and Blechnum in the British Isles
		Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i>
		Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>)
		Petrifying springs with tufa formation (<i>Cratoneurion</i>)
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)
		Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation
IE0000299	Lough Cutra SAC	Lesser horseshoe bat (<i>Rhinolophus hipposideros</i>)
IE0000304	Lough Rea SAC	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
IE0000318	Peterswell Turlough SAC	Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidention</i> p.p. vegetation
		Turloughs
IE0000322	Rahasane Turlough SAC	Turloughs
IE0000606	Lough Fingall Complex SAC	Lesser horseshoe bat (<i>Rhinolophus hipposideros</i>)
		Alpine and Boreal heaths
		Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>
		Juniperus communis formations on heaths or calcareous grasslands
		Limestone pavements
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)
		Turloughs
IE0000996	Ballyvaughan Turlough SAC	Turloughs
IE0001285	Kiltiernan Turlough SAC	Turloughs
IE0001321	Termon Lough SAC	Turloughs
IE0001913	Sonnagh Bog SAC	Blanket bogs (* if active bog)
IE0001926	East Burren Complex SAC	Lesser horseshoe bat (<i>Rhinolophus hipposideros</i>)

Site code	Site name	Qualifying Interest
		Marsh fritillary (<i>Euphydryas aurinia</i>)
		Otter (<i>Lutra lutra</i>)
		Alkaline fens
		Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)
		Alpine and Boreal heaths
		Calaminarian grasslands of the <i>Violetalia calaminariae</i>
		Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>
		Caves not open to the public
		Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp.
		Juniperus communis formations on heaths or calcareous grasslands
		Limestone pavements
		Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>)
		Petrifying springs with tufa formation (<i>Cratoneurion</i>)
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)
		Turloughs
		Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation
IE0002117	Lough Coy SAC	Turloughs
IE0002180	Gortacarnaun Wood SAC	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles
IE0002181	Drummin Wood SAC	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles
IE0002244	Ardrahan Grassland SAC	Alpine and Boreal heaths
		Juniperus communis formations on heaths or calcareous grasslands
		Limestone pavements
IE0002293	Carrowbaun, Newhall and Ballylee Turloughs SAC	Turloughs
IE0002294	Cahermore Turlough SAC	Turloughs
IE0002295	Ballinduff Turlough SAC	Turloughs
IE0002352	Monivea Bog SAC	Active raised bogs
		Degraded raised bogs still capable of natural regeneration
		Depressions on peat substrates of the <i>Rhynchosporion</i>
IE0004031	Inner Galway Bay SPA	Bar-tailed Godwit (<i>Limosa lapponica</i>)
		Black-headed Gull (<i>Chroicocephalus ridibundus</i>)
		Common Gull (<i>Larus canus</i>)
		Common Tern (<i>Sterna hirundo</i>)
		Cormorant (<i>Phalacrocorax carbo</i>)
		Curlew (<i>Numenius arquata</i>)

Site code	Site name	Qualifying Interest
		Dunlin (<i>Calidris alpina</i>)
		Golden Plover (<i>Pluvialis apricaria</i>)
		Great Northern Diver (<i>Gavia immer</i>)
		Grey Heron (<i>Ardea cinerea</i>)
		Lapwing (<i>Vanellus vanellus</i>)
		Light-bellied Brent Goose (<i>Branta bernicla hrota</i>)
		Red-breasted Merganser (<i>Mergus serrator</i>)
		Redshank (<i>Tringa totanus</i>)
		Ringed Plover (<i>Charadrius hiaticula</i>)
		Sandwich Tern (<i>Sterna sandvicensis</i>)
		Shoveler (<i>Anas clypeata</i>)
		Teal (<i>Anas crecca</i>)
		Turnstone (<i>Arenaria interpres</i>)
		Wigeon (<i>Anas penelope</i>)
IE0004042	Lough Corrib SPA	Arctic Tern (<i>Sterna paradisaea</i>)
		Black-headed Gull (<i>Chroicocephalus ridibundus</i>)
		Common Gull (<i>Larus canus</i>)
		Common Scoter (<i>Melanitta nigra</i>)
		Common Tern (<i>Sterna hirundo</i>)
		Coot (<i>Fulica atra</i>)
		Gadwall (<i>Anas strepera</i>)
		Golden Plover (<i>Pluvialis apricaria</i>)
		Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>)
		Hen Harrier (<i>Circus cyaneus</i>)
		Pochard (<i>Aythya ferina</i>)
		Shoveler (<i>Anas clypeata</i>)
		Tufted Duck (<i>Aythya fuligula</i>)
IE0004056	Lough Cutra SPA	Cormorant (<i>Phalacrocorax carbo</i>)
IE0004089	Rahasane Turlough SPA	Black-tailed Godwit (<i>Limosa limosa</i>)
		Golden Plover (<i>Pluvialis apricaria</i>)
		Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>)
		Whooper Swan (<i>Cygnus cygnus</i>)
		Wigeon (<i>Anas penelope</i>)
IE0004107	Coole-Garryland SPA	Whooper Swan (<i>Cygnus cygnus</i>)
IE0004134	Lough Rea SPA	Coot (<i>Fulica atra</i>)
		Shoveler (<i>Anas clypeata</i>)
IE0004142	Cregganna Marsh SPA	Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>)
IE0004168	Slieve Aughty Mountains SPA	Hen Harrier (<i>Circus cyaneus</i>)
		Merlin (<i>Falco columbarius</i>)

B.13 References

Bailey, M. and Rochford J. (2006) Otter Survey of Ireland 2004/2005. Irish Wildlife Manuals, No. 23. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Coillte. Coillte District Strategic Plan.

DAFM (Department of Agriculture, Fisheries and the Marine).(2014).Forestry Programme 2014-2020: Ireland.

DAFM (Department of Agriculture, Food and Marine). Rural Environmental Protection Scheme (REPS).

DAFM (Department of Agriculture, Food and Marine). Agri-Environmental Options Scheme (AEOS).

DAFM (Department of Agriculture, Food and Marine).(2020). Food Harvest 2020.

DAFM (Department of Agriculture, Food and Marine).(2025). Food Wise 2025.

DAFM (Department of Agriculture, Food and Marine).(2014). National Rural Development Programme 2014-2020.

Department of Communications, Energy and Natural Resources.(2008). National Report for Ireland on Eel Stock Recovery Plan 2008.

DoEHLG (2009 rev 2010) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government.

European Communities (EC) (2000) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission.

EC (2002) 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, Office for Official Publications of the European Communities, Luxembourg. European Commission.

EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. European Commission.

EC (2007) Interpretation Manual of European Union Habitats. Version EUR 27. European Commission.

EPA (Environmental Protection Agency).(2009) River Basin Management Plan (RBMP) for the Western River Basin District in Ireland (2009-2015).

EPA STRIVE (2011). BOGLAND: Sustainable Management of Peatlands in Ireland. University College Dublin (UCD).

Flora (Protection) Order (2015). Statutory Instrument. Published by the Stationery Office, Dublin.

IS (2000) Wildlife (Amendment) Act, 2000.

NPWS (National Parks and Wildlife Services). Freshwater Pearl Mussel Sub-Basin Management Plan

National Parks and Wildlife Service (NPWS) (2008). The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

NBDC (2016) Biodiversity Maps [ONLINE] Available at: <http://maps.biodiversityireland.ie/#/Map>. [Accessed on 21 April 2016].

NPWS (1976) Wildlife Act 1976. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2005) Inner Galway Bay SPA 000297. Site Synopsis. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2011) Actions for Biodiversity 2011-2016, Ireland's National Biodiversity Plan and National Species Action Plans. . National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

NPWS (2013a) Lough Corrib SAC 000297. Site Synopsis. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013b) Galway Bay Complex SAC 000268. Site Synopsis. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013c) Conservation Objectives: Galway Bay Complex SAC 000268. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013f) Conservation Objectives: Inner Galway Bay SPA 004031. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013h) Galway Bay Complex SAC (Site Code 268). Conservation objectives supporting document - Lagoons. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS, (2013g) Inner Galway Bay Special Protection Area (Site Code 4031) Conservation Objectives Supporting Document Version 1. National Parks & Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2014). The Status of EU Protected Habitats and Species in Ireland. Species Assessment Volume 3. Habitats Assessment Volume 2. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Galway City Biodiversity Action Plan

Galway County Council (2015) Galway County Development Plan 2015-2021.

Galway County Council (2011) Galway City Development Plan 2011-2017.

Galway County Council (2017) Galway City Development Plan 2017-2023.

Galway County Council (2015) County Galway Wind Energy Strategy 2015-2021.

GSI (Geological Survey of Ireland). Groundwater Protection Schemes.

Irish Water.(2015). Water Services Strategic Plan 2015.

Met Eireann. (2013). Ireland's Climate: the road ahead. Dublin: Met Eireann.

OPW (Office of Public Works). (2014). Environmental River Enhancement Programme (EREP) 2014.

S.I. (SI No 268). (2006). Shellfish Waters Directive. European Communities (Quality of Shellfish Waters) Regulations 2006.

Water Framework Directive. Corrib Water Management Unit Action Plan

Directive of the European Parliament (2007) Water Framework and Floods Directive, Assessment and management of flood risks - Available at: http://www.cfram.ie/pdfs-downloads/FRM_Directive.pdf

B.14 Appendix B: Conservation objectives of screened Natura 2000 sites

B.14 Appendix B: Conservation objectives of screened Natura 2000 sites



Conservation objectives for Ardrahan Grassland SAC [002244]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
------	-------------

4060	Alpine and Boreal heaths
------	--------------------------

5130	<i>Juniperus communis</i> formations on heaths or calcareous grasslands
------	---

8240	Limestone pavements*
------	----------------------

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Ardrahan Grassland SAC [002244]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*



Conservation objectives for Ballinduff Turlough SAC [002295]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
------	-------------

3180	Turloughs*
------	------------

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Ballinduff Turlough SAC [002295]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*



Conservation objectives for Ballyvaughan Turlough SAC [000996]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
-------------	--------------------

3180	Turloughs*
------	------------

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Ballyvaughan Turlough SAC [000996]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*

National Parks and Wildlife Service

Conservation Objectives Series

Black Head-Poulsallagh Complex SAC 000020



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



**National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,
7 Ely Place, Dublin 2, Ireland.
Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie**

Citation:

**NPWS (201) Conservation Objectives: Black Head-Poulsallagh Complex SAC
000020. Version 1. National Parks and Wildlife Service, Department of Arts,
Heritage and the Gaeltacht.**

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

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Notes/Guidelines:

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

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

000020 Black Head-Poulsallagh Complex SAC

1170	Reefs
1220	Perennial vegetation of stony banks
1395	Petalwort <i>Petalophyllum ralfsii</i>
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation
4060	Alpine and Boreal heaths
5130	Juncus ^ i ^ • { } ~ formations on heaths or calcareous grasslands
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)
6510	Lowland hay meadows (Cichorium ^ i ^ • { } ~ formations on heaths or calcareous grasslands)
7220	Petrifying springs with tufa formation (Cratoneurion)
8240	Limestone pavementsE
8330	Submerged or partially submerged sea caves

Please note that this SAC is adjacent to Galway Bay Complex SAC (000268). 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

NPWS Documents

Year :	1999
Title :	National Shingle Beach Survey of Ireland 1999
Author :	Moore, D.; Wilson, F.
Series :	Unpublished Report to NPWS
Year :	2013
Title :	Conservation status assessment for petrifying springs
Author :	Lyons, M.D.; Kelly, D.L.
Series :	Unpublished report to NPWS
Year :	2013
Title :	Irish semi-natural grasslands survey 2007-2012
Author :	O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; Perrin, P.M.
Series :	Irish Wildlife Manual No. 78
Year :	2013
Title :	National survey of limestone pavement and associated habitats in Ireland
Author :	Wilson, S.; Fernández, F.
Series :	Irish Wildlife Manual No. 73
Year :	2013
Title :	Monitoring survey of Annex I sand dune habitats in Ireland
Author :	Delaney, A.; Devaney, F.M.; Martin, J.R.; Barron, S.J.
Series :	Irish Wildlife Manual No. 75
Year :	2014
Title :	Black Head-Poulsallagh Complex SAC (site code: 020) Conservation objectives supporting document- coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2014
Title :	Black Head-Poulsallagh Complex SAC (site code: 020) Conservation objectives supporting document- water courses V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2014
Title :	Black Head-Poulsallagh Complex SAC (site code: 020) Conservation objectives supporting document- marine habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

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

Year :	2007
Title :	Interpretation manual of European Union habitats
Author :	European Commission
Series :	DG Environment

Year :	2012
Title :	Intertidal reef survey of Black Head-Poulsallagh Complex
Author :	MERC
Series :	Unpublished report to the Marine Institute and NPWS

Year :	2012
Title :	Subtidal reef survey of Black Head-Poulsallagh Complex
Author :	MERC
Series :	Unpublished report to the Marine Institute and NPWS

Year :	2013
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author :	Campbell, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin

Spatial data sources

Year :	Derived 2014
Title :	Coast of Ireland Oblique Imagery Survey 2003
GIS Operations :	Point dataset created from visual inspection of survey
Used For :	8330 (map 3)
Year :	Interpolated 2014
Title :	1994-1995 BioMar surveys; 2011 reef surveys
GIS Operations :	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising
Used For :	1170, marine community types (maps 3 and 4)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present
Used For :	Marine community types base data (map 4)
Year :	2014
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1395 (map 5)
Year :	Revision 2012
Title :	National Shingle Beach Survey
GIS Operations :	Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1220 (map 5)
Year :	2013
Title :	Sand Dune Monitoring Project 2011. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used
Used For :	1220 (map 5)
Year :	Derived 2014
Title :	Internal NPWS files
GIS Operations :	Dataset created from spatial reference contained in files
Used For :	7220 (map 6)
Year :	2013
Title :	National Survey of Limestone Pavement and Associated Habitats in Ireland distribution data
GIS Operations :	Dataset clipped to the SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	8240 (map 6)
Year :	Derived 2014
Title :	Internal NPWS files
GIS Operations :	Dataset created from spatial references supplied by NPWS experts. Expert opinion used as necessary to resolve any issues arising
Used For :	3260 (map 6)

Conservation Objectives for : Black Head-Poulsallagh Complex SAC [000020]

1170 Reefs

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 3	Habitat area estimated as 541ha from 1994-1996 BioMar surveys (Picton and Costello, 1997) and 2011 intertidal and subtidal reef surveys (MERC, 2012)
Distribution	Occurrence	The distribution of reefs is stable or increasing, subject to natural processes. See map 3 for mapped distribution	Based on information from 1994-1996 BioMar surveys (Picton and Costello, 1997) and 2011 intertidal and subtidal reef surveys (MERC, 2012)
Community structure	Biological composition	Conserve the following community types in a natural condition: Intertidal reef community complex; <i>Laminaria</i> -dominated community complex. See map 4	Likely area of reef communities was derived from 1994-1996 BioMar surveys (Picton and Costello, 1997) and 2011 intertidal and subtidal reef surveys (MERC, 2012). See marine supporting document for further details

Conservation Objectives for : Black Head-Poulsallagh Complex SAC [000020]

1220 Perennial vegetation of stony banks

To maintain the favourable conservation condition of Perennial vegetation of stony banks in Black Head-Poulsallagh Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Fanore- 0.22ha	Current area within the SAC is unknown. It was recorded from Poulmagrahaun and Poulsallagh during the National Shingle Beach Survey (NSBS) (Moore and Wilson, 1999), but the extent was not mapped. One area of vegetated shingle was recorded at Fanore during the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). NB further unsurveyed areas maybe present within the SAC. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 5 for mapped locations	Full distribution unknown at present, although the habitat was recorded at Poulmagrahaun and Poulsallagh (Moore and Wilson, 1999). It was also recorded from Fanore by Delaney et al. (2013)
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Moore and Wilson (1999) and Delaney et al. (2013). Shingle features are relatively stable in the long term. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Moore and Wilson (1999) and Delaney et al. (2013). At Poulmagrahaun and Poulsallagh, associated habitats include lowland karst and intertidal shingle. At Fanore, a range of coastal habitats, such as strandline, embryo dunes, mobile dunes and fixed dunes, occur adjacent to the vegetated shingle. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the typical vegetated shingle flora including the range of sub-communities within the different zones	Based on data from Moore and Wilson (1999) and Delaney et al. (2013). The population of rock samphire (<i>Crithmum maritimum</i>) at Poulsallagh was considered during the NSBS to be the best in the region. See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Moore and Wilson (1999) and Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See coastal habitats supporting document for further details

Conservation Objectives for : Black Head-Poulsallagh Complex SAC [000020]

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 Black Head-Poulsallagh Complex 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. See map 6	A nutrient poor, highly calcareous sub-type of this habitat occurs in the Caher River. This river (calculated as 7.4km long) is of international conservation importance, with in-stream tufaceous springs forming an integral part of the 3260 habitat. These springs also form part of the range of the priority Annex I habitat Petrifying springs with tufa formation (Cratoneurion) (7220) in the SAC. See Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document and the conservation objective for 7220 for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 6	See Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document for further details
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regime	See Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document for further details
Hydrological regime: groundwater discharge	Metres per second	Maintain appropriate hydrological regime	See Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document for further details
Substratum composition: particle size range	Millimetres	Maintain appropriate substratum particle size range, quantity and quality, subject to natural process	See Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document for further details
Calcium carbonate deposition/tufa formation	Various	Maintain appropriate calcium carbonate concentration in groundwater and appropriate deposition rates in the river to support the natural structure and functioning of the habitat	See Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document for further details
Water quality	Various	Maintain appropriate water quality to support the natural structure and functioning of the habitat	See Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document for further details
Vegetation composition: typical species	Occurrence	The typical species of the Caher River tufaceous sub-type should be present and in good condition	See Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document for further details
Vegetation composition: communities	Occurrence	The characteristic communities of the Caher River tufaceous sub-type should be present, in good condition and should not decline in area (subject to natural processes)	See Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document for further details
Floodplain connectivity	Hectares	The area of active floodplain at and upstream of the habitat should be maintained	See Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document for further details

Riparian habitat	Hectares	The area and condition of riparian habitats, notably hazel (<i>Corylus avellana</i>) woodland, should be maintained	See Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation supporting document for further details
------------------	----------	---	--

Conservation Objectives for : Black Head-Poulsallagh Complex SAC [000020]

4060 Alpine and Boreal heaths

To maintain the favourable conservation condition of Alpine and Boreal heaths in Black Head-Poulsallagh Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Alpine and Boreal heaths occurs in intimate association with other Annex I habitats in this SAC: <i>Juniperus communis</i> formations on heaths or calcareous grasslands (5130); Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco- Brometalia) (6210); Petrifying springs with tufa formation (Cratoneurion) (7220); Limestone pavements (8240). Therefore, these habitats cannot easily be mapped or considered separately. Conservation objectives for all these habitats should be used in conjunction with each other as appropriate
Habitat distribution	Occurrence	No decline, subject to natural processes	See notes for area above
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present	List of positive indicator species identified by the national survey of limestone pavement and associated habitats (Wilson and Fernandez, 2013). This document should be consulted for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of monitoring stops	Negative indicator species collectively not more than 10% cover	List of negative indicator species identified by Wilson and Fernandez (2013)
Vegetation composition: non-native species	Percentage cover at a representative number of monitoring stops	Non-native species not more than 1% cover	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: trees and shrubs	Percentage cover at a representative number of monitoring stops	Cover of trees and shrubs (except juniper (<i>Juniperus communis</i>)) not more than 25%	Attribute and target based on Wilson and Fernandez (2013)
Physical structure: disturbance	Percentage cover at a representative number of monitoring stops	Less than 10% disturbed bare ground (excluding rocks/stones)	Attribute and target based on Wilson and Fernandez (2013)
Indicators of local distinctiveness	Occurrence	Indicators of local distinctiveness are maintained	Includes red-data and other rare or localised species as well as archaeological and geological features, which often support distinctive species

Conservation Objectives for : Black Head-Poulsallagh Complex SAC [000020]

5130 >i b]dYfi g'Wta a i b]g formations on heaths or calcareous grasslands

To maintain the favourable conservation condition of *Juniperus communis* formations on heaths or calcareous grasslands in Black Head-Poulsallagh Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	<i>Juniperus communis</i> formations on heaths or calcareous grasslands occurs in intimate association with other Annex I habitats in this SAC: Alpine and Boreal heaths (4060); Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco- Brometalia) (6210); Petrifying springs with tufa formation (Cratoneurion) (7220); Limestone pavements (8240). Therefore, these habitats cannot easily be mapped or considered separately. Conservation objectives for all these habitats should be used in conjunction with each other as appropriate. Cooper et al. (2012) surveyed and mapped one juniper formation within the SAC. Wilson and Valverde (2013) also recorded this habitat
Habitat distribution	Occurrence	No decline, subject to natural processes	See notes for area above
Juniper: population size	Number per formation	At least 50 juniper plants per formation	To classify as a juniper formation, at least 50 plants should be present (Cooper et al., 2012). The surveyed formation (by Cooper et al. (2012)) contained at least 1000 plants
Vegetation composition: typical species	Number per formation	At least 50% of the listed positive indicator species for the relevant vegetation group present	The surveyed juniper formation (by Cooper et al. (2012)) is within vegetation group 1 (<i>Carex flacca-Succisa pratensis</i> group). See Cooper et al. (2012) for positive indicator species
Vegetation composition: negative indicator species	Occurrence per formation	Negative indicator species, particularly non-native invasive species, absent or under control	Negative indicator species listed by Cooper et al. (2012)
Vegetation structure: cone-bearing plants	Percentage per formation	At least 10% of juniper plants are bearing cones	Attribute and target based on Cooper et al. (2012)
Vegetation structure: seedling recruitment	Percentage per formation	At least 10% of juniper plants are seedlings	Attribute and target based on Cooper et al. (2012)
Vegetation structure: dead juniper	Percentage per formation	Mean percentage of each juniper plant dead less than 10%	Attribute and target based on Cooper et al. (2012)

Conservation Objectives for : Black Head-Poulsallagh Complex SAC [000020]

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*)(*important orchid sites)

To maintain the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) in Black Head-Poulsallagh Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco- Brometalia</i>) occurs in intimate association with other Annex I habitats in this SAC: Alpine and Boreal heaths (4060); <i>Juniperus communis</i> formations on heaths or calcareous grasslands (5130); Petrifying springs with tufa formation (Cratoneurion) (7220); Limestone pavements (8240). Therefore, these habitats cannot easily be mapped or considered separately. Conservation objectives for all these habitats should be used in conjunction with each other as appropriate. O'Neill et al. (2013) surveyed and mapped some areas of this habitat within the SAC in detail, as did Wilson and Fernandez (2013)
Habitat distribution	Occurrence	No decline, subject to natural processes	See notes for area above
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present, including two "high quality" species	List of positive indicator species, including high quality species, identified by the Irish semi-natural grasslands survey (O'Neill et al., 2013). This document should be consulted for further details
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%	List of negative indicator species identified by O'Neill et al. (2013)
Vegetation composition: non-native species	Percentage 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). Wilson and Fernandez (2013) list red valerian (<i>Centranthus ruber</i>) and cotoneaster (<i>Cotoneaster</i> sp.) as non-native species particularly associated with this habitat and limestone pavement in the Burren
Vegetation composition: woody species and bracken	Percentage at a representative number of monitoring stops	Cover of woody species (except certain listed species) and bracken (<i>Pteridium aquilinum</i>) not more than 5%	Woody species that can occur above 5% cover are juniper (<i>Juniperus communis</i>), burnet rose (<i>Rosa spinosissima</i>), mountain avens (<i>Dryas octopetala</i>) and hoary rock-rose (<i>Helianthemum oelandicum</i>). However, cover of these species above 25% may indicate transition to another Annex I habitat such as Alpine and Boreal heaths (4060) or <i>Juniperus communis</i> formations (5130). Attribute and target based on O'Neill et al. (2013)
Vegetation structure: broadleaf herb: grass ratio	Percentage at a representative number of monitoring stops	Broadleaf herb component of vegetation between 40 and 90%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: sward height	Percentage at a representative number of monitoring stops	At least 30% of sward between 5cm and 40cm tall	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: litter	Percentage at a representative number of monitoring stops	Litter cover not more than 25%	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare soil	Percentage at a representative number of monitoring stops	Not more than 10% bare soil	Attribute and target based on O'Neill et al. (2013)
Physical structure: disturbance	Square metres	Area showing signs of serious grazing or other disturbance less than 20m ²	Attribute and target based on O'Neill et al. (2013)

Conservation Objectives for : Black Head-Poulsallagh Complex SAC [000020]

6510 Lowland hay meadows (5`cdYWfi g`dfUHYbg]g, GUb[i]gcfVUcZV]bU]g)

To maintain the favourable conservation condition of Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) in Black Head-Poulsallagh Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Extent of this habitat in this SAC is currently unknown. Internal NPWS files note meadows with some of the indicator species; however, further work is required to establish the nature and extent of this habitat in the SAC, particularly as management by mowing needs to be taken into account
Habitat distribution	Occurrence	No decline, subject to natural processes	Distribution of this habitat in this SAC is currently unknown. See notes for area above
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present, including one "high quality" species as listed in O'Neill et al. (2013)	List of positive indicator species, including high quality species, identified by the Irish semi-natural grasslands survey (O'Neill et al., 2013). This document should be consulted for further details
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%	List of negative indicator species identified by O'Neill et al. (2013)
Vegetation composition: non-native species	Percentage 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)
Vegetation composition: woody species and bracken	Percentage at a representative number of monitoring stops	Cover of woody species and bracken (<i>Pteridium aquilinum</i>) not more than 5%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: broadleaf herb: grass ratio	Percentage at a representative number of monitoring stops	Broadleaf herb component of vegetation between 40 and 90%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: sward height	Percentage at a representative number of monitoring stops	At least 50% of sward between 10cm and 50cm tall	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: litter	Percentage at a representative number of monitoring stops	Litter cover not more than 25%	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare soil	Percentage at a representative number of monitoring stops	Not more than 5% bare soil	Attribute and target based on O'Neill et al. (2013)
Physical structure: disturbance	Square metres	Area showing signs of serious grazing or other disturbance less than 20m ²	Attribute and target based on O'Neill et al. (2013)

Conservation Objectives for : Black Head-Poulsallagh Complex SAC [000020]

7220 Petrifying springs with tufa formation (*Cratoneurion*)

To maintain the favourable conservation condition of Petrifying springs with tufa formation (*Cratoneurion*) in Black Head-Poulsallagh Complex 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	10 spring/spring complexes have been recorded in the site (internal NPWS files); however, habitat extent is not yet known. NB further areas of the habitat almost certainly occur within this SAC
Habitat distribution	Occurrence	No decline. See map 6 for recorded locations	This habitat has been recorded at 10 locations within the SAC and is associated with other habitats including limestone pavement (8240) and water courses of plain to montane levels (3260). Lyons and Kelly (2013) recognise three main subtypes of spring. The springs in this SAC fall into the inland non-wooded springs subtype (the other two subtypes being woodland springs and coastal springs) and within this subtype, karst springs are recognised as a distinct group. NB further areas of the habitat almost certainly occur within this SAC. See also the conservation objective for 3260
Hydrological regime: height of water table; water flow	Metres; metres per second	Maintain appropriate hydrological regimes	The hydrological regimes of individual springs are currently unknown in detail. Petrifying springs rely on permanent irrigation, usually from upwelling groundwater sources or seepage sources. In karst areas, water tends to flow away rapidly over bare rock surfaces, even on fairly flat ground (Lyons and Kelly, 2013)
Water quality	Water chemistry measures	Maintain oligotrophic and calcareous conditions	Water chemistry is currently unknown for springs in this SAC. Characteristically, petrifying spring water has high values for pH, alkalinity and dissolved calcium and is oligotrophic (Lyons and Kelly, 2013)
Vegetation composition: typical species	Occurrence	Maintain typical species	The bryophyte <i>Palustriella commutata</i> (<i>Cratoneuron commutatum</i>) is diagnostic of petrifying springs (EC, 2007) and is found in this habitat in the SAC (internal NPWS files). <i>Orthothecium rufescens</i> is recorded on the north-facing slopes of Black Head- its only recorded location in Ireland outside the northwest of the country (Lyons and Kelly, 2013), while the vascular species large-flowered butterwort (<i>Pinguicula grandiflora</i>) is also listed as being present at a number of springs on Cappanawalla. These two species can be indicative of petrifying spring habitat in the Burren (Lyons and Kelly, 2013)

Conservation Objectives for : Black Head-Poulsallagh Complex SAC [000020]

8240 Limestone pavements

To maintain the favourable conservation condition of Limestone pavements in Black Head-Poulsallagh Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable, subject to natural processes	Limestone pavements occurs in intimate association with other Annex I habitats in this SAC: Alpine and Boreal heaths (4060); <i>Juniperus communis</i> formations on heaths or calcareous grasslands (5130); Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (6210); Petrifying springs with tufa formation (Cratoneurion) (7220). Therefore, these habitats cannot easily be mapped or considered separately. Conservation objectives for all these habitats should be used in conjunction with each other as appropriate. Wilson and Fernandez (2013) mapped the indicative area of limestone pavement, including associated habitats as 5,572ha (map 6). Four sites within the SAC were surveyed in detail as part of the national survey of limestone pavement and associated habitats (Wilson and Fernandez, 2013). This survey should be consulted for further details
Habitat distribution	Occurrence	No decline. Map 6 shows indicative distribution, including associated habitats	See notes for area above. Based on data from Wilson and Fernandez (2013). This habitat is split into exposed pavement and wooded pavement. In this SAC, the area of wooded pavement is relatively small
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present	Positive indicator species for exposed and wooded pavement are listed in Wilson and Fernandez (2013)
Vegetation composition: bryophyte layer	Percentage at a representative number of monitoring stops	Bryophyte cover at least 50% on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Collective cover of negative indicator species on exposed pavement not more than 1%	Negative indicator species listed in Wilson and Fernandez (2013). Negative indicator species for wooded pavement overlap with non-native species (below)
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1% on exposed pavement; on wooded pavement not more than 10% with no regeneration	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: scrub	Percentage at a representative number of monitoring stops	Scrub cover no more than 25% of exposed pavement	Attribute and target based on Wilson and Fernandez (2013). This SAC has very little scrub cover compared with areas further inland
Vegetation composition: bracken cover	Percentage at a representative number of monitoring stops	Bracken (<i>Pteridium aquilinum</i>) cover no more than 10% on exposed pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation structure: woodland canopy	Percentage at a representative number of monitoring stops	Canopy cover on wooded pavement at least 30%	Wooded limestone pavement in this SAC is mostly low-growing hazel (<i>Corylus avellana</i>) woodland, some of which can be classified as Atlantic hazel woodland, an internationally rare woodland type. Despite its low stature it is nonetheless an important habitat for woodland species. Attribute and target based on Wilson and Fernandez (2013)
Vegetation structure: dead wood	Occurrence in a representative number of monitoring stops	Sufficient quantity of dead wood on wooded pavement to provide habitat for saproxylic organisms	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem

Physical structure: disturbance	Occurrence in a representative number of monitoring stops	No evidence of grazing pressure on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)
Indicators of local distinctiveness	Occurrence	Indicators of local distinctiveness are maintained	Includes red-data and other rare or localised species as well as archaeological and geological features, which often support distinctive species

Conservation Objectives for : Black Head-Poulsallagh Complex SAC [000020]

8330 Submerged or partially submerged sea caves

To maintain the favourable conservation condition of Submerged or partially submerged sea caves in Black Head-Poulsallagh Complex SAC, which is defined by the following list of attributes and targets:

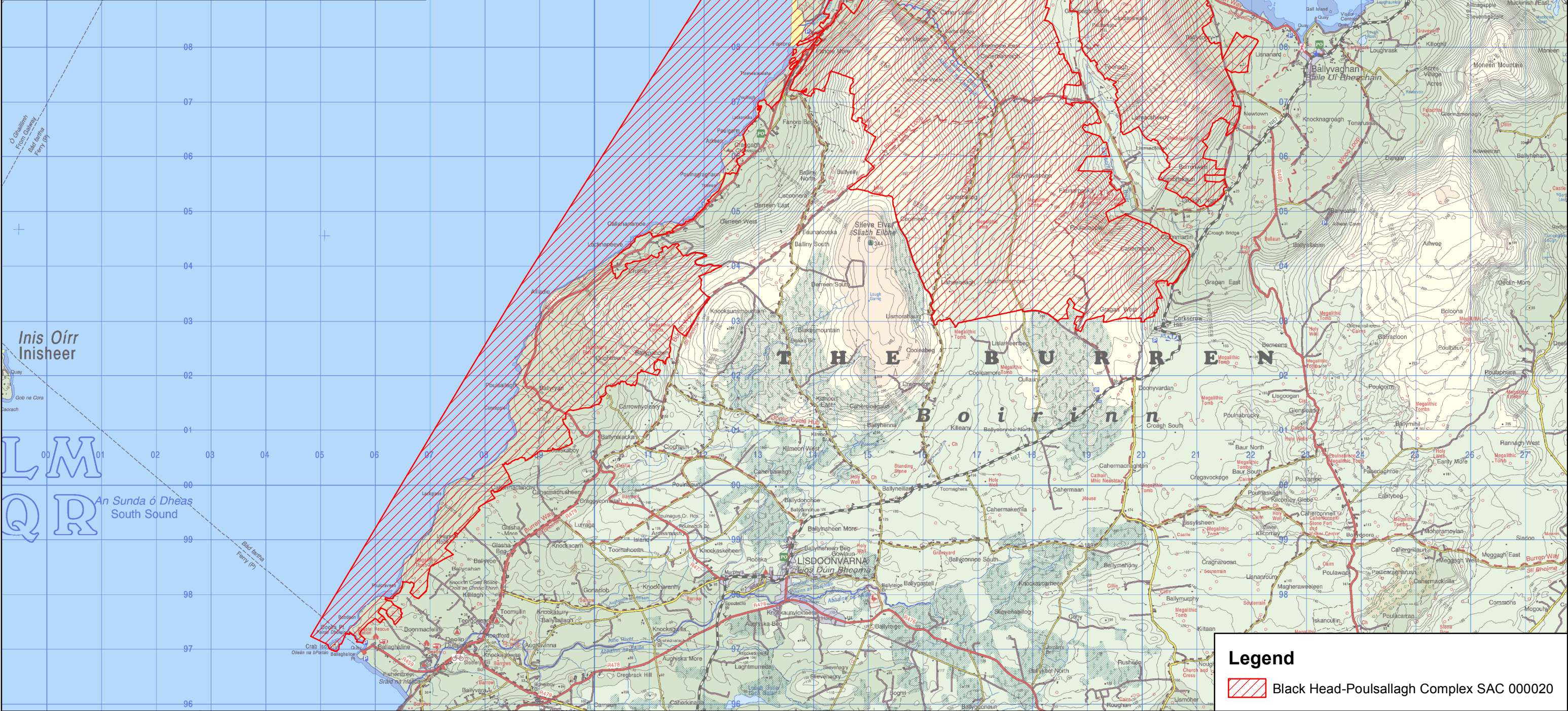
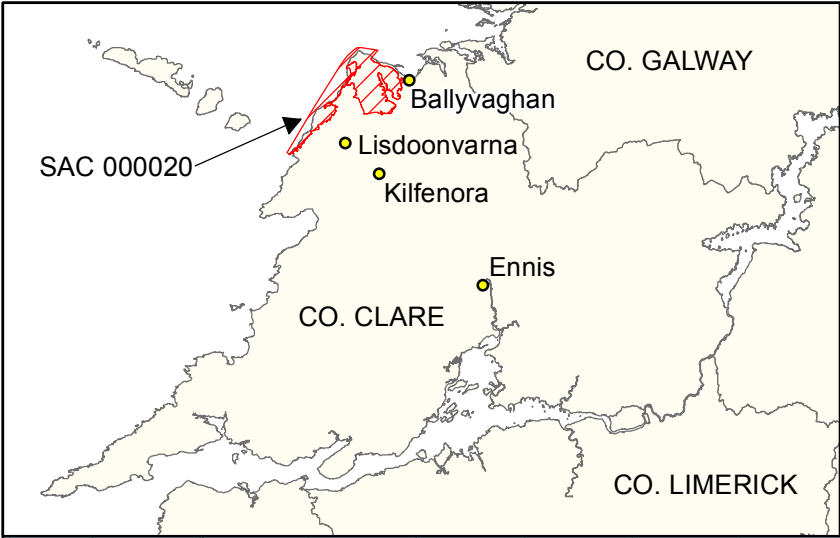
Attribute	Measure	Target	Notes
Distribution	Occurrence	The distribution of sea caves is stable, subject to natural processes. See map 3 for known caves	Sea cave distribution at this site was derived from an oblique aerial survey and therefore only detects the presence of sea caves visible intertidally in the flight path. NB other sea caves may occur within the SAC
Community structure	Biological composition	Human activities should occur at levels that do not adversely affect the ecology of sea caves in this SAC	See marine supporting document for further details

Conservation Objectives for : Black Head-Poulsallagh Complex SAC [000020]

1395 Petalwort *Petalophyllum ralfsii*

To maintain the favourable conservation condition of Petalwort in Black Head-Poulsallagh Complex SAC, which is defined by the following list of attributes and targets:

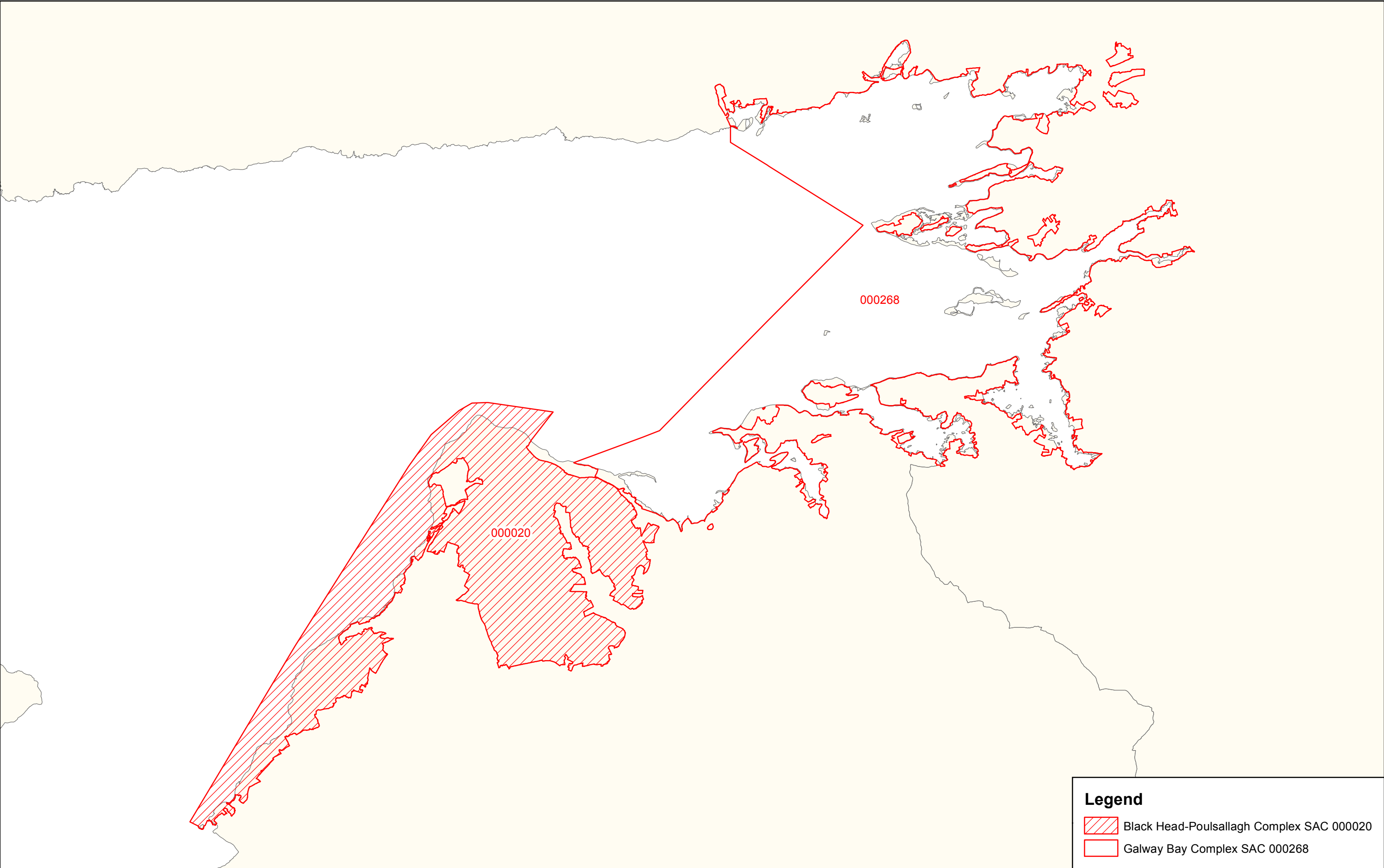
Attribute	Measure	Target	Notes
Distribution of populations	Number and geographical spread	No decline of known population at Fanore. See map 5	The population at Fanore occurs on a trampled path in a damp flat depression strewn with large limestone boulders between sand dunes. Data from NPWS surveys and Campbell (2013)
Population size	Number of individuals	No decline. The population at Fanore is estimated at c.400 thalli	Population derived from mean of number of thalli in three 1 x 1m plots, from three counts from April 2009 to March 2011 (Campbell, 2013); 11.3 thalli per m ² in 35 m ² = 396 thalli (c.400 thalli)
Area of suitable habitat	Hectares	No decline. Area of suitable habitat at Fanore is estimated to be c.0.04ha	The area of occupancy of <i>P. ralfsii</i> at Fanore as measured by GPS mapping is c.70m ² (Campbell, 2013). However, not all of this is suitable and the extent of suitable habitat at Fanore is estimated to be ca. 50% of this figure, i.e. c.35 m ²
Hydrological conditions: soil moisture	Occurrence of damp soil conditions	Maintain hydrological conditions so that substrate is kept moist and damp throughout the year, but not subject to prolonged inundation by flooding in winter	<i>Petalophyllum ralfsii</i> grows in damp sand. Based on Campbell (2013)
Vegetation: open structure	Height and percentage cover of vegetation	Maintain open, low vegetation, with a high percentage cover of bryophytes (small acrocarps and liverwort turf) and bare ground	<i>Petalophyllum ralfsii</i> grows in compacted, sandy ground, maintained by rabbit (<i>Oryctolagus cuniculus</i>) grazing and trampling (by walkers). Campbell (2013) recorded a mean height of vegetation of 2.1cm, with bryophyte cover c.26-90% and bare ground c.3-25% (based on three 1 x 1m plots from 2009 and 2011)

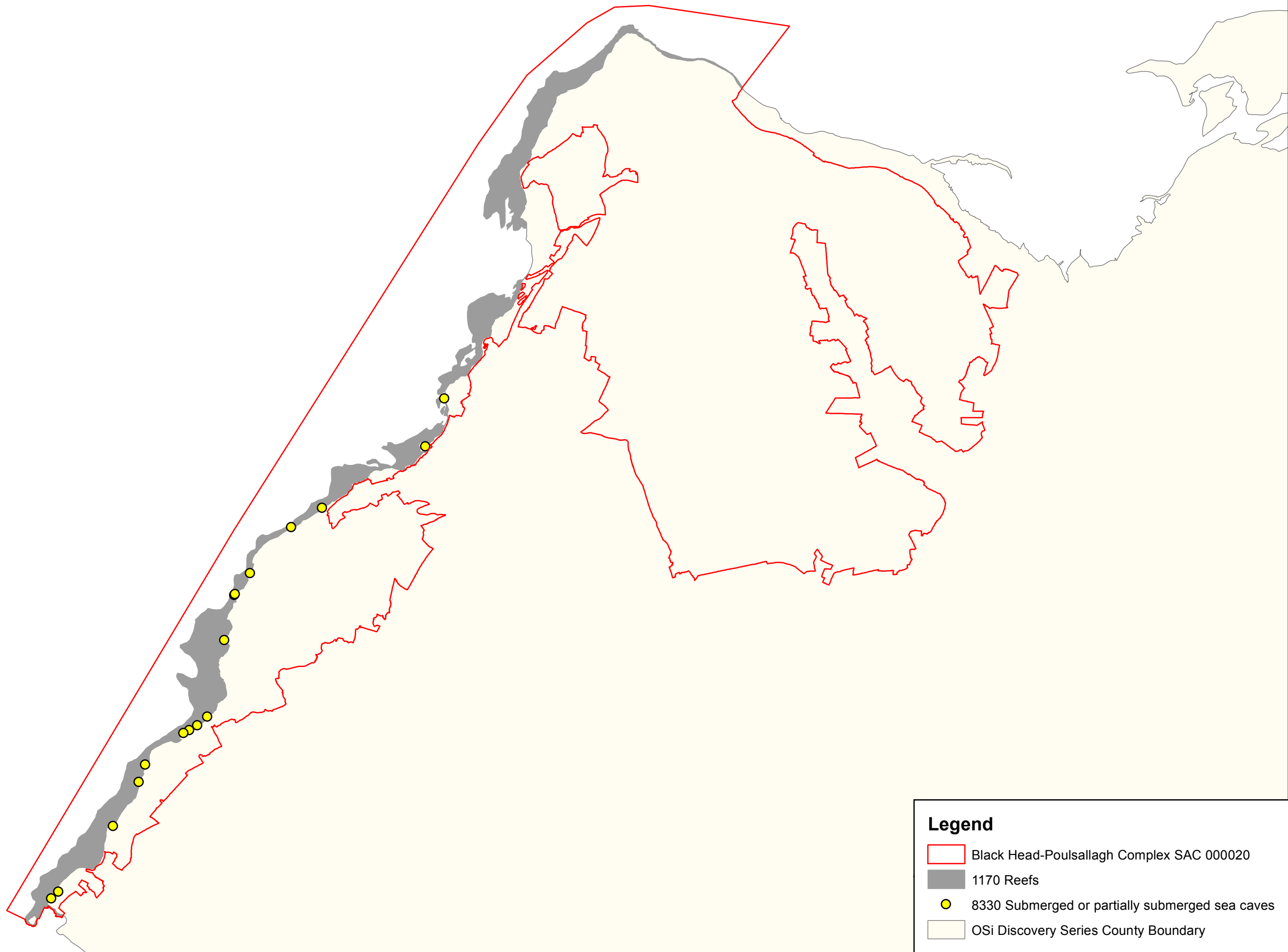


Legend

 Black Head-Poulsallagh Complex SAC 000020

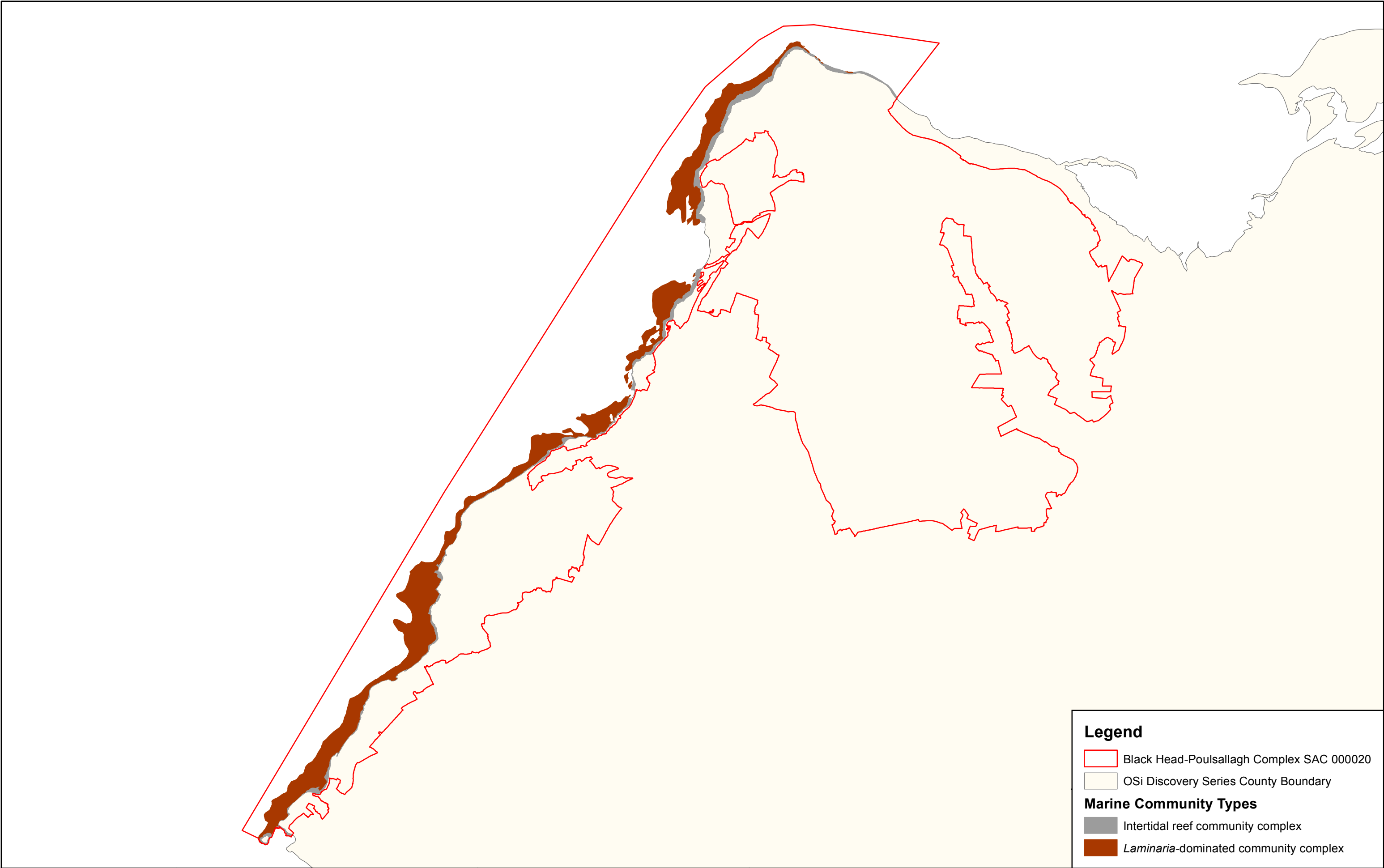










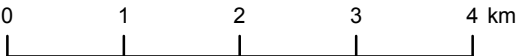
Legend

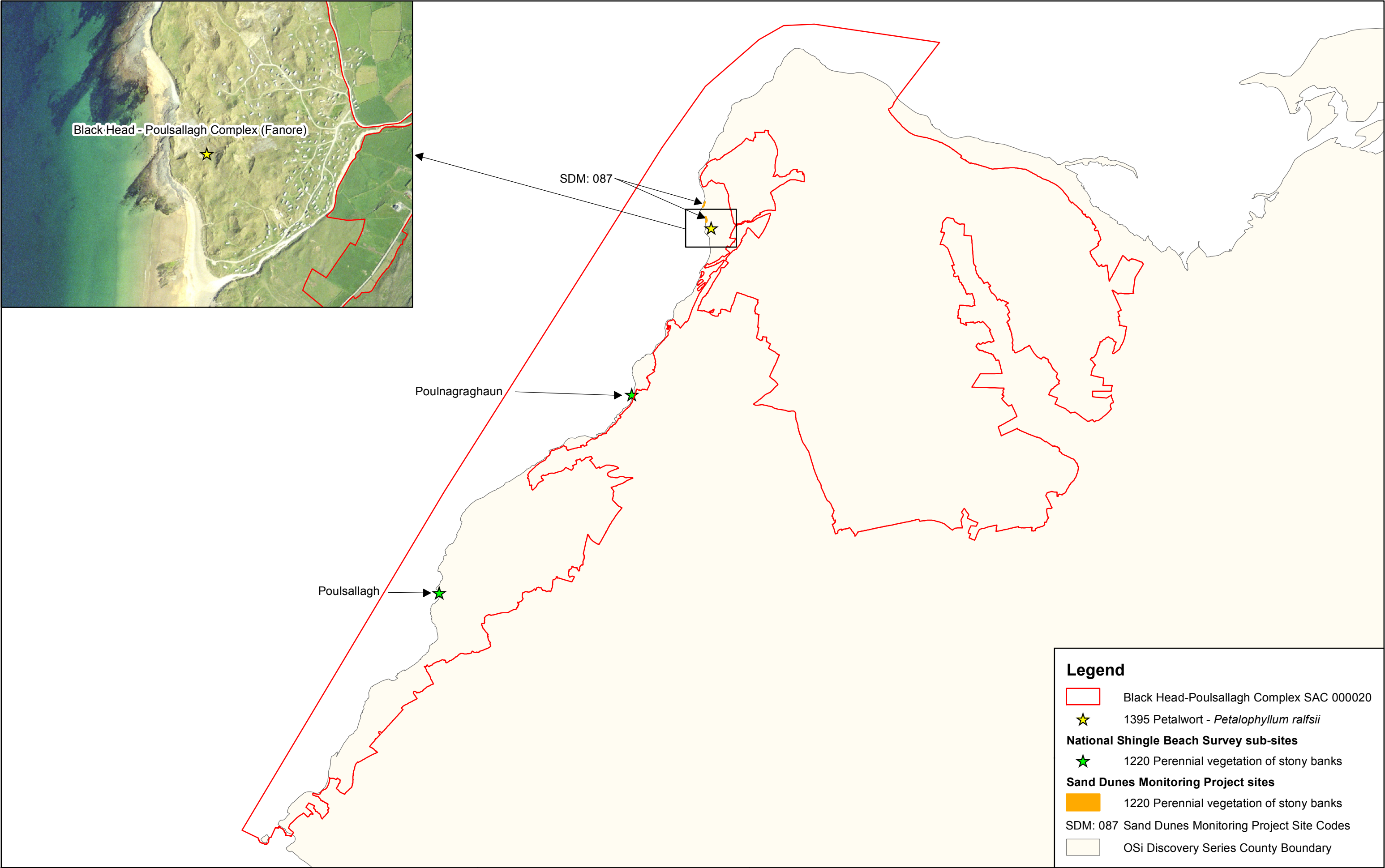
- Black Head-Poulsallagh Complex SAC 000020
- 1170 Reefs
- 8330 Submerged or partially submerged sea caves
- OSi Discovery Series County Boundary

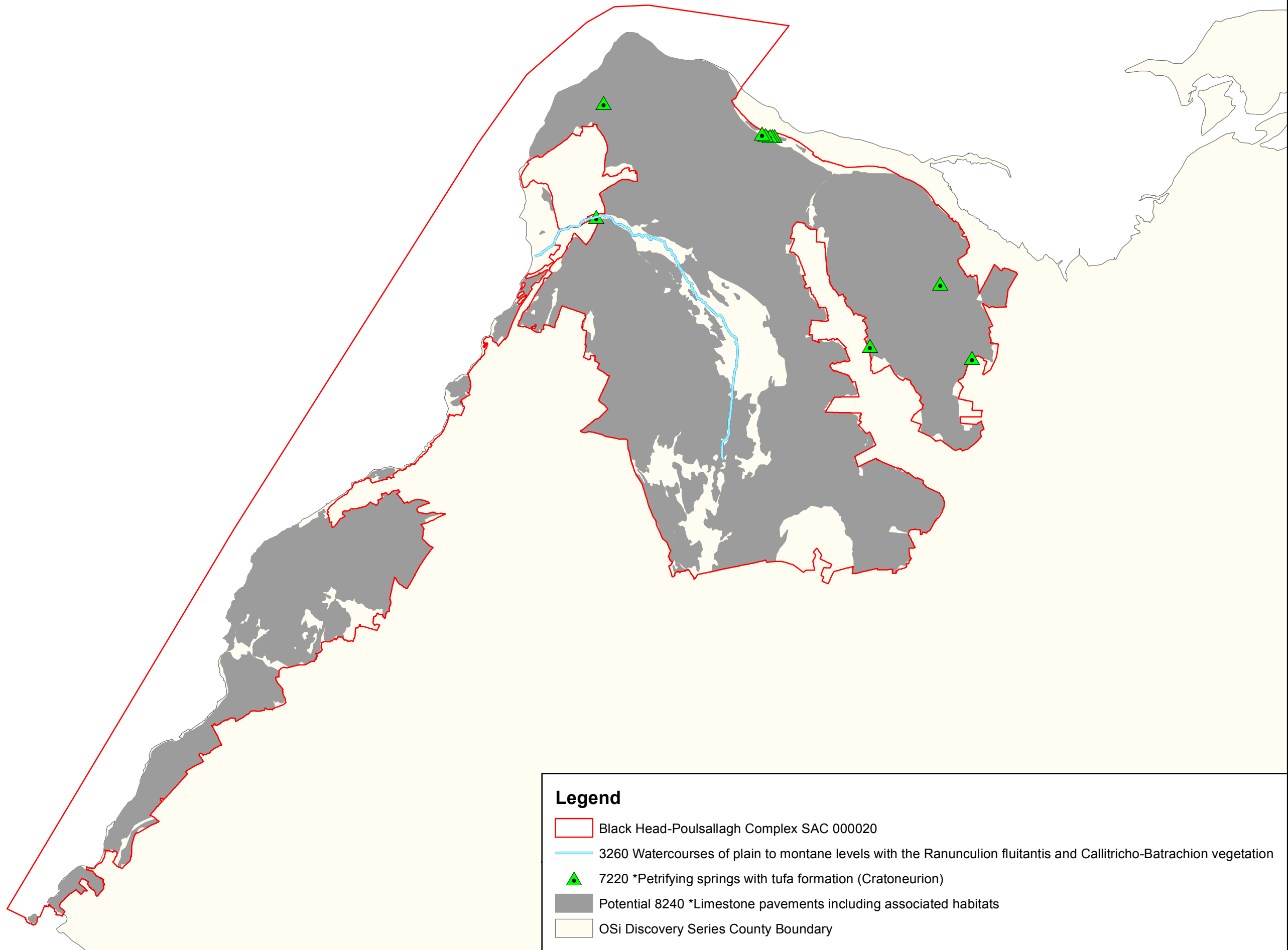


Legend

-  Black Head-Poulsallagh Complex SAC 000020
-  OSi Discovery Series County Boundary
- Marine Community Types**
-  Intertidal reef community complex
-  *Laminaria*-dominated community complex







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

MAP 6:
BLACK HEAD-POULSALLAGH COMPLEX SAC
CONSERVATION OBJECTIVES
FLOATING RIVER VEGETATION,
PETRIFYING SPRINGS &
LIMESTONE PAVEMENTS
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 000020; version 3.01. CO. CLARE

0 1 2 3 4 km

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

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



Map Version 1
Date: May 2014



Conservation objectives for Caherglassaun Turlough SAC [000238]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
------	-------------

3180	Turloughs*
------	------------

3270	Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidens</i> p.p. vegetation
------	--

* denotes a priority habitat

Code	Common Name	Scientific Name
1303	Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>



Citation: NPWS (2016) *Conservation objectives for Caherglassaun Turlough SAC [000238]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*



Conservation objectives for Cahermore Turlough SAC [002294]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
------	-------------

3180	Turloughs*
------	------------

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Cahermore Turlough SAC [002294]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*



Conservation objectives for Carrowbaun, Newhall and Ballylee Turloughs SAC [002293]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
-------------	--------------------

3180	Turloughs*
------	------------

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Carrowbaun, Newhall and Ballylee Turloughs SAC [002293]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*



Conservation objectives for Castletaylor Complex SAC [000242]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
3180	Turloughs*
4060	Alpine and Boreal heaths
5130	<i>Juniperus communis</i> formations on heaths or calcareous grasslands
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco Brometalia</i>) (* important orchid sites)*
8240	Limestone pavements*

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Castletaylor Complex SAC [000242]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*



Conservation objectives for Coole-Garryland Complex SAC [000252]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation
3180	Turloughs*
3270	Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidens</i> p.p. vegetation
5130	<i>Juniperus communis</i> formations on heaths or calcareous grasslands
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)*
8240	Limestone pavements*
91J0	<i>Taxus baccata</i> woods of the British Isles*

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Coole-Garryland Complex SAC [000252]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*



Conservation objectives for Coole-Garryland SPA [004107]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A038	Whooper Swan	<i>Cygnus cygnus</i>



Citation: NPWS (2016) *Conservation objectives for Coole-Garryland SPA [004107]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*

Conservation objectives for Cregganna Marsh SPA [004142]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A395	Greenland White-fronted Goose	<i>Anser albifrons flavirostris</i>



Citation: NPWS (2016) *Conservation objectives for Cregganna Marsh SPA [004142]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*



Conservation objectives for Drummin Wood SAC [002181]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
------	-------------

91A0	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles
------	---

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Drummin Wood SAC [002181]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*

Conservation objectives for East Burren Complex SAC [001926]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
3140	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp.
3180	Turloughs*
3260	Water courses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachion</i> vegetation
4060	Alpine and Boreal heaths
5130	<i>Juniperus communis</i> formations on heaths or calcareous grasslands
6130	Calaminarian grasslands of the <i>Violetalia calaminariae</i>
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)*
6510	Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>)



- 7210 Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae*
- 7220 Petrifying springs with tufa formation (Cratoneurion)*
- 7230 Alkaline fens
- 8240 Limestone pavements*
- 8310 Caves not open to the public
- 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)*

* denotes a priority habitat

Code	Common Name	Scientific Name
1065	Marsh Fritillary	<i>Euphydryas aurinia</i>
1303	Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>
1355	Otter	<i>Lutra lutra</i>

Citation: NPWS (2016) Conservation objectives for East Burren Complex SAC [001926]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

National Parks and Wildlife Service

Conservation Objectives Series

Galway Bay Complex SAC 000268



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



**National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,
7 Ely Place, Dublin 2, Ireland.
Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie**

Citation:

**NPWS (2013) Conservation Objectives: Galway Bay Complex SAC 000268.
Version 1. National Parks and Wildlife Service, Department of Arts, Heritage
and the Gaeltacht.**

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

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Notes/Guidelines:

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

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

000268	Galway Bay Complex SAC
1140	Mudflats and sandflats not covered by seawater at low tide
1150	Coastal lagoons*
1160	Large shallow inlets and bays
1170	Reefs
1220	Perennial vegetation of stony banks
1310	<i>Ulex</i> and other annuals colonising mud and sand
1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)
1355	Otter <i>Lutra lutra</i>
1365	Harbour seal <i>Phoca vitulina</i>
1410	Mediterranean salt meadows (<i>Juncetalia maritimi</i>)
3180	Turloughs*
5130	<i>Ranunculus</i> formations on heaths or calcareous grasslands
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco Brometalia</i>)(*important orchid sites)
7210	Calcareous fens with <i>Cladonia</i> and species of the <i>Caricion davallianae</i> *
7230	Alkaline fens

Please note that this SAC overlaps with Inner Galway Bay SPA (004031) and adjoins Moneen Mountain SAC (000054). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

Year :	1980
Title :	An assessment of the status of the common seal <i>Phoca vitulina vitulina</i> in Ireland
Author :	Summers, C.F.; Warner, P.J.; Nairn, R.G.W.; Curry, M.G.; Flynn, J.
Series :	Biological Conservation 17: 115-123
Year :	1982
Title :	Otter survey of Ireland
Author :	Chapman, P.J.; Chapman, L.L.
Series :	Unpublished Report to Vincent Wildlife Trust
Year :	1983
Title :	An assessment of the breeding populations of common seals (<i>Phoca vitulina vitulina</i>) in the Republic of Ireland during 1979
Author :	Warner, P.J.
Series :	Irish Naturalist's Journal 21: 24-26
Year :	1991
Title :	The spatial organization of otters (<i>Lutra lutra</i>) in Shetland
Author :	Kruuk, H.; Moorhouse, A.
Series :	J. Zool, 224: 41-57
Year :	1999
Title :	National Shingle Beach Survey of Ireland
Author :	Moore, D.; Wilson, F.
Series :	Unpublished Report to NPWS
Year :	2002
Title :	Distribution of the Harbour Seal (<i>Phoca vitulina</i>) in greater Galway Bay
Author :	Doyle, T.
Series :	Unpublished BSc. (hons.) thesis, NUI Galway
Year :	2006
Title :	Otters - ecology, behaviour and conservation
Author :	Kruuk, H.
Series :	Oxford University Press
Year :	2007
Title :	Inventory of Irish coastal lagoons (version 2)
Author :	Oliver, G.
Series :	Unpublished Report to NPWS
Year :	2007
Title :	Saltmarsh Monitoring Project 2006
Author :	McCorry, M.
Series :	Unpublished Report to NPWS
Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, C.; Swann, M.
Series :	Unpublished Report to NPWS

Year :	2009
Title :	Saltmarsh Monitoring Project 2007-2008
Author :	McCorry, M.; Ryle, T.
Series :	Unpublished Report to NPWS
Year :	2010
Title :	Monitoring and Assessment of Irish Lagoons for the purpose of the EU Water Framework Directive
Author :	Roden, C.M.; Oliver, G.
Series :	EPA
Year :	2010
Title :	Otter tracking study of Roaringwater Bay
Author :	De Jongh, A.; O'Neill, L.
Series :	Unpublished Draft Report to NPWS
Year :	2010
Title :	Subtidal Benthic Investigations in Galway Bay Complex cSAC (0268) and Inner Galway Bay SPA (4031)
Author :	Aquafact
Series :	Unpublished report for Marine Institute and NPWS
Year :	2010
Title :	Reef Investigations in Galway Bay cSAC (0269)
Author :	Aquafact
Series :	Study for Marine Institute and NPWS
Year :	2012
Title :	Benthic Survey Services Framework. Galway Bay Intertidal Surveys 2009 & 2010
Author :	RPS
Series :	Unpublished report to NPWS & Marine Institute
Year :	1990
Title :	1989 survey of breeding herds of common seal <i>Phoca vitulina</i> with reference to previous surveys
Author :	Harrington, R.
Series :	Unpublished report to Wildlife Service
Year :	2004
Title :	Harbour seal population assessment in the Republic of Ireland: August 2003
Author :	Cronin, M.; Duck, C.; O'Cadhla, O.; Naim, R.; Strong, D.; O'Keeffe, C.
Series :	Irish Wildlife Manual No. 11
Year :	2004
Title :	Summary of National Parks & Wildlife Service surveys for common (harbour) seals (<i>Phoca vitulina</i>) and grey seals (<i>Halichoerus grypus</i>), 1978 to 2003
Author :	Lyons, D.O.
Series :	Irish Wildlife Manual No.13
Year :	2006
Title :	Otter Survey of Ireland 2004/2005
Author :	Bailey, M.; Rochford, J.
Series :	Irish Wildlife Manual No. 23
Year :	2006
Title :	Surveys of sensitive subtidal benthic communities
Author :	MERC
Series :	Unpublished Report to NPWS

Year :	2010
Title :	Harbour seal population monitoring 2009-2012: Report no. 1. Report on a pilot monitoring study carried out in southern and western Ireland, 2009
Author :	NPWS
Series :	Unpublished Report to NPWS
Year :	2011
Title :	Harbour seal pilot monitoring project, 2010
Author :	NPWS
Series :	Unpublished Report to NPWS
Year :	2012
Title :	The Conservation Status of Juniper Formations in Ireland
Author :	Cooper, F.; Stone, R.E.; McEvoy, P.; Wilkins, T.; Reid, N.
Series :	Irish Wildlife Manual No. 63
Year :	2012
Title :	Harbour seal pilot monitoring project, 2011
Author :	NPWS
Series :	Unpublished Report to NPWS
Year :	2013
Title :	Galway Bay Complex SAC (site code 268) Conservation objectives supporting document-coastal habitats V1
Author :	NPWS
Series :	Unpublished report to NPWS
Year :	2013
Title :	Galway Bay Complex SAC (Site code 268) Conservation objectives supporting document-lagoons V1
Author :	NPWS
Series :	Unpublished report to NPWS
Year :	2013
Title :	Galway Bay Complex SAC (site code 268) Conservation objectives supporting document-marine habitats and species V1
Author :	NPWS
Series :	Unpublished report to NPWS
Year :	2013
Title :	Galway Bay Complex SAC (site code 268) Conservation objectives supporting document-turloughs V1
Author :	NPWS
Series :	Unpublished report to NPWS

Spatial data sources

Year :	Interpolated 2013
Title :	Intertidal survey (2009) and subtidal surveys (2006, 2010)
GIS Operations :	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising
Used For :	1140, 1170, Marine community types (maps 3, 6, 7)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present
Used For :	Marine community types base data (map 7)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. EPA WFD transitional waterbody data erased from extent. Expert opinion used as necessary to resolve any issues arising
Used For :	1160 (map 5)
Year :	Revision 2012
Title :	National Shingle Beach Survey
GIS Operations :	Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1220 (map 8)
Year :	Revision 2010
Title :	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used
Used For :	1310, 1330, 1410 (map 9)
Year :	2010
Title :	EPA WFD Waterbodies data
GIS Operations :	Creation of a 20m buffer applied to river and stream centreline data; creation of 80m buffer on the aquatic side of lake data; creation of 10m buffer on the terrestrial side of lake data. These datasets are combined with the derived OSi data and Coastal Lagoon data for the 1355 CO. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1355 (no map)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	Creation of an 80m buffer on the marine side of the high water mark (HWM); creation of a 10m buffer on the terrestrial side of the HWM; combination of 80m and 10m HWM buffer datasets; creation of a 10m buffer on the terrestrial side of the river banks data; creation of 20m buffer applied to canal centreline data. These datasets are combined with the derived EPA WFD Waterbodies data and Coastal Lagoon data for the 1355 CO. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising. Creation of 250m buffer on marine side of HWM to highlight potential commuting points
Used For :	1355 (map 11)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1365 (map 12)

Year :	Revision 2011
Title :	Inventory of Irish Coastal Lagoons. Version 3
GIS Operations :	Creation of 80m buffer on the aquatic side of lagoon data; creation of 10m buffer on the terrestrial side of lagoon data. These datasets are combined with the derived OSi data and EPA WFD Waterbodies data for the 1355 CO. Overlapping regions are investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1355 (no map)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present
Used For :	Marine community types base data (map 7)
Year :	2013
Title :	Internal NPWS files
GIS Operations :	Spatial location created from easting and northing Irish Grid coordinates
Used For :	5130 (map 10)
Year :	2013
Title :	Turloughs Database 2013
GIS Operations :	Relevant turloughs identified; clipped to SAC boundary
Used For :	3180 (map 10)
Year :	Revision 2011
Title :	Inventory of Irish Coastal Lagoons. Version 3
GIS Operations :	Clipped to SAC boundary
Used For :	1150 (map 4)
Year :	2013
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1365 (map 12)

Conservation Objectives for : Galway Bay Complex SAC [000268]

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 3	Habitat area was estimated using OSi data as 744ha
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sandy mud community complex; and Intertidal sand community complex. See map 7	Based on intertidal surveys undertaken in 2009 and 2010 (RPS, 2012). See marine supporting document for further information

Conservation Objectives for : Galway Bay Complex SAC [000268]

1150 Coastal lagoons

To restore the favourable conservation condition of Coastal lagoons in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable, subject to slight natural variation. Favourable reference area 76.7ha. See map 4	Areas calculated from spatial data derived from Oliver, 2007. Site codes IL037, IL038, IL039, IL046, IL047, IL048, IL049, IL050, IL051, IL052. NB there may be more, as yet unmapped, lagoons within this SAC. See lagoon supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 4 for mapped lagoons	Sites IL037, IL038, IL039, IL046, IL047, IL048, IL049, IL050, IL051, IL052 in Oliver, 2007. NB there may be more, as yet unmapped, lagoons within this SAC. See lagoon supporting document for further details
Salinity regime	Practical salinity units (psu)	Median annual salinity and temporal variation within natural ranges	The lagoons in the site vary from oligohaline to euhaline. See lagoon supporting document for further details
Hydrological regime	Metres	Annual water level fluctuations and minima within natural ranges	Most of the lagoons listed for this site are considered to be shallow; however, Aughinish lagoon and Lough Atalia do have deeper (at least 3m) parts. See lagoon supporting document for further details
Barrier: connectivity between lagoon and sea	Permeability	Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management	The lagoons within this site exhibit a variety of barrier types including cobble/shingle, karst and artificial embankment/causeway. Several are recorded as having sluices. See lagoon supporting document for further details
Water quality: Chlorophyll <i>a</i>	µg/L	Annual median chlorophyll <i>a</i> within natural ranges and less than 5µg/L	Target based on Roden and Oliver (2010). See lagoon supporting document for further details
Water quality: Molybdate Reactive Phosphorus (MRP)	mg/L	Annual median MRP within natural ranges 0.1mg/L	Target based on Roden and Oliver (2010). See lagoon supporting document for further details
Water quality: Dissolved Inorganic Nitrogen (DIN)	mg/L	Annual median DIN within natural ranges and less than 0.15mg/L	Target based on Roden and Oliver (2010). See lagoon supporting document for further details
Depth of macrophyte colonisation	Metres	Macrophyte colonisation to at least 2m depth	For shallow lagoons, it is expected that macrophytes should extend to their deepest points. See lagoon supporting document for further details
Typical plant species	Number and m ²	Maintain number and extent of listed lagoonal specialists, subject to natural variation	Species listed in Oliver, 2007. See lagoon supporting document for further details
Typical animal species	Number	Maintain listed lagoon specialists, subject to natural variation	Species listed in Oliver, 2007. See lagoon supporting document for further details
Negative indicator species	Number and % cover	Negative indicator species absent or under control	Low salinity, shallow water and elevated nutrient levels increase the threat of accelerated encroachment by reedbeds. See lagoon supporting document for further details

1160 Large shallow inlets and bays

To maintain the favourable conservation condition of Large shallow inlets and bays in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 5	Habitat area was estimated as 10,825ha using OSI data and the Transitional Water Body area as defined under the Water Framework Directive
Community extent	Hectares	Maintain the extent of the <i>Zostera</i> -dominated community complex and the maërl-dominated community, subject to natural processes. See map 7	Based on 2006 diver observation and dropdown camera data (MERC, 2006). See marine supporting document for further details
Community structure: <i>Zostera</i> density	Shoots per m ²	Conserve the high quality of <i>Zostera</i> -dominated communities, subject to natural processes	2006 diver observation and dropdown camera data (MERC, 2006). See marine supporting document for further details
Community structure	Biological composition	Conserve the high quality of the maërl-dominated community, subject to natural processes	2006 diver observation and dropdown camera data (MERC, 2006). See marine supporting document for further details
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal sandy mud community complex; Intertidal sand community complex; Fine to medium sand with bivalves community complex; Sandy mud to mixed sediment community complex; Mixed sediment dominated by Mytilidae community complex; Shingle; Furoid-dominated community complex; <i>Laminaria</i> -dominated community complex; and Shallow sponge-dominated community complex. See map 7	Based on intertidal and subtidal surveys undertaken in 2009 and 2010 (Aquafact, 2010a, b; RPS, 2012). See marine supporting document for further information

1170 Reefs

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

Attribute	Measure	Target	Notes
Distribution	Occurrence	The distribution of reefs is stable or increasing, subject to natural processes. See map 6 for mapped distribution	Based on information from 2009 and 2010 intertidal survey data and 2009 subtidal survey data (Aquafact, 2010a, b; RPS, 2012). See marine supporting document for further details
Habitat area	Hectares	The permanent habitat area is stable, subject to natural processes. See map 6	Habitat area estimated as 2773ha using 2009 and 2010 intertidal survey data and 2009 subtidal survey data (Aquafact, 2010a, b; RPS, 2012)
Community extent	Hectares	Maintain the extent of the <i>Mytilus</i> -dominated reef community, subject to natural processes. See map 7	Area established from 2009 intertidal survey (RPS, 2012)
Community structure: <i>Mytilus</i> density	Individuals per m ²	Conserve the high quality of the <i>Mytilus</i> -dominated reef community, subject to natural processes	Based on intertidal survey 2009 (RPS, 2012) and intertidal walkover 2012
Community structure	Biological composition	Conserve the following community types in a natural condition: Fucoid-dominated community complex; <i>Laminaria</i> -dominated community complex; and Shallow sponge-dominated community complex See map 7	Reef mapping based on information from 2009 subtidal reef survey (Aquafact, 2010b) and 2009 and 2010 intertidal surveys (RPS, 2012). See marine supporting document for further details

1220 Perennial vegetation of stony banks

To maintain the favourable conservation condition of Perennial vegetation of stony banks in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	Current area unknown. It was recorded from Rinville Point, Tawin Point and coastline from Blackhead to Carrickada during the National Shingle Beach Survey (Moore and Wilson, 1999), but the extent was not mapped. Two areas of vegetated shingle were recorded during the Coastal Monitoring Project (Ryle et al., 2009): Bishopsquarter - 0.18ha and Barna (Whitestrand) - 0.45ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 8 for mapped locations	Full distribution unmapped at present, although the habitat has been recorded at Rinville Point, Tawin Point and coastline from Blackhead to Carrickada (Moore and Wilson, 1999). It has also been recorded from Barna and Bishopquarter by Ryle et al. (2009). See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	The Galway Bay shoreline supports good examples of shingle beaches along the more exposed shores to the south and west of Galway city and to the north-east of Finnavara, County Clare. Shingle features are relatively stable in the longterm (Moore and Wilson, 1999). See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Moore and Wilson (1999). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the typical vegetated shingle flora including the range of sub-communities within the different zones. Typical species include sea sandwort (<i>Honckenya peploides</i>), sea beet (<i>Beta vulgaris</i> ssp. <i>maritima</i>), rock samphire (<i>Crithmum maritimum</i>), sea mayweed (<i>Tripleurospermum maritimum</i>), yellow-horned poppy (<i>Glaucium flavum</i>) and sea campion (<i>Silene uniflora</i>)	Based on data from Moore and Wilson (1999). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Moore and Wilson (1999). Negative indicators include non-native species indicative of changes in nutrient status and species not considered characteristic of the habitat. See coastal habitats supporting document for further details

Conservation Objectives for : Galway Bay Complex SAC [000268]

1310 *Salicornia* and other annuals colonising mud and sand

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Barna House - 0.067ha, Seaweed Point - 0.003ha, Roscam West and South - 0.023ha, Kilcaimin - 0.015, Kileenaran - 0.007ha, Kinvara West - 0.017ha, Scanlan's Island - 0.117ha, Tawin Island - 1.098ha. See map 9	Based on data from Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). Habitat recorded at eight of the ten sub-sites surveyed and mapped, giving a total estimated area of 1.347ha. N.B. Further unsurveyed areas may be present within this site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 9 for known distribution	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). <i>Salicornia</i> is an annual species, so its distribution can vary significantly from year to year. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain/restore, natural circulation of sediments and organic matter, without any physical obstructions	Sediment supply is particularly important for pioneer saltmarsh community, as the distribution of this habitat depends on accretion rates. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain, or where necessary restore creek and pan structure, subject to natural processes, including erosion and succession	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). Creeks deliver sediment throughout saltmarsh system. Creeks and pan structures well developed at Kileenaran and Tawin Island. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	This pioneer saltmarsh community requires regular tidal inundation. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for details
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the range of species-poor communities with typical species listed in SMP (McCorry and Ryle, 2009)	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	There is currently no common cordgrass (<i>Spartina anglica</i>) in this SAC. Prevent establishment of cordgrass	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details

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

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Barna House - 2.33ha, Seaweed Point - 1.41ha, Roscam West and South - 3.30ha, Oranmore North - 4.24ha, Kilcaimin - 6.82ha, Tawin Island - 53.85ha, Tyrone House-Dunbulcaun Bay - 9.83ha, Kileenaran - 15.37ha, Kinvara West - 13.33ha, Scanlan's Island - 4.13ha. See map 9	Based on data from Saltmarsh monitoring Project (SMP) (McCorry, 2007; McCorry and Ryle, 2009). Ten sub-sites that supported Atlantic salt meadow were mapped (114.612ha) and additional areas of potential saltmarsh (149.18ha) were identified by an examination of aerial photographs, giving a total estimated area of 263.80ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 9 for known distribution	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions	See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). The efficiency of sediment circulation throughout a saltmarsh depends on the creek pattern. Creeks and pans are well developed at both Tawin Island and Kileenaran. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% area outside creeks vegetated	Based on data from SMP (McCorry, 2007; 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 SMP (McCorry and Ryle, 2009)	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	There is currently no common cordgrass (<i>Spartina anglica</i>) in this SAC. Prevent establishment of cordgrass	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details

Conservation Objectives for : Galway Bay Complex SAC [000268]

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Barna House - 0.282ha, Seaweed Point - 0.931ha, Kilcaimin - 0.005ha, Tawin Island - 1.799ha. Tyrone House- Dunbulcan Bay - 8.184ha, Kileenaran - 0.271ha. See map 9	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry and Ryle, 2009). Six sub-sites that support Mediterranean salt meadow were mapped (11.472ha) and additional areas of potential saltmarsh (8.415ha) were identified from an examination of aerial photographs, giving a total estimated area of 19.887ha. 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 9 for known distribution	See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions	See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession	Based on data from the SMP (McCorry, 2007; McCorry and Ryle, 2009). [Site-specific info.]. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Mediterranean salt meadows is found high up in the saltmarsh but requires occasional tidal inundation. [Site-specific info.] See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation in the sward	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated	Based on data from SMP (McCorry, 2007; 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 SMP (McCorry and Ryle, 2009)	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - <i>Spartina anglica</i>	Hectares	There is currently no common cordgrass (<i>Spartina anglica</i>) in this SAC. Prevent establishment of cordgrass	Based on data from SMP (McCorry, 2007; McCorry and Ryle, 2009). See coastal habitats supporting document for further details

3180 Turloughs

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable at c.59ha or increasing, subject to natural processes. See map 10	Based on measured area of four known turloughs. NB there may be more, as yet unmapped, turloughs within this SAC. See turloughs supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 10	NB there may be more, as yet unmapped, turloughs within this SAC. See turloughs supporting document for further details
Hydrological regime: flood duration, frequency, area, depth; permanently flooded area	Various	Appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Hydrological regime is sub-divided into more detailed attributes in the turloughs supporting document
Soil type: area	Hectares	Variety, area and extent of soil types necessary to support turlough vegetation and other biota	See turloughs supporting document for further details
Soil nutrient status: nitrogen and phosphorous	N and P concentration in soil	Nutrient status appropriate to soil types	See turloughs supporting document for further details
Physical structure: bare ground	Presence	Sufficient wet bare ground, as appropriate	See turloughs supporting document for further details
Chemical processes: calcium carbonate deposition and concentration	CaCO ₃ deposition rate/soil concentration	Appropriate CaCO ₃ deposition rates and concentration in soil	See turloughs supporting document for further details
Water quality: nutrients; colour; phytoplankton; epiphyton	Various	Appropriate water quality to support the natural structure and functioning of the habitat	Water quality is sub-divided into more detailed attributes in the turloughs supporting document
Active peat formation	Flood duration	Active peat formation, where appropriate	See turloughs supporting document for further details
Vegetation composition: area of vegetation communities	Hectares	Maintain area of sensitive and high conservation value vegetation communities/units at each turlough	See turloughs supporting document for further details
Vegetation composition: vegetation zonation	Distribution	Maintain vegetation zonation/mosaic characteristic of each turlough	See turloughs supporting document for further details
Vegetation structure: sward height	Centimetres	Sward heights appropriate to the vegetation unit, and a variety of sward heights across each turlough	See turloughs supporting document for further details
Typical species: terrestrial, wetland and aquatic plants, invertebrates and birds	Presence	Maintain typical species within and across all turloughs	Typical species is sub-divided into more detailed attributes in the turloughs supporting document
Fringing habitats: area	Hectares	Maintain marginal fringing habitats that support turlough vegetation, invertebrate, mammal and/or bird populations	See turloughs supporting document for further details

Vegetation
structure:
turlough
woodland

Species diversity and
woodland structure

Maintain appropriate
turlough woodland
diversity and structure

See turloughs supporting document for further
details

Conservation Objectives for : Galway Bay Complex SAC [000268]

5130 Juniperus communis formations on heaths or calcareous grasslands

To restore the favourable conservation condition of *Juniperus communis* formations on heaths or calcareous grasslands in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Occurrence	Area stable or increasing, subject to natural processes. At least 1.4ha at mapped location. See map 10	Minimum area from one mapped location. Based on site visit in March 2013. Appropriate management might encourage expansion of the area. NB further unsurveyed areas maybe present within the SAC
Habitat distribution	Hectares	No decline. Known location shown on map 10	Distribution based on NPWS site visits in 2002, 2003 and 2013 (internal NPWS files). NB further unsurveyed locations maybe present within the SAC
Juniper population size	Number	At least 50 plants	To classify as a juniper formation, at least 50 plants should be present (Cooper et al., 2012). A site visit in March 2013 estimated c.130 plants
Formation structure: cover and height	Percentage and metres	Well-developed structure with an open to closed cover of juniper up to or exceeding 0.5 m in height with associated species	Structure currently open with most plants less than 0.5m in height (February 2013)
Formation structure: community diversity and extent	Hectares	Appropriate diversity and extent of formation	Suitable management could lead to expansion of the formation and increased diversity of associated species
Formation structure: cone-bearing plants	Percentage	At least 10% of plants bearing cones	Target based on Cooper et al., 2012. c.23% of plants were fruiting, some prolifically, during a site visit in March 2013
Formation structure: seedling recruitment	Percentage	At least 10% of juniper plants within the formation are seedlings	Target based on Cooper et al., 2012. No seedlings were recorded in February 2013
Formation structure: dead plants	Percentage	Not more than 10% of plants dead	Target based on Cooper et al., 2012. Only a few dead plants observed February 2013
Vegetation composition: typical species	Occurrence	A variety of typical native species with a minimum of 10 species present (excluding negative indicator species)	The area appears to fall into the <i>Carex flacca-Succisa pratensis</i> vegetation group as classified by Cooper et al. (2012), who also list positive indicator species. Few of these species have been recorded but a detailed survey has not been undertaken. Lack of suitable management at this site has resulted in a dominance of gorse (<i>Ulex europaeus</i>) and purple moorgrass (<i>Molinia caerulea</i>)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	Gorse (<i>Ulex europaeus</i>) and purple moorgrass (<i>Molinia caerulea</i>) are currently competing strongly with the juniper. Blackthorn (<i>Prunus spinosa</i>) and the non-native cotoneaster (<i>Cotoneaster integrifolius</i>) also pose a threat

Conservation Objectives for : Galway Bay Complex SAC [000268]

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*)(*important orchid sites)

To maintain the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) in Galway Bay Complex, 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	Extent of this habitat in the SAC is currently unknown. Areas are likely to be small and often in mosaic with other habitats such as limestone pavement and scrub (Dwyer et al., 2007; internal NPWS files). Dwyer et al. (2007) surveyed a number of sub-sites in 2006. The Irish semi-natural grasslands survey undertook survey work in Counties Clare and Galway in 2012 and additional information is likely to be available for this SAC following data analysis
Habitat distribution	Occurrence	No decline, subject to natural processes	Full distribution of this habitat in this SAC is currently unknown- see note above
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 7 positive indicator species present, including 2 "high quality" species	List of positive indicator species, including high quality species, identified by O'Neill et al. (2010)
Vegetation composition: negative indicator species	Percentage	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%. Non-native invasive species, absent or under control	List of negative indicator species identified by O'Neill et al. (2010)
Vegetation structure: sward height	Percentage	30-70% of sward 5-40cm high	Attribute and target based on O'Neill et al. (2010)
Vegetation structure: woody species and bracken (<i>Pteridium aquilinum</i>)	Percentage	Cover of bracken (<i>Pteridium aquilinum</i>) and woody species (except juniper (<i>Juniperus communis</i>)) not more than 5% cover	Attribute and target based on O'Neill et al. (2010)
Physical structure: bare ground	Percentage	Not more than 10% bare ground	Attribute and target based on O'Neill et al. (2010)

Conservation Objectives for : Galway Bay Complex SAC [000268]

7210 Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*

To maintain the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The full extent of this habitat within the SAC is currently unknown. Fen vegetation occurs in wetland areas to the east of Oranmore (Internal NPWS files). It has also been recorded in Ballindereen Lough (see turloughs supporting document for further details). This habitat is found in mosaic with another habitats including the Annex I habitat: Alkaline fens (7230) (Internal NPWS Files). NB further areas of fen are likely to occur within the SAC
Habitat distribution	Occurrence	No decline, subject to natural processes	Full distribution of this habitat in this SAC is currently unknown- see note above
Hydrological regime	Flow rates, metres	Appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat	Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat
Peat formation	Flood duration	Active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time (Jim Ryan, pers. comm.)
Water quality: nutrients	Water chemistry measures	Appropriate water quality to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus with the latter tending to be the limiting nutrient
Vegetation composition: typical species	Presence	Maintain vegetation cover of typical species including brown mosses and vascular plants	Mosses listed for fen at this site include <i>Campylopus stellatus</i> , <i>Fissidens adianthoides</i> and <i>Ctenidium molluscum</i> . Other species recorded include saw sedge (<i>Cladium mariscus</i>), black bog rush (<i>Schoenus nigricans</i>), purple moor-grass (<i>Molinia caerulea</i>), water mint (<i>Mentha aquatica</i>), wild angelica (<i>Angelica sylvestris</i>) and bogbean (<i>Menyanthes trifoliata</i>) (Internal NPWS files)
Vegetation composition: trees and shrubs	Percentage	Cover of scattered native trees and shrubs not more than 10%	Scrub and trees will tend to invade if fen conditions become drier. Internal NPWS files report scattered multi-stemmed trees over much of the habitat. Attribute and target based on upland habitat conservation assessment criteria (Perrin et al., in prep.)
Physical structure: disturbed bare ground	Percentage	Cover of disturbed bare ground not more than 10%. Where tufa is present, disturbed bare ground not more than 1%	While grazing may be appropriate in this habitat, excessive areas of disturbed bare ground may develop due to unsuitable grazing regimes. Attribute and target based on upland habitat conservation assessment criteria (Perrin et al., in prep.)
Physical structure: drainage	Percentage	Areas showing signs of drainage as a result of drainage ditches or heavy trampling not more than 10%	Attribute and target based on upland habitat conservation assessment criteria (Perrin et al., in prep.)

Conservation Objectives for : Galway Bay Complex SAC [000268]

7230 Alkaline fens

To maintain the favourable conservation condition of Alkaline fens in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The full extent of this habitat within the SAC is currently unknown. Fen vegetation occurs in wetland areas to the east of Oranmore (Internal NPWS files). It has also been recorded in Ballindereen Lough (see turloughs supporting document for further details). This habitat is found in mosaic with another habitats including the Annex I habitat: Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion davallianae (7210). NB further areas of fen are likely to occur within the SAC
Habitat distribution	Occurrence	No decline, subject to natural processes	Full distribution of this habitat in this SAC is currently unknown- see note above
Hydrological regime	Flow rates, metres	Appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat	Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat
Peat formation	Flood duration	Active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time (Jim Ryan, pers. comm.)
Water quality: nutrients	Water chemistry measures	Appropriate water quality to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus with the latter tending to be the limiting nutrient
Vegetation composition: typical species	Presence	Maintain vegetation cover of typical species including brown mosses and vascular plants	Mosses listed for fen at this site include <i>Campylopus stellatus</i> , <i>Fissidens adianthoides</i> and <i>Ctenidium molluscum</i> . Other species recorded include black bog rush (<i>Schoenus nigricans</i>), purple moor-grass (<i>Molinia caerulea</i>), sedge species (<i>Carex</i> spp.), water mint (<i>Mentha aquatica</i>), butterwort (<i>Pinguicula</i> spp.) and ling heather (<i>Calluna vulgaris</i>) (Internal NPWS files)
Vegetation composition: trees and shrubs	Percentage	Cover of scattered native trees and shrubs less than 10%	Scrub and trees will tend to invade if fen conditions become drier. Internal NPWS files report scattered multi-stemmed trees over much of the habitat. Attribute and target based on upland habitat conservation assessment criteria (Perrin et al., in prep.)
Physical structure: disturbed bare ground	Percentage	Cover of disturbed bare ground less than 10%. Where tufa is present, disturbed bare ground less than 1%	While grazing may be appropriate in this habitat, excessive area of disturbed bare ground may develop due to unsuitable grazing regimes. Attribute and target based on upland habitat conservation assessment criteria (Perrin et al., in prep.)
Physical structure: drainage	Percentage	Areas showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%	Attribute and target based on upland habitat conservation assessment criteria (Perrin et al., in prep.)

Conservation Objectives for : Galway Bay Complex SAC [000268]**1355 Otter *Lutra lutra***

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

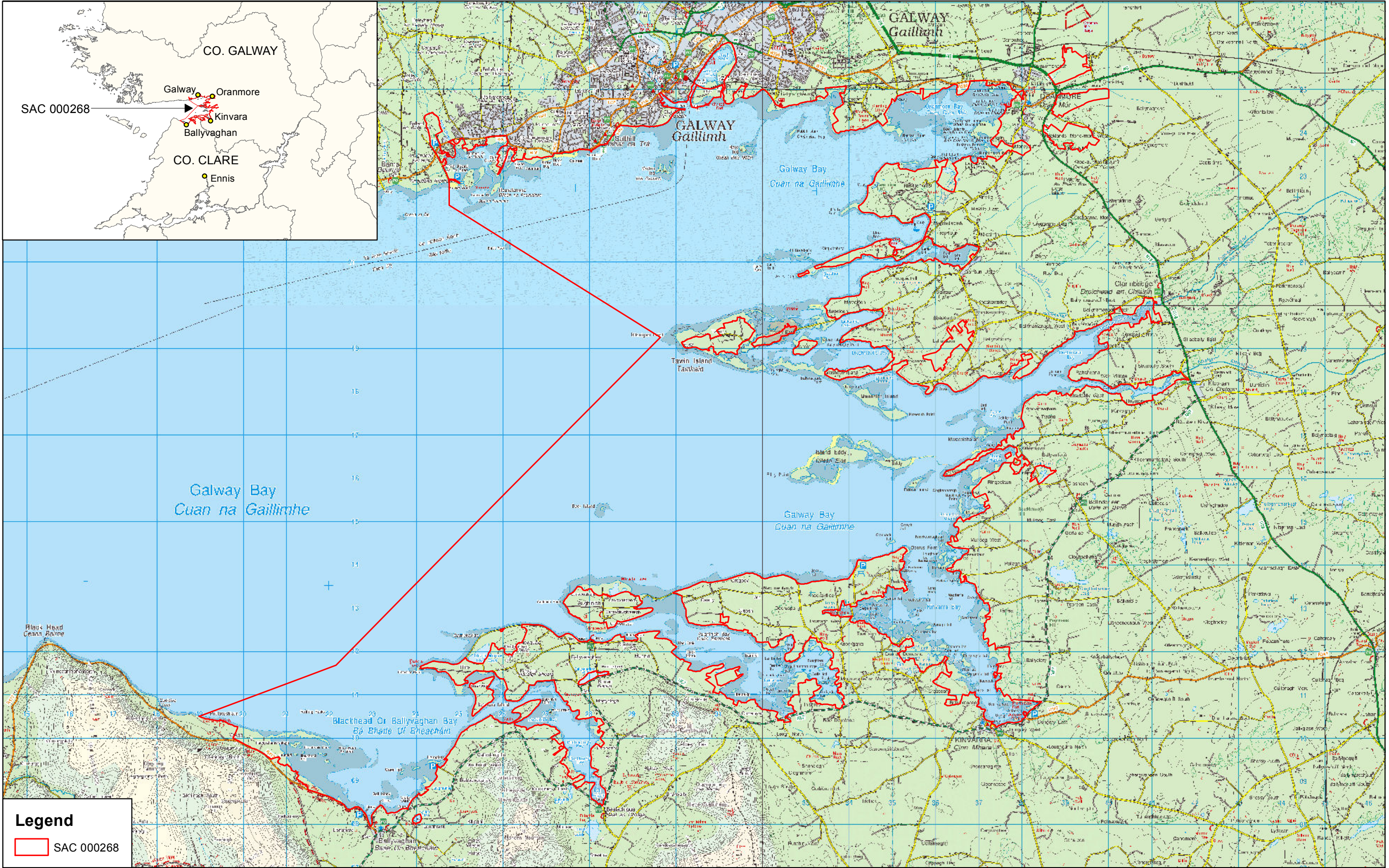
Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. FCS target, based on 1980/81 survey findings, is 88% in SACs. Current range in the west is estimated at 70% (Bailey and Rochford, 2006).
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 262ha above high water mark (HWM); 14ha 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 2040ha	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 4km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 21ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (NPWS, 2007)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk, 2006; Kruuk and Moorhouse, 1991)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006) and wrasse and rockling in coastal waters (Kingston et al., 1999)
Barriers to connectivity	Number	No significant increase. For guidance, see map 11	Otters will regularly commute across stretches of open water up to 500m e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed

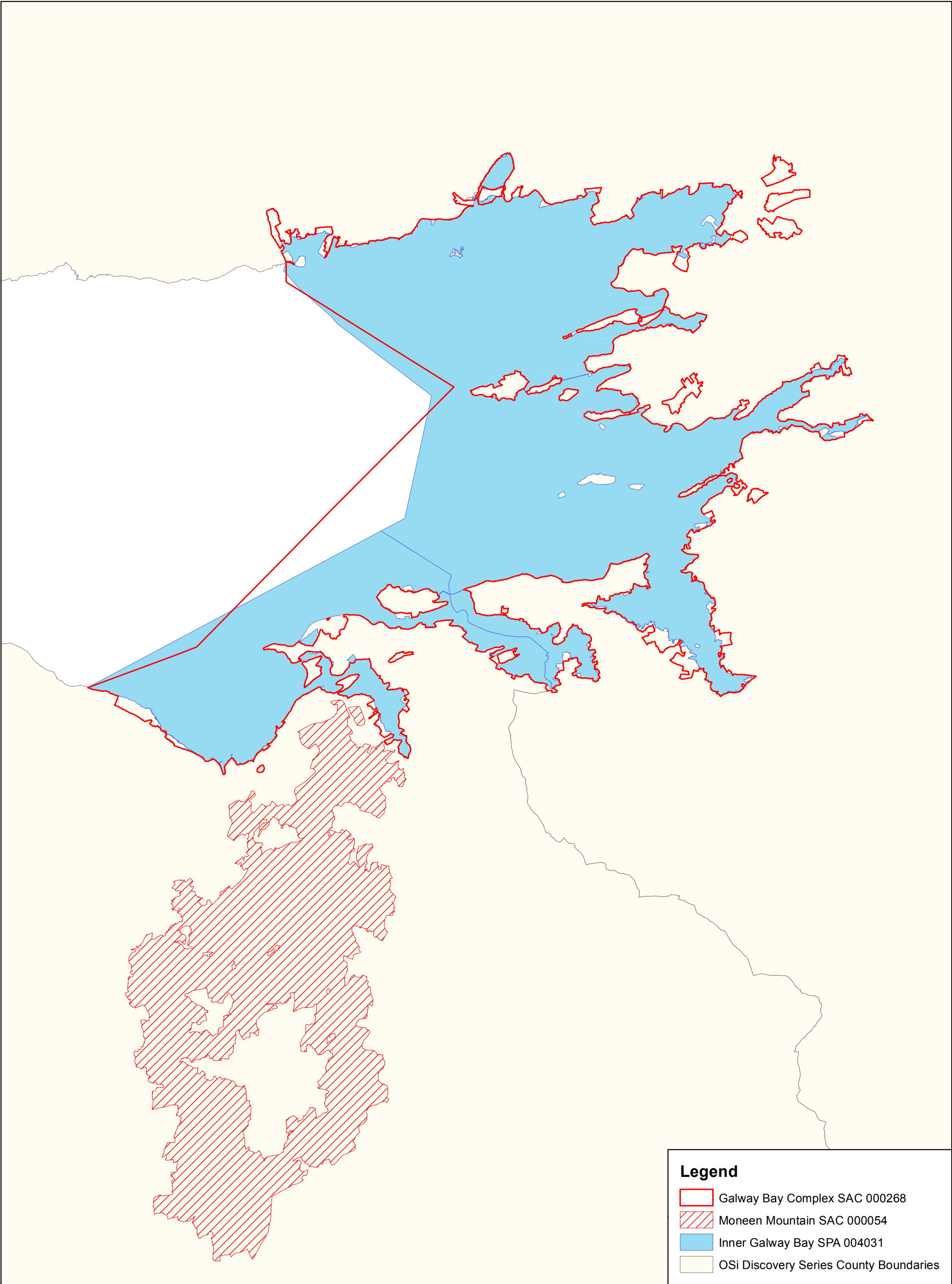
Conservation Objectives for : Galway Bay Complex SAC [000268]

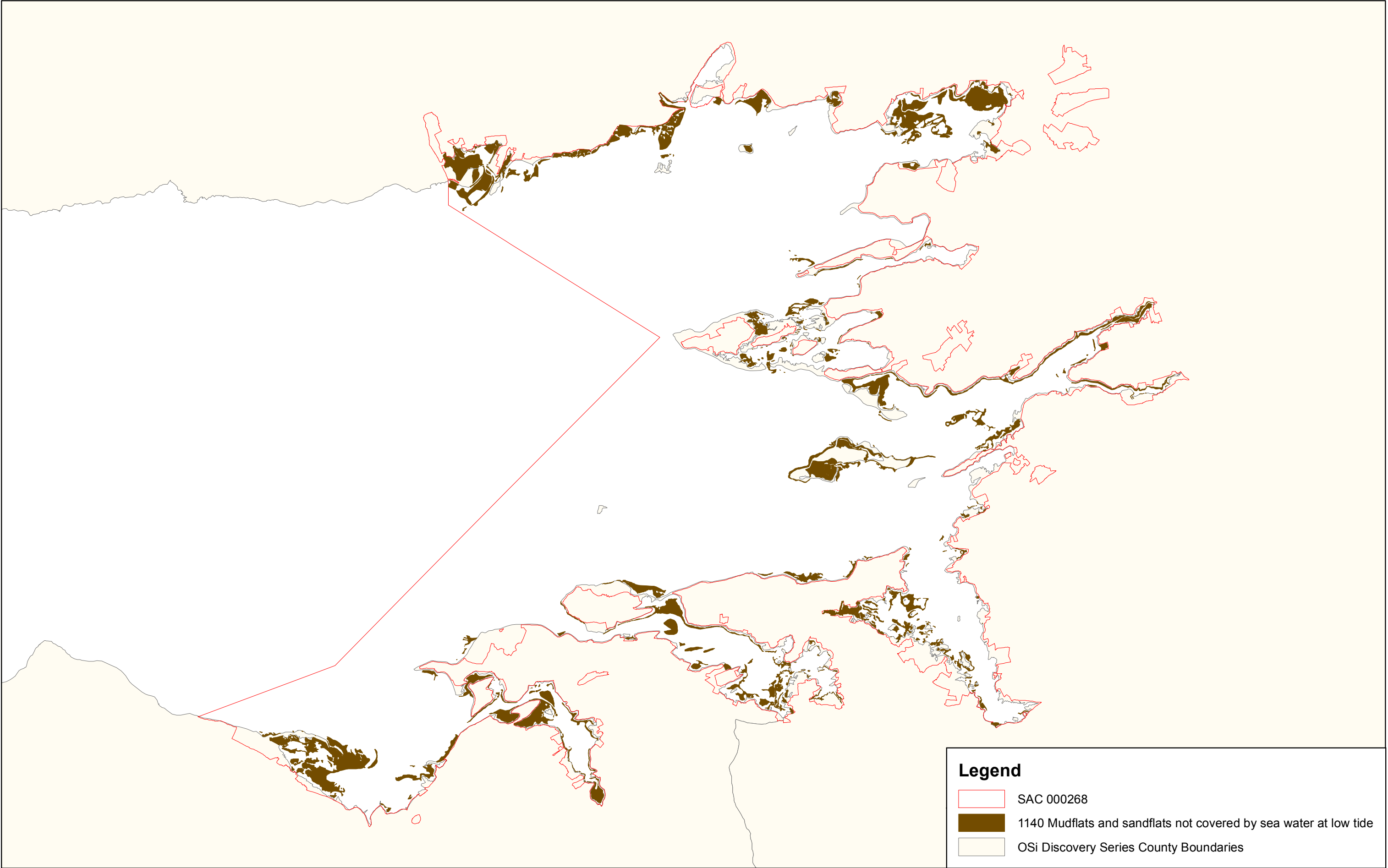
1365 Harbour seal *Phoca vitulina*

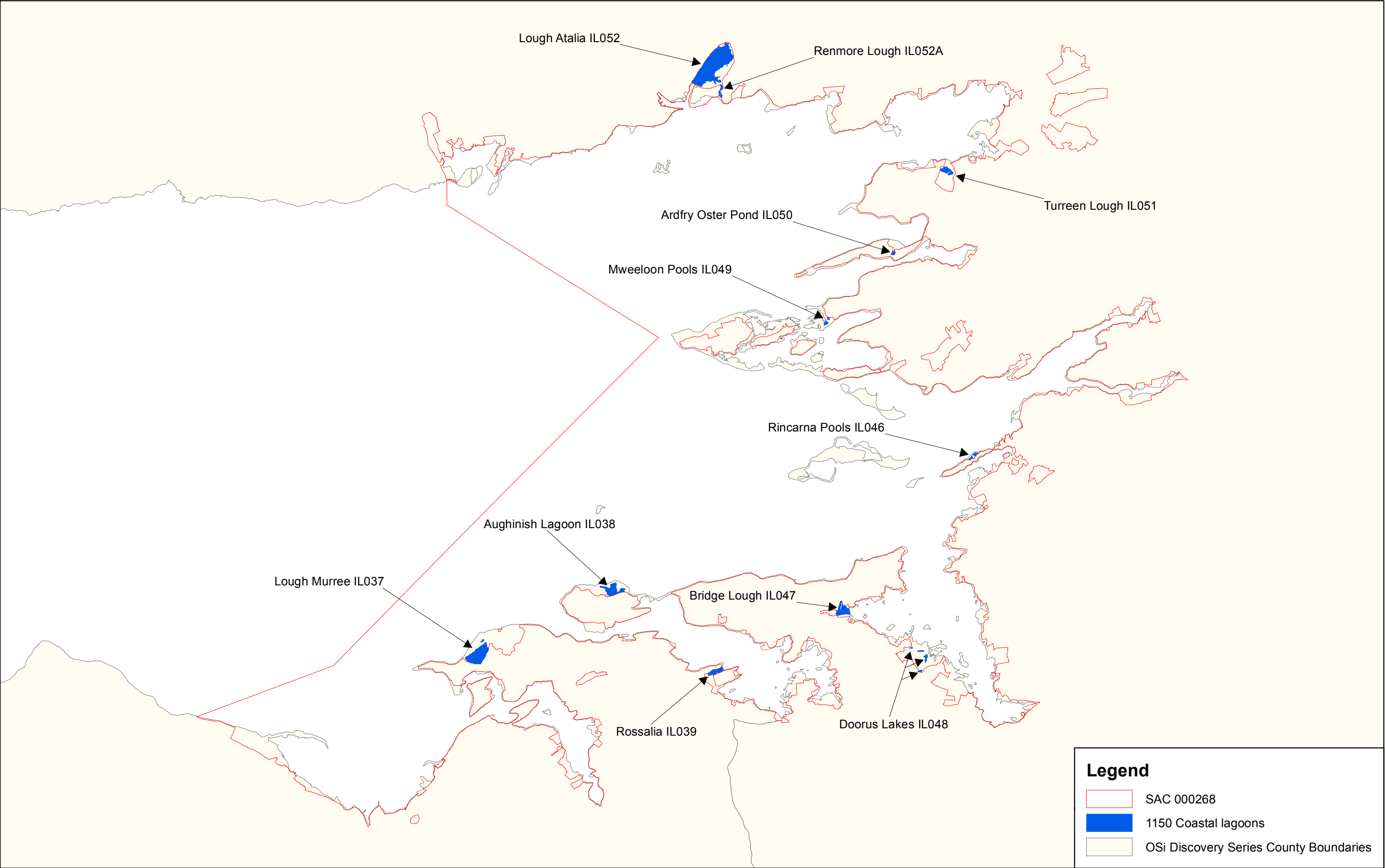
To maintain the favourable conservation condition of Harbour Seal in Galway Bay Complex SAC, which is defined by the following list of attributes and targets:

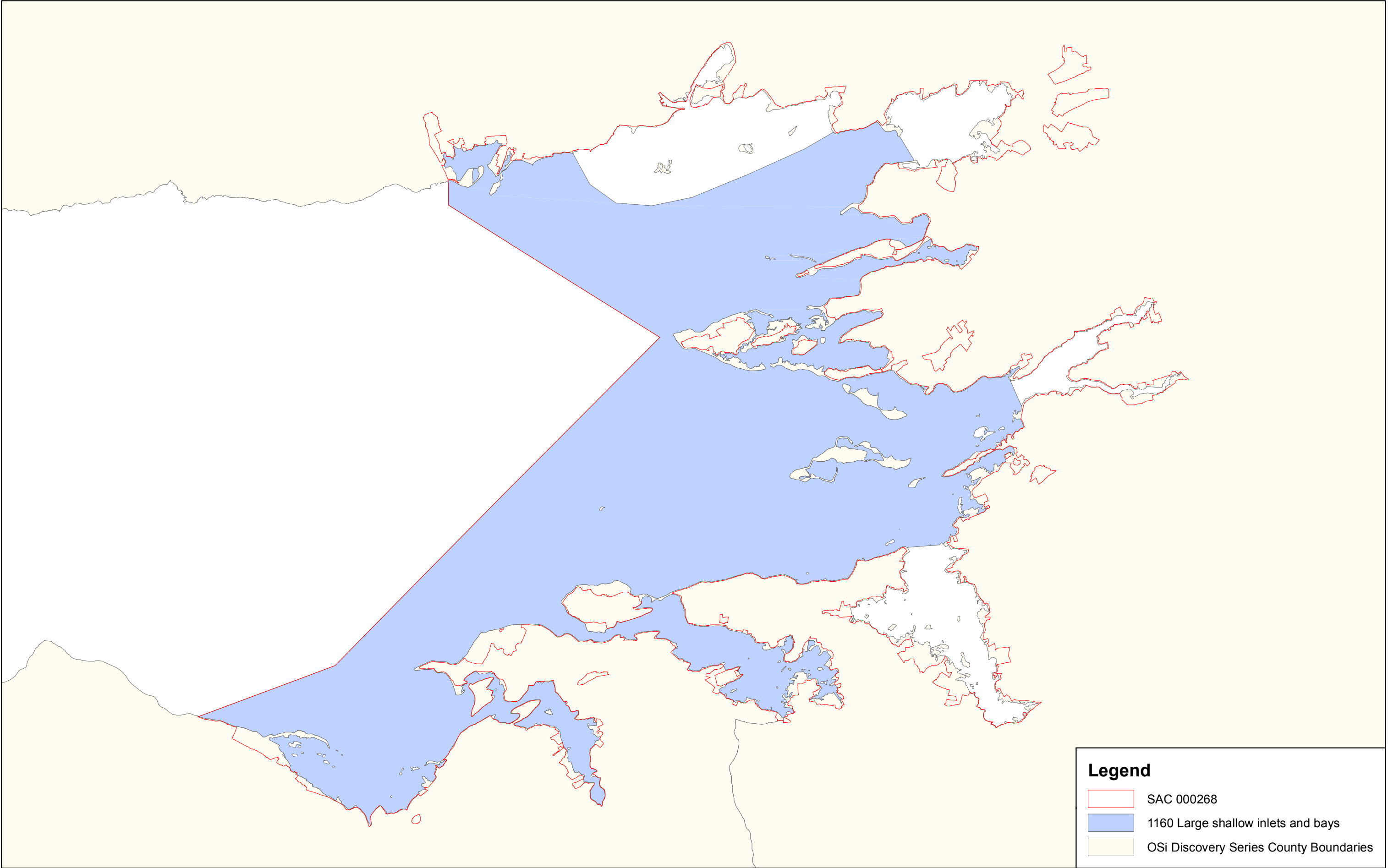
Attribute	Measure	Target	Notes
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use. See map 12	See marine supporting document for further details
Breeding behaviour	Breeding sites	Conserve breeding sites in a natural condition. See map 12	Attribute and target based on background knowledge of Irish breeding populations, review of data summarised by Summers et al. (1980), Warner (1983), Harrington (1990), Doyle (2002), Lyons (2004), and unpublished NPWS records. See marine supporting document for further details
Moulting behaviour	Moult haul-out sites	Conserve moult haul-out sites in a natural condition. See map 12	Attribute and target based on background knowledge of Irish populations, review of data from Doyle (2002), Lyons (2004), Cronin et al. (2004), NPWS (2010, 2011, 2012) and unpublished NPWS records. See marine supporting document for further details
Resting behaviour	Resting haul-out sites	Conserve resting haul-out sites in a natural condition. See map 12	Attribute and target based on background knowledge of Irish populations, review of data from Doyle (2002), Lyons (2004) and unpublished NPWS records. See marine supporting document for further details
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the harbour seal population at the site	See marine supporting document for further details

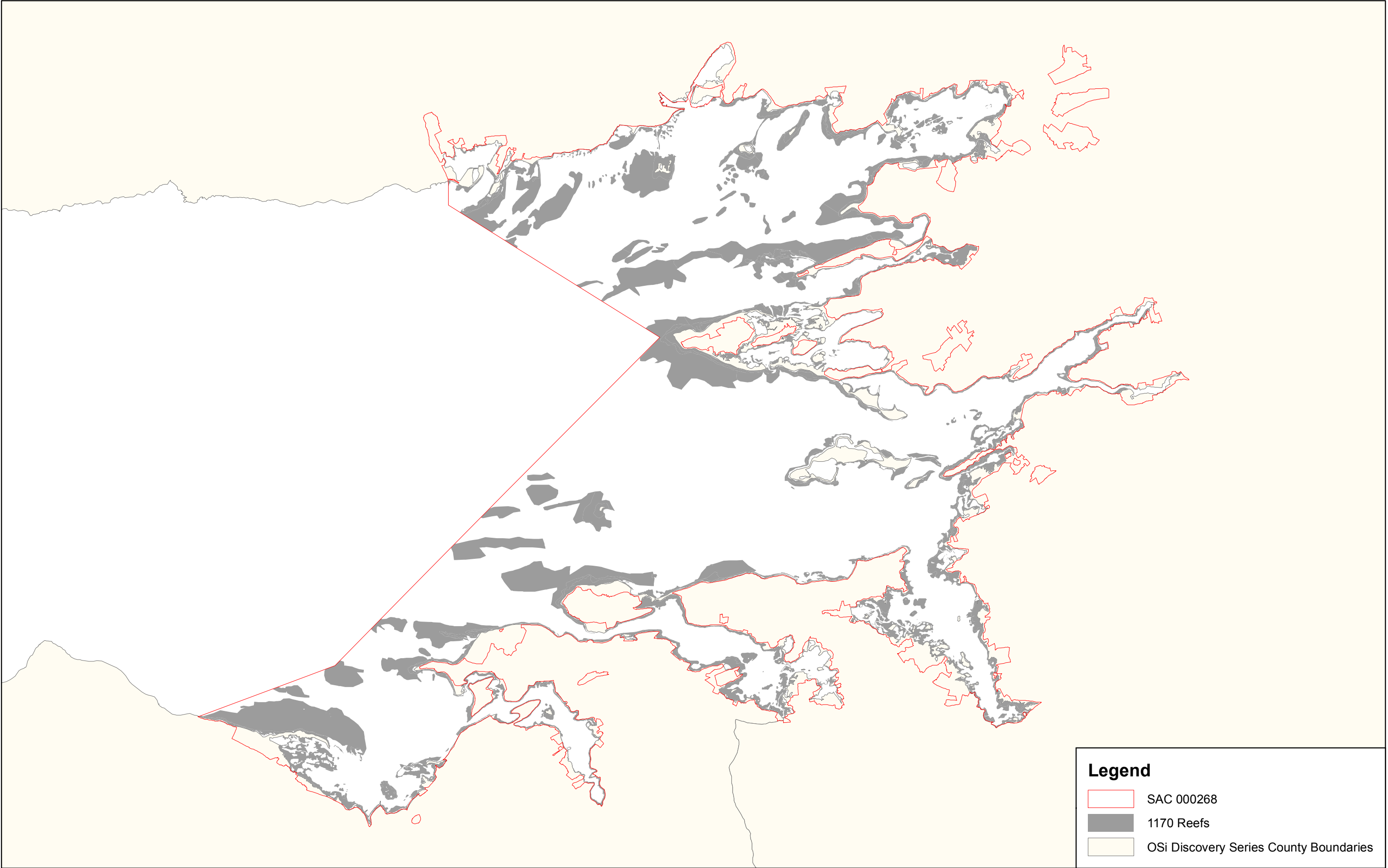


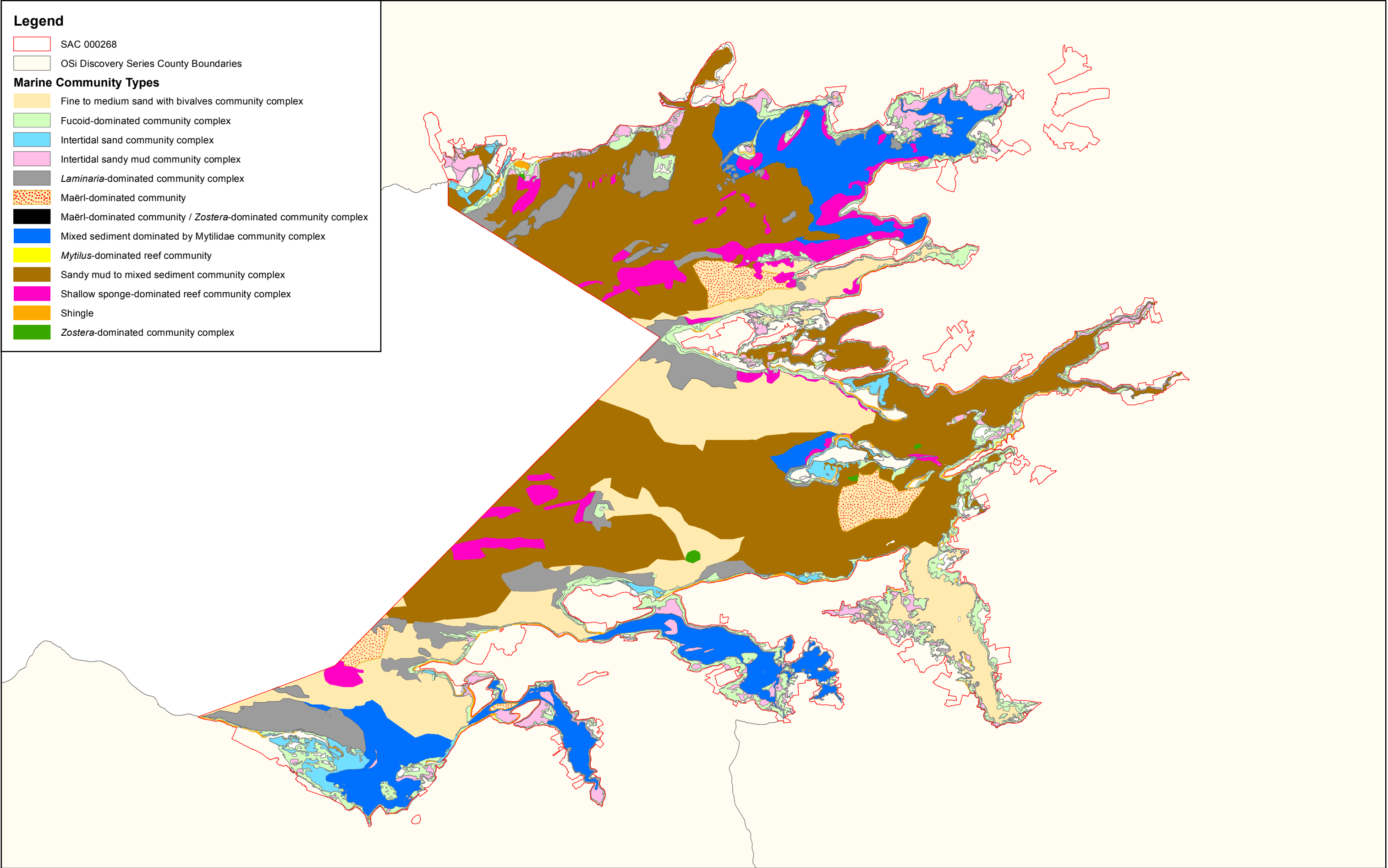


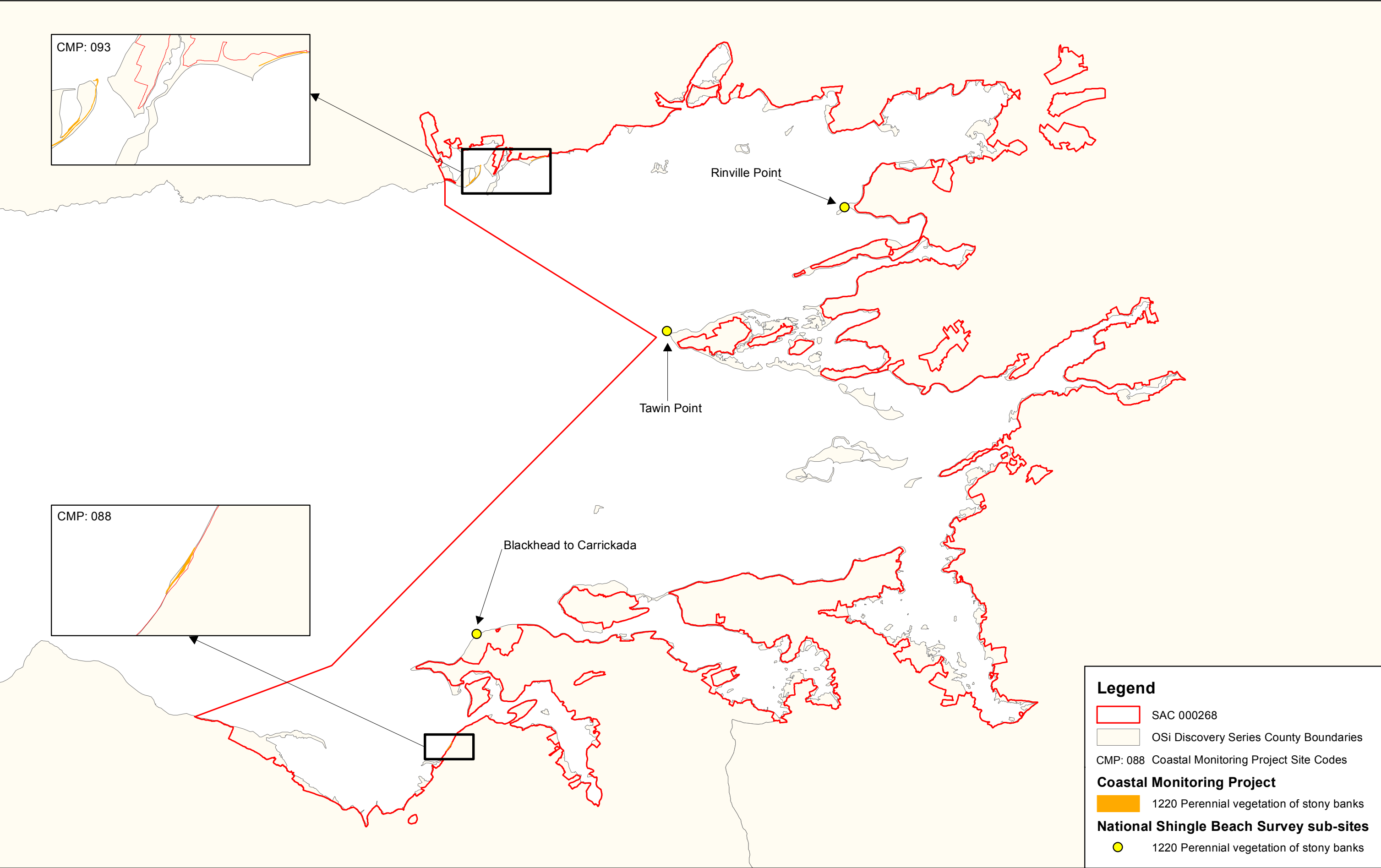


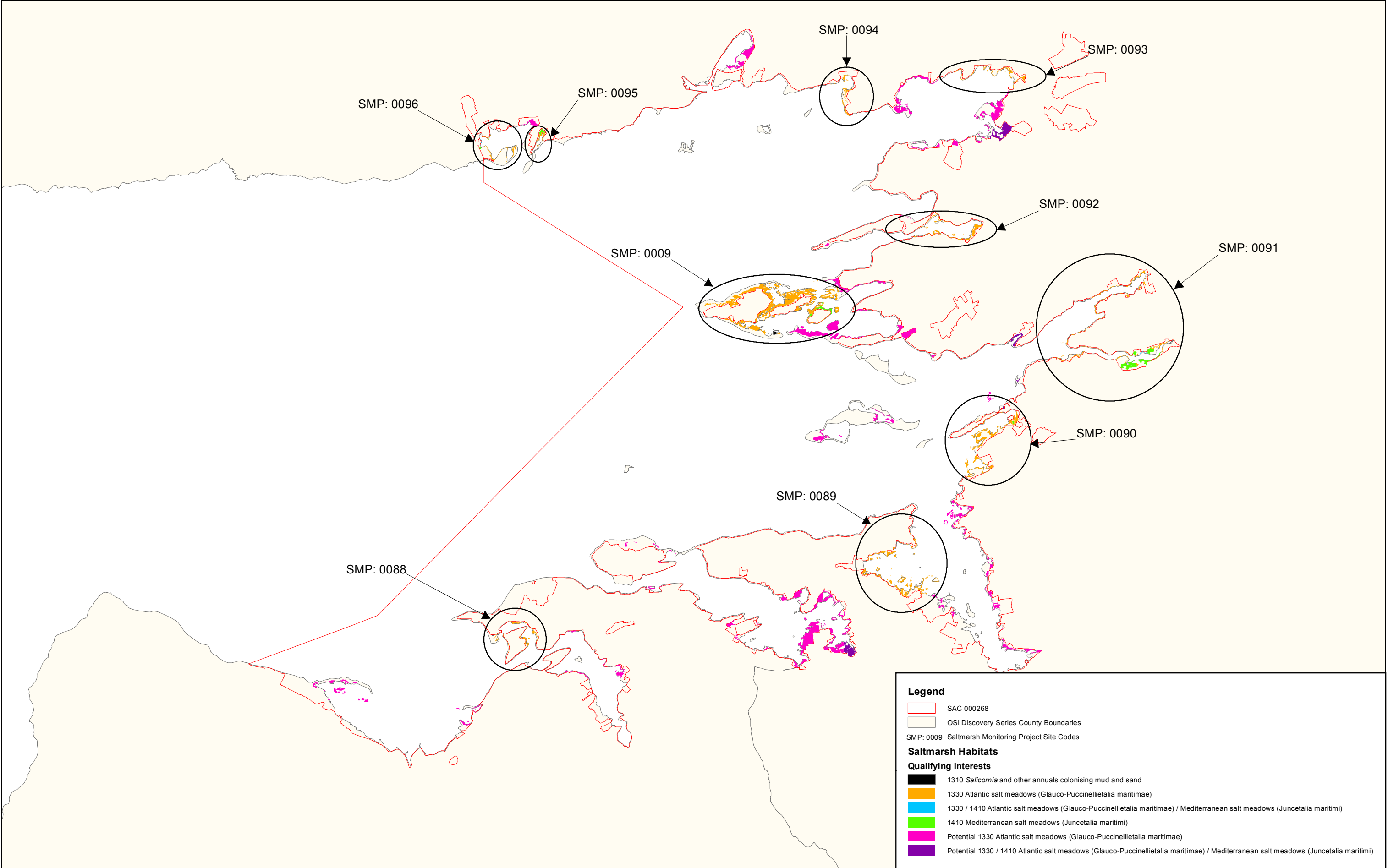


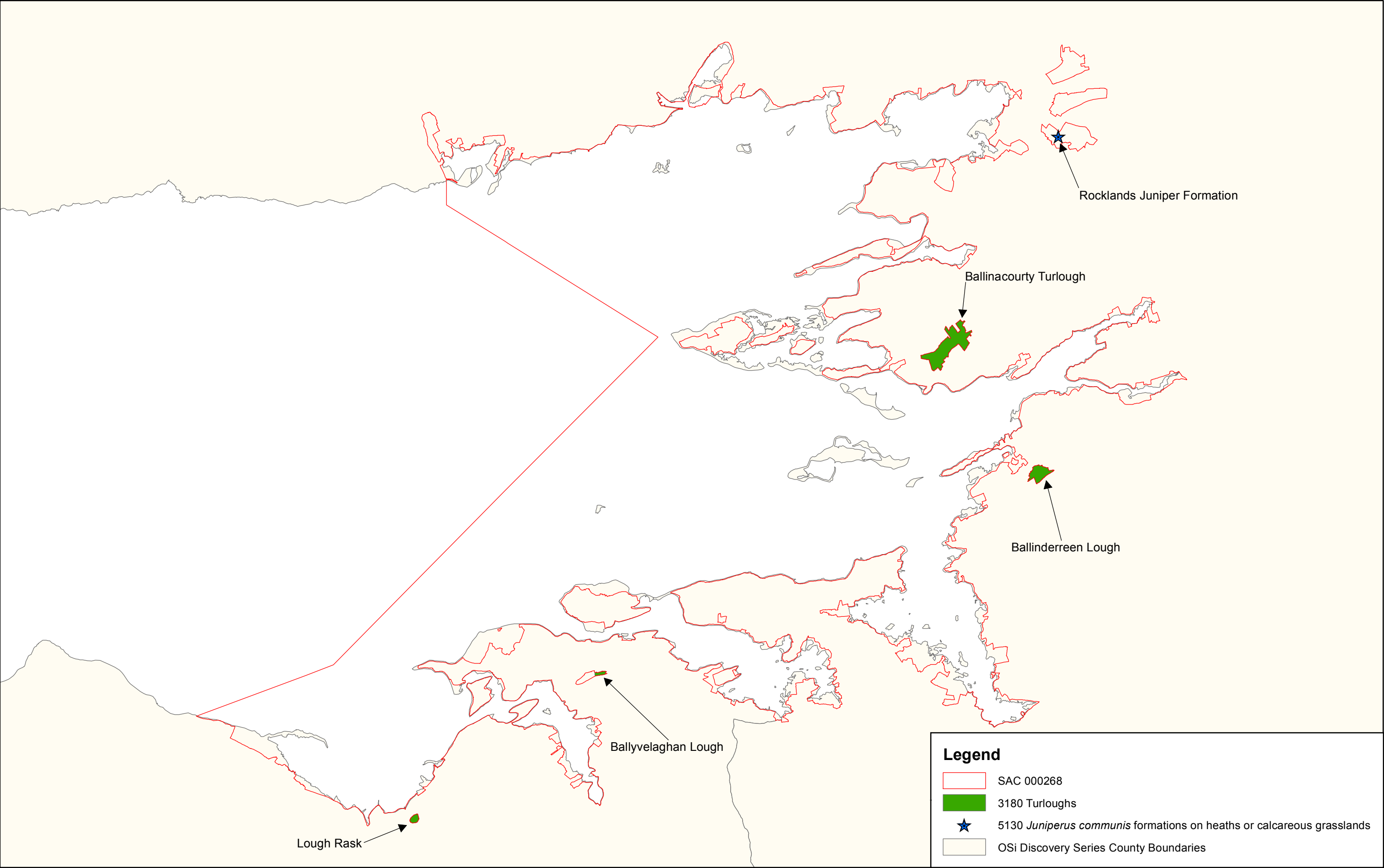


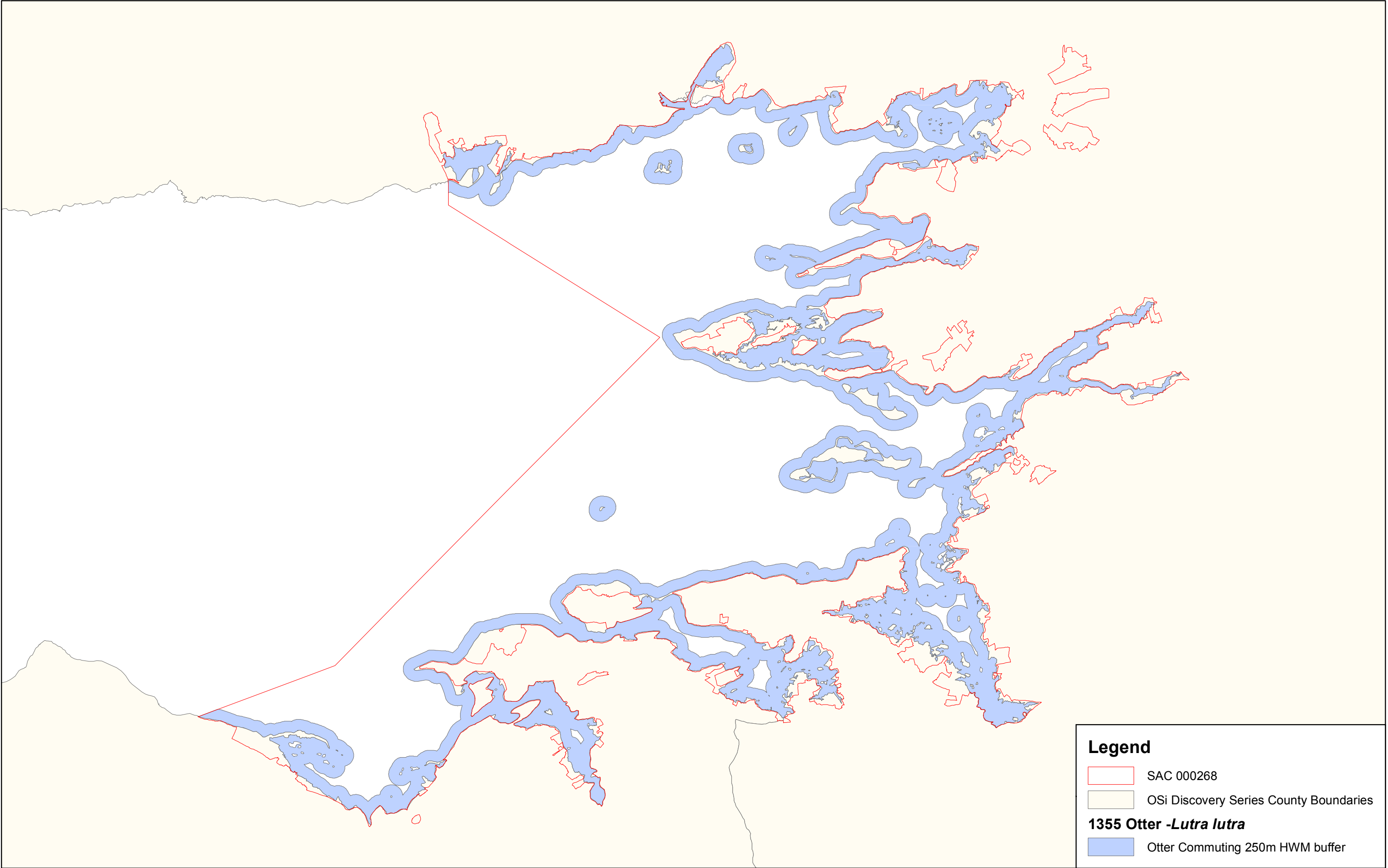












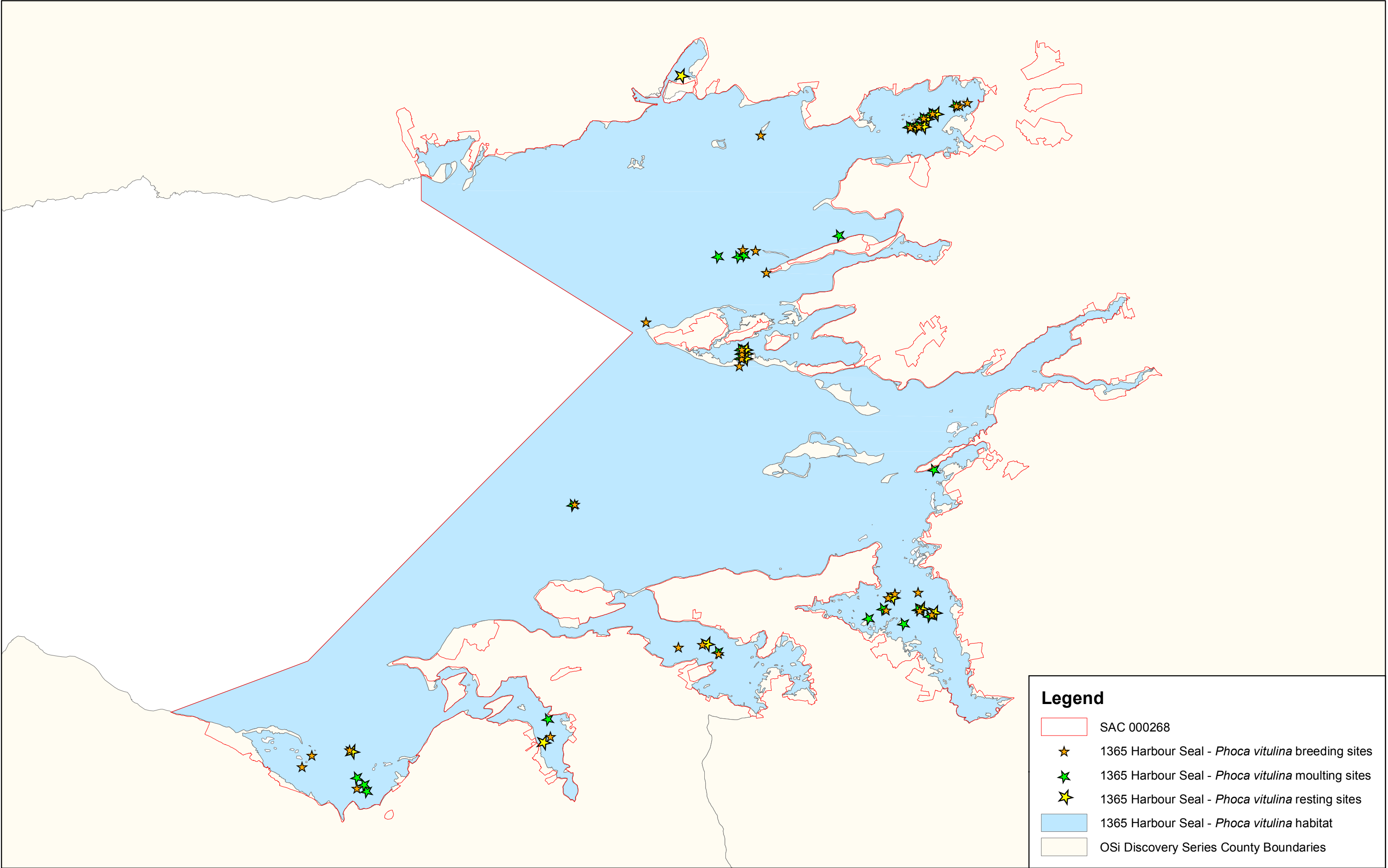
Legend

SAC 000268

OSi Discovery Series County Boundaries

1355 Otter -*Lutra lutra*

Otter Commuting 250m HWM buffer



Conservation objectives for Gortacarnaun Wood SAC [002180]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
------	-------------

91A0	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles
------	---

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Gortacarnaun Wood SAC [002180]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*

National Parks and Wildlife Service

Conservation Objectives Series

Inner Galway Bay SPA 004031



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



**National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,
7 Ely Place, Dublin 2, Ireland.
Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie**

Citation:

**NPWS (2013) Conservation Objectives: Inner Galway Bay SPA 004031. Version
1. National Parks and Wildlife Service, Department of Arts, Heritage and the
Gaeltacht.**

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

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Notes/Guidelines:

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

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

004031	Inner Galway Bay SPA
--------	----------------------

A003	Great Northern Diver <i>Gavia immer</i>
A017	Cormorant <i>Phalacrocorax carbo</i>
A028	Grey Heron <i>Ardea cinerea</i>
A046	Brent Goose <i>Branta bernicla hrota</i>
A050	Wigeon <i>Anas penelope</i>
A052	Teal <i>Anas crecca</i>
A056	Shoveler <i>Anas clypeata</i>
A069	Red-breasted Merganser <i>Mergus serrator</i>
A137	Ringed Plover <i>Charadrius hiaticula</i>
A140	Golden Plover <i>Pluvialis apricaria</i>
A142	Lapwing <i>Vanellus vanellus</i>
A149	Dunlin <i>Calidris alpina alpina</i>
A157	Bar-tailed Godwit <i>Limosa lapponica</i>
A160	Curlew <i>Numenius arquata</i>
A162	Redshank <i>Tringa totanus</i>
A169	Turnstone <i>Arenaria interpres</i>
A179	Black-headed Gull <i>Chroicocephalus ridibundus</i>
A182	Common Gull <i>Larus canus</i>
A191	Sandwich Tern <i>Sterna sandvicensis</i>
A193	Common Tern <i>Sterna hirundo</i>
A999	Wetlands

Please note that this SPA overlaps with Galway Bay Complex SAC (000268). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping site as appropriate.

Supporting documents, relevant reports & publications

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

Year :	1985
Title :	The birds of the Western Palearctic- Volume IV
Author :	Cramp, S.
Series :	Oxford University Press, Oxford
Year :	1995
Title :	Seabird monitoring handbook for Britain and Ireland: a compilation of methods for survey and monitoring of breeding seabirds.
Author :	Walsh, P.; Halley, D.J.; Harris, M.P.; del Nevo, A.; Sim, I.M.W.; Tasker, M.L.
Series :	JNCC, Peterborough
Year :	1996
Title :	Handbook of birds of the world volume 3: hoatzin to auks
Author :	del Hoyo, J; Elliott, A.; Sargatal, J.
Series :	Lynx Edicions, Barcelona
Year :	1997
Title :	The status and distribution of breeding sandwich, roseate, common, arctic and little terns in Ireland in 1995
Author :	Hannon, C.; Berrow, S.D.; Newton, S.F.
Series :	Irish Birds, 6(1): 1-22
Year :	2004
Title :	Seabird Populations of Britain and Ireland
Author :	Mitchell, P.I.; Newton, S.F.; Ratcliffe, N.; Dunn, T.E.
Series :	Poyser, London
Year :	2013
Title :	Seabird Monitoring Programme (SMP) Database
Author :	JNCC
Series :	http://jncc.defra.gov.uk/smp/Default.aspx
Year :	2013
Title :	BirdLife International Seabird Ecology and Foraging Range Database
Author :	BirdLife International
Series :	http://seabird.wikispaces.com
Year :	2013
Title :	Inner Galway Bay SPA (site code 4031) Conservation objectives supporting document V1
Author :	NPWS
Series :	Unpublished report to NPWS

A003 Great Northern Diver *Gavia immer*

To maintain the favourable conservation condition of Great Northern Diver in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by great northern diver, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A017 Cormorant *Phalacrocorax carbo*

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

Attribute	Measure	Target	Notes
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline	This attribute applies to breeding cormorant. Measure based on standard survey methods (see Walsh et al., 1995). The Seabird Monitoring Programme (SMP) online database (JNCC, 2013) provides population data for this species. A recent survey of Deer Island (conducted in 2010) estimated 128 AONs at this colony, which represents an approximate decline of 38% since 1985
Productivity rate	Mean number	No significant decline	This attribute applies to breeding cormorant. Measure based on standard survey methods (see Walsh et al., 1995). The Seabird Monitoring Programme (SMP) online database (JNCC, 2013) provides population data for this species
Distribution: breeding colonies	Number; location; area (hectares)	No significant decline	This attribute applies to breeding cormorant. Cormorant colonies are usually sited on flat or rocky islets or sea stack tops, less often on cliffs (Walsh et al., 1995). Deer Island is a traditional breeding colony in this SPA
Prey biomass available	Kilogrammes	No significant decline	This attribute applies to breeding cormorant. Key prey items: fish (mostly benthic), some crustaceans. Key habitats: cormorants use sandy areas as well as rocky and vegetated substrates. Foraging range: max. 50km, mean max. 31.67km, mean 8.46km (BirdLife International Seabird Database (Birdlife International, 2013))
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	This attribute applies to breeding cormorant. Seabird species make extensive use of the marine waters adjacent to their breeding colonies. Foraging range: max. 50km, mean max. 31.67km, mean 8.46km (BirdLife International Seabird Database (Birdlife International, 2013))
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding cormorant population	This attribute applies to breeding cormorant. Cormorant colonies are usually sited on flat or rocky islets or sea stack tops, less often on cliffs (Walsh et al., 1995). Deer Island is a traditional breeding site
Population trend	Percentage change	Long term population trend stable or increasing	This attribute applies to non-breeding cormorant. Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the numbers or range of areas used by cormorant, other than that occurring from natural patterns of variation	This attribute applies to non-breeding cormorant. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A028 Grey Heron *Ardea cinerea*

To maintain the favourable conservation condition of Grey Heron in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing and intensity of use of areas used by grey heron, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A046 Brent Goose *Branta bernicla hrota*

To maintain the favourable conservation condition of Light-bellied Brent Goose in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing and intensity of use of areas by light-bellied brent goose, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A050 *Wigeon* *Anas penelope*

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

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by wigeon, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A052 Teal *Anas crecca*

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

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by teal, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A056 Shoveler *Anas clypeata*

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

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by shoveler, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A069 Red-breasted Merganser *Mergus serrator*

To maintain the favourable conservation condition of Red-breasted Merganser in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing and intensity of use of areas by red-breasted merganser, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A137 Ringed Plover *Charadrius hiaticula*

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

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by ringed plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A140 Golden Plover *Pluvialis apricaria*

To maintain the favourable conservation condition of Golden Plover in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A142 Lapwing *Vanellus vanellus*

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

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by lapwing, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives

Conservation Objectives for : Inner Galway Bay SPA [004031]

A149 Dunlin *Calidris alpina alpina*

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

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A157 Bar-tailed Godwit *Limosa lapponica*

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

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A160 Curlew *Numenius arquata*

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

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by curlew, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A162 Redshank *Tringa totanus*

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

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of area	There should be no significant decrease in the range, timing or intensity of use of areas by redshank, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A169 Turnstone *Arenaria interpres*

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

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	There should be no significant decrease in the range, timing or intensity of use of areas by turnstone, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A179 Black-headed Gull *Chroicocephalus ridibundus*

To maintain the favourable conservation condition of Black-headed Gull in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	There should be no significant decrease in the range, timing and intensity of use of areas used by black-headed gull other than that occurring from natural patterns of variation	As determined by regular low tide and other waterbird surveys. Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A182 Common Gull *Larus canus*

To maintain the favourable conservation condition of Common Gull in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by the common gull, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Inner Galway Bay SPA [004031]

A191 Sandwich Tern *Sterna sandvicensis*

To maintain the favourable conservation condition of Sandwich Tern in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline	Measure based on standard tern survey methods (see Walsh et al., 1995). Hannon et al. (1997) and Mitchell et al. (2004) provide summary population information. The Seabird Monitoring Programme (SMP) online database (JNCC, 2013) provides population data for this species
Productivity rate: fledged young per breeding pair	Mean number	No significant decline	Measure based on standard tern survey methods (see Walsh et al., 1995). The Seabird Monitoring Programme (SMP) online database (JNCC, 2013) provides population data for this species
Distribution: breeding colonies	Number; location; area (Hectares)	No significant decline	Typical sandwich tern breeding sites are located on low-lying offshore islands or islets in bays or brackish lagoons on spits or remote mainland dunes (Cramp, 1985). Wide fluctuations between years in both breeding numbers and colony locations are known to occur for this species (Mitchell et al., 2004)
Prey biomass available	Kilogrammes	No significant decline	Key prey items: Mostly energy-rich fish, some crustaceans and occasionally insects and rag worms. Key habitats: sandwich tern forage in/over shallow marine waters such as bays, inlets and outflows, gullies, shoals, inshore waters, reefs, and sandbanks; also more open waters nearshore and offshore, including open sea. Foraging range: max. 70km, mean max. 42.3km, mean 14.7km (BirdLife International Seabird Database (Birdlife International, 2013))
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	Seabird species can make extensive use of the marine waters adjacent to their breeding colonies. Foraging range: Max 70km, mean max 42.3km, mean 14.7km (Birdlife International Seabird Database (Birdlife International, 2013))
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding sandwich tern population	Typical sandwich tern breeding sites are located on low-lying offshore islands or islets in bays or brackish lagoons on spits or remote mainland dunes (Cramp, 1985)

A193 Common Tern *Sterna hirundo*

To maintain the favourable conservation condition of Common Tern in Inner Galway Bay SPA, which is defined by the following list of attributes and targets:

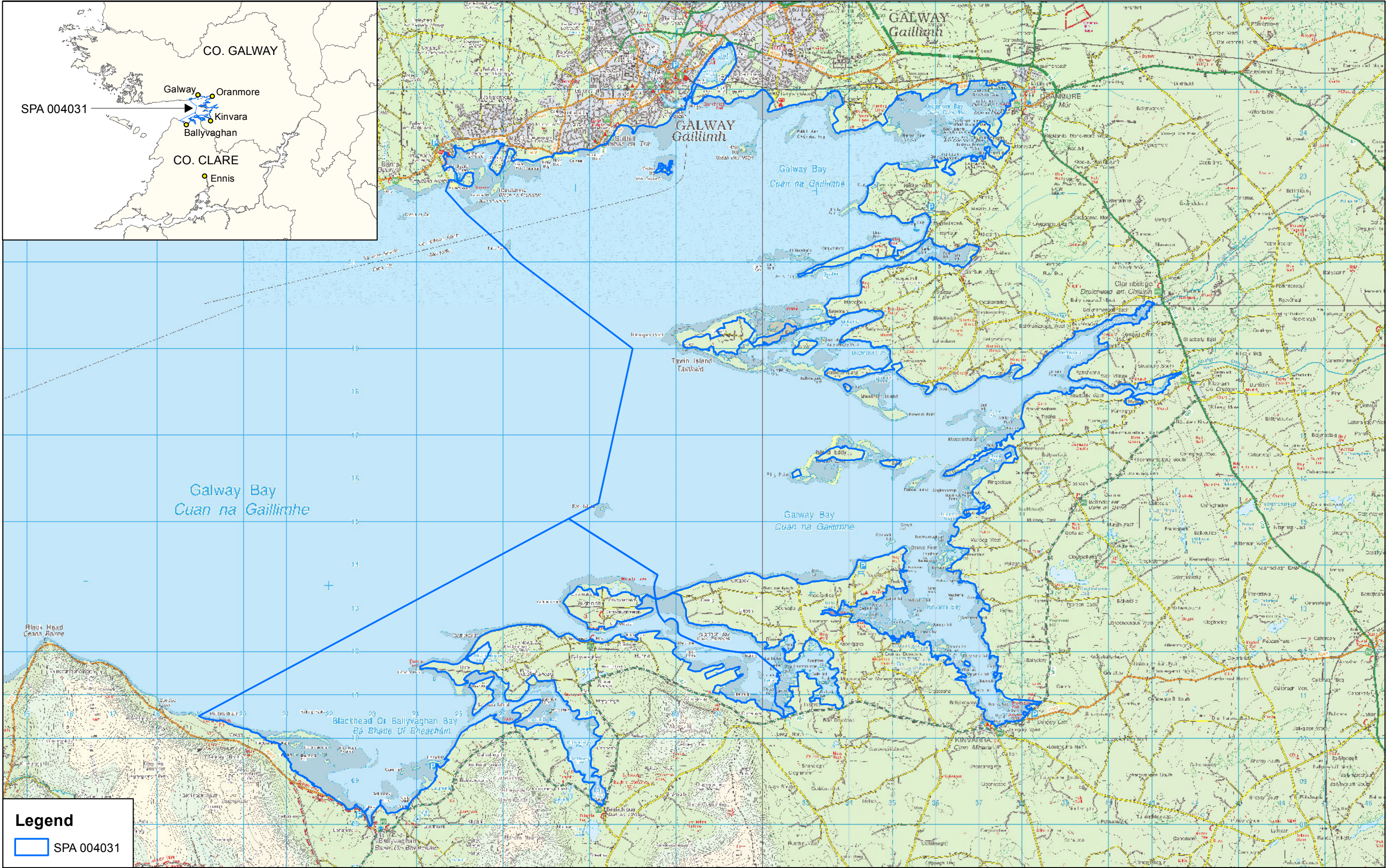
Attribute	Measure	Target	Notes
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline	Measure based on standard tern survey methods (see Walsh et al., 1995). Hannon et al. (1997) and Mitchell et al. (2004) provide summary population information. The Seabird Monitoring Programme (SMP) (JNCC, 2013) provides population data for this species
Productivity rate: fledged young per breeding pair	Mean number	No significant decline	Measure based on standard tern survey methods (see Walsh et al., 1995). The Seabird Monitoring Programme (SMP) (JNCC, 2013) provides population data for this species
Distribution: breeding colonies	Number; location; area (Hectares)	No significant decline	Common tern breeding colonies can be sited in both coastal and inland areas using a wide variety of habitats including sandy, rocky or well-vegetated islands in estuaries, lakes and rivers. This species can also use man-made substrates (Del Hoyo et al., 1996)
Prey biomass available	Kilogrammes	No significant decline	Key prey items: Small fish, crustaceans, insects and occasionally squid. Key habitats: common tern forage in/over shallow coastal waters, bays, inlets, shoals, tidal-rips, drift lines, beaches, saltmarsh creeks, lakes, ponds, or rivers. Foraging range: max. 37km, mean max. 33.81km, mean 8.67km (BirdLife International Seabird Database (Birdlife International, 2013))
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	Seabird species can make extensive use of marine waters adjacent to their breeding colonies. Foraging range: max. 37km, mean max. 33.81km, mean 8.67km (BirdLife International Seabird Database (Birdlife International, 2013))
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding little tern population	Breeding colonies can be sited in both coastal and inland areas using a wide variety of habitats including sandy, rocky or well vegetated islands in estuaries, lakes and rivers. This species can also use man-made substrates (Del Hoyo et al., 1996)

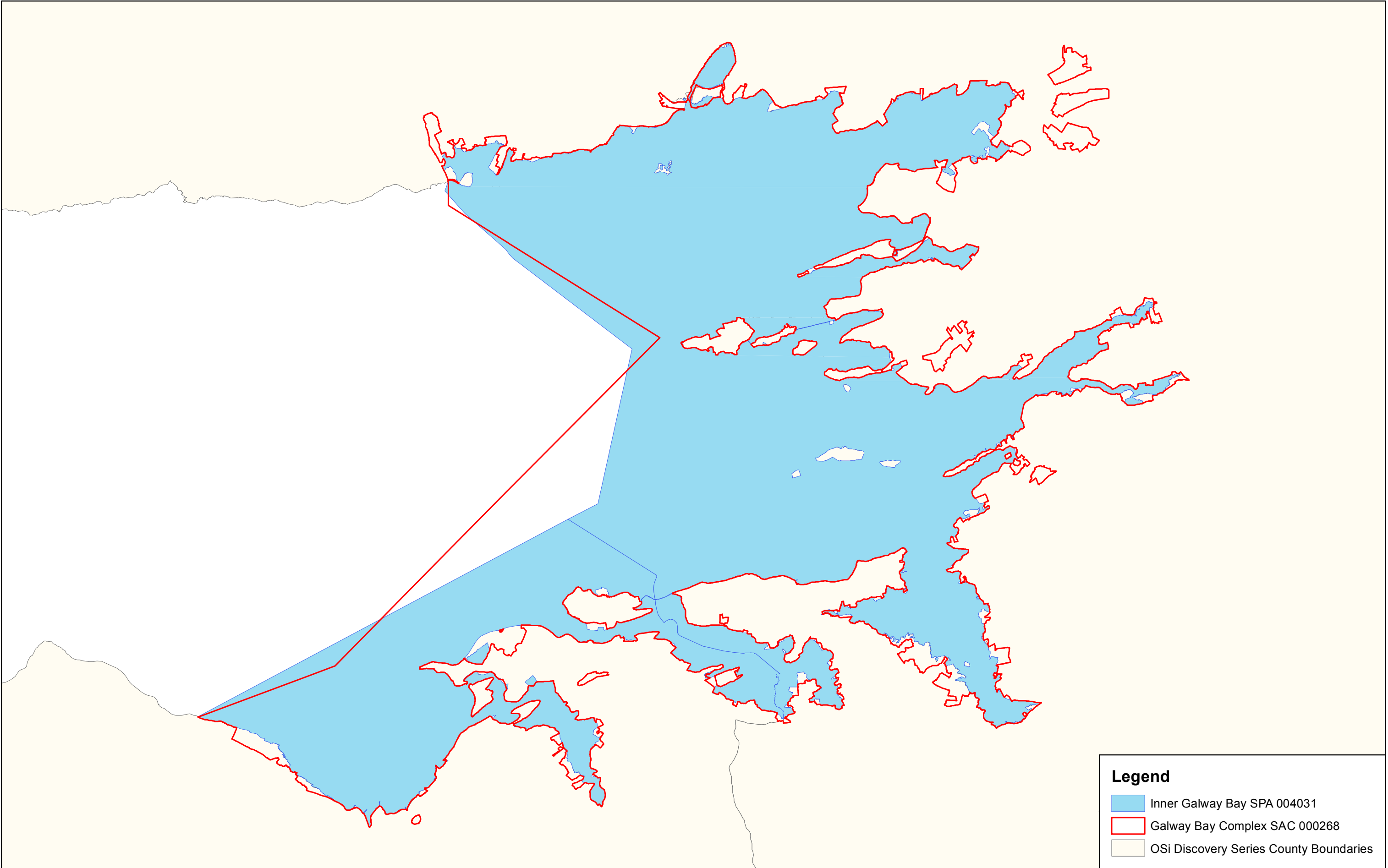
Conservation Objectives for : Inner Galway Bay SPA [004031]

A999 Wetlands

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 13,267ha, other than that occurring from natural patterns of variation	The wetland habitat area was estimated as 13,267ha using OSI data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document





Conservation objectives for Kiltartan Cave (Coole) SAC [000286]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code Description

8310 Caves not open to the public

* denotes a priority habitat

Code	Common Name	Scientific Name
1303	Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>



Citation: NPWS (2016) *Conservation objectives for Kiltartan Cave (Coole) SAC [000286]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*



Conservation objectives for Kiltiernan Turlough SAC [001285]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
-------------	--------------------

3180	Turloughs*
------	------------

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Kiltiernan Turlough SAC [001285]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*

National Parks and Wildlife Service

Conservation Objectives Series

Lough Corrib SAC 000297



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

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



**National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,
7 Ely Place, Dublin 2, Ireland.
Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie**

Citation:

**NPWS (2017) Conservation Objectives: Lough Corrib SAC 000297. Version 1.
National Parks and Wildlife Service, Department of Arts, Heritage, Regional,
Rural and Gaeltacht Affairs.**

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

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Notes/Guidelines:

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

Qualifying Interests

* indicates a priority habitat under the Habitats Directive

000297	Lough Corrib 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>
1106	Salmon <i>Salmo salar</i>
1303	Lesser Horseshoe Bat <i>Rhinolophus hipposideros</i>
1355	Otter <i>Lutra lutra</i>
1393	Slender Green Feather-moss <i>Drepanocladus vernicosus</i>
1833	Slender Naiad <i>Najas flexilis</i>
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)
6410	Terrestrial meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)
7110	Active raised bogsE
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion
7210	Calcareous fens with <i>Cladophora</i> and species of the Caricion davallianaeE
7220	Petrifying springs with tufa formation (Cratoneurion)E
7230	Alkaline fens
8240	Limestone pavementsE
91A0	Old sessile oak woods with <i>Quercus</i> and <i>Erica</i> in the British Isles
91D0	Bog woodlandE

Please note that this SAC overlaps with Lough Corrib SPA (004042). It is adjacent to Galway Bay Complex SAC (000268), Maumturk Mountains SAC (002008), Connemara Bog Complex SAC (002034) and Monivea Bog SAC (002352). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1984
Title :	The vegetation of Irish lakes
Author :	Heuff, H.
Series :	Unpublished report to NPWS
Year :	1995
Title :	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
Author :	Moorkens, E.
Series :	Unpublished report to NPWS
Year :	1998
Title :	Conservation management of the white-clawed crayfish, <i>Austropotamobius pallipes</i>
Author :	Reynolds, J.D.
Series :	Irish Wildlife Manual No. 1
Year :	2002
Title :	<i>Najas flexilis</i> in Donegal
Author :	Roden, C.M.
Series :	Unpublished report to NPWS
Year :	2004
Title :	Pilot project for monitoring populations of the freshwater pearl mussel <i>Margaritifera margaritifera</i> . Baseline survey of the Owenriff River SAC, County Galway
Author :	Moorkens, E.
Series :	Unpublished report to NPWS
Year :	2004
Title :	The distribution of <i>Najas flexilis</i> in Ireland 2002-2004
Author :	Roden, C.M.
Series :	Unpublished report to NPWS
Year :	2005
Title :	Monitoring populations of the freshwater pearl mussel <i>Margaritifera margaritifera</i> . Repeat survey of the Owenriff River cSAC, County Galway
Author :	Moorkens, E.
Series :	Unpublished report to NPWS
Year :	2006
Title :	Otter survey of Ireland 2004/2005
Author :	Bailey, M.; Rochford, J.
Series :	Irish Wildlife Manual No. 23
Year :	2006
Title :	Bat mitigation guidelines for Ireland
Author :	Kelleher, C.; Marnell, F.
Series :	Irish Wildlife Manual No. 25
Year :	2007
Title :	A survey of juvenile lamprey populations in the Corrib and Suir catchments
Author :	O'Connor, W.
Series :	Irish Wildlife Manual No. 26

Year :	2007
Title :	Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents. Article 17 forms and supporting maps
Author :	NPWS
Series :	Unpublished report to NPWS
Year :	2008
Title :	Monitoring populations of freshwater pearl mussel <i>Margaritifera margaritifera</i> . 2008 repeat survey of the Owenriff River SAC, County Galway
Author :	Moorkens, E.; Killeen, I.
Series :	Unpublished report to NPWS
Year :	2008
Title :	National survey of native woodlands 2003-2008
Author :	Perrin, P.M.; Martin, J.; Barron, S.; O'Neill, F.H.; McNutt, K.E.; Delaney, A.
Series :	Unpublished report to NPWS
Year :	2009
Title :	NS II freshwater pearl mussel sub-basin management plans: monitoring of the freshwater pearl mussel in the Owenriff
Author :	Moorkens, E.
Series :	Unpublished report to NPWS
Year :	2009
Title :	NS II freshwater pearl mussel sub-basin management plans: Report on biological monitoring of surface water quality in the Owenriff catchment (Corrib sub-catchment), Co. Galway
Author :	Williams, L.
Series :	Unpublished report to NPWS
Year :	2009
Title :	NS II freshwater pearl mussel sub-basin management plans: fisheries survey. Stage 1 report
Author :	Paul Johnston Associates
Series :	Unpublished report to NPWS
Year :	2010
Title :	A provisional inventory of ancient and long-established woodland in Ireland
Author :	Perrin, P.M.; Daly, O.H.
Series :	Irish Wildlife Manual No. 46
Year :	2010
Title :	A technical manual for monitoring white-clawed crayfish (<i>Austropotamobius pallipes</i>) in Irish lakes
Author :	Reynolds, J., O'Connor, W., O'Keeffe, C.; Lynn, D.
Series :	Irish Wildlife Manual No.45
Year :	2010
Title :	Second Draft Owenriff Freshwater Pearl Mussel Sub-basin Management Plan (2009-2015). March 2010
Author :	NPWS
Series :	Unpublished document to Department of the Environment, Heritage and Local Government
Year :	2011
Title :	Monitoring populations of the freshwater pearl mussel <i>Margaritifera margaritifera</i> – 2011 condition assessment survey of the freshwater pearl mussel in the Owenriff River, County Galway
Author :	Moorkens, E.
Series :	Unpublished report to NPWS

Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	Conservation status assessment for petrifying springs
Author :	Lyons, M.D.; Kelly, D.L.
Series :	Unpublished report to NPWS
Year :	2013
Title :	National otter survey of Ireland 2010/12
Author :	Reid, N.; Hayden, B.; Lundy, M.G.; Pietravalle, S.; McDonald, R.A.; Montgomery, W.I.
Series :	Irish Wildlife Manual No. 76
Year :	2013
Title :	Irish semi-natural grasslands survey 2007-2012
Author :	O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; Perrin, P.M.
Series :	Irish Wildlife Manual No. 78
Year :	2013
Title :	National survey of limestone pavement and associated habitats in Ireland
Author :	Wilson, S.; Fernandez, F.
Series :	Irish Wildlife Manual No. 73
Year :	2013
Title :	Results of a monitoring survey of bog woodland
Author :	Cross, J.; Lynn, D.
Series :	Irish Wildlife Manual No. 69
Year :	2013
Title :	A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel
Author :	Roden, C.; Murphy, P.
Series :	Irish Wildlife Manual No. 70
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer, J.; Duff, K.; Smith, G.
Series :	Irish Wildlife Manual No. 81

Year :	2014
Title :	Addergoole Bog (SAC 000297), Co.Galway, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer, J.; Duff, K.; Smith, G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS
Year :	2015
Title :	Monitoring methods for <i>Hamatocaulis vernicosus</i> (Mitt.) Hedenäs (Slender green feather-moss) in the Republic of Ireland
Author :	Campbell, C.; Hodgetts, N.; Lockhart, N.
Series :	Irish Wildlife Manual No. 91
Year :	2015
Title :	Monitoring populations of the freshwater pearl mussel <i>Margaritifera margaritifera</i> – 2014 Monitoring survey of the Owenriff River, County Galway. March 2015
Author :	Moorkens, E.A.
Series :	Unpublished report to NPWS
Year :	2015
Title :	Monitoring populations of the freshwater pearl mussel <i>Margaritifera margaritifera</i> – 2015 Monitoring Survey of the Owenriff River, County Galway. November 2015
Author :	Moorkens, E.A.
Series :	Unpublished report to NPWS
Year :	2016
Title :	Monitoring guidelines for the assessment of petrifying springs in Ireland
Author :	Lyons, M.D.; Kelly, D.L.
Series :	Irish Wildlife Manual No. 94
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2017
Title :	2016 Survey and condition assessment of the population of the freshwater mussel <i>Margaritifera margaritifera</i> in the Owenriff River, County Galway
Author :	Moorkens, E.
Series :	Unpublished report to NPWS
Year :	2017
Title :	Lough Corrib SAC (site code: 297) Conservation objectives supporting document- <i>Najas flexilis</i> V1
Author :	NPWS
Series :	Conservation objectives supporting document

Year : 2017
Title : Lough Corrib SAC (site code: 297) Conservation objectives supporting document- raised bog habitats V1
Author : NPWS
Series : Conservation objectives supporting document

Other References

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

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

Year : 1984
Title : Studies on the biology of freshwater mussels (Lamellibranchia: Unionacea) in Ireland
Author : Ross, E.D.
Series : Unpublished MSc Thesis. National University of Ireland, Galway

Year : 1988
Title : The reproductive biology of freshwater mussels in Ireland, with observations on their distribution and demography
Author : Ross, E.D.
Series : Unpublished Ph.D. Thesis, National University of Ireland, Galway

Year : 1989
Title : The genera *Scorpidium* and *Hamatocaulis*, gen. nov., in northern Europe
Author : Hedenäs, L.
Series : Lindbergia, 15: 8-36

Year : 1990
Title : The phytosociology and ecology of the aquatic and wetland communities of the lower Lough Corrib basin, County Galway
Author : Mooney, E.P.; O'Connell, M.
Series : Proceedings of the Royal Irish Academy. Section B: Biological, Geological, and Chemical Science, 90B(5): 58-97

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

Year : 1994
Title : The ecological status of Lough Corrib, Ireland, as indicated by physiographic factors, water chemistry and macrophytic flora
Author : Krause, W.; King, J.J.
Series : Vegetatio, 110: 149-161

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

Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
Year :	2001
Title :	Aquatic plants in Britain and Ireland
Author :	Preston, C.D.; Croft, J.M.
Series :	Harley Books, Colchester
Year :	2002
Title :	Reversing the habitat fragmentation of British woodlands
Author :	Peterken, G.
Series :	WWF-UK, London
Year :	2002
Title :	A survey of the white-clawed crayfish (<i>Austropotamobius pallipes</i>) Lereboullet and of water quality in two catchments of eastern Ireland
Author :	Demers, A.; Reynolds, J.D.
Series :	Bulletin Francais de la Peche et de la Pisciculture, 367: 729-740
Year :	2002
Title :	Deterioration of Atlantic soft water macrophyte communities by acidification, eutrophication and alkalinisation
Author :	Arts, G.H.P.
Series :	Aquatic Botany, 73: 373-393
Year :	2003
Title :	Monitoring the river, sea and brook lamprey, <i>Lampetra fluviatilis</i> , <i>L. planeri</i> and <i>Petromyzon marinus</i>
Author :	Harvey, J.; Cowx, I.
Series :	Conserving Natura 2000 Rivers Monitoring Series No. 5. English Nature, Peterborough
Year :	2003
Title :	Ecology of watercourses characterised by Ranunculion fluitantis and Callitriche-Batrachion Vegetation
Author :	Hatton-Ellis, T.W.; Grieve, N.
Series :	Conserving Natura 2000 Rivers Ecology Series No. 11. English Nature, Peterborough
Year :	2003
Title :	Identifying lamprey. A field key for sea, river and brook lamprey
Author :	Gardiner, R.
Series :	Conserving Natura 2000 rivers, Conservation techniques No. 4. English Nature, Peterborough
Year :	2004
Title :	The ecology of <i>Najas flexilis</i>
Author :	Wingfield, R.A.; Murphy, K.J.; Hollingsworth, P.; Gaywood, M.J.
Series :	Scottish Natural Heritage Commissioned Report No. 017 (ROAME No. F98PA02)
Year :	2005
Title :	Common standards monitoring guidance for freshwater fauna
Author :	JNCC
Series :	Joint Nature Conservation Committee, Peterborough
Year :	2006
Title :	Otters - ecology, behaviour and conservation
Author :	Kruuk, H.
Series :	Oxford University Press

Year :	2006
Title :	The status of host fish populations and fish species richness in European freshwater pearl mussel (<i>Margaritifera margaritifera</i>) streams
Author :	Geist, J.; Porkka, M.; Kuehn, R.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 16: 251-266
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2007
Title :	Evolutionary history of lamprey paired species <i>Lampetra fluviatilis</i> L. and <i>Lampetra planeri</i> Bloch as inferred from mitochondrial DNA variation
Author :	Espanhol, R.; Almeida, P.R.; Alves, M.J.
Series :	Molecular Ecology, 16: 1909-1924
Year :	2008
Title :	The lesser horseshoe bat conservation handbook
Author :	Schofield, H.W.
Series :	The Vincent Wildlife Trust
Year :	2008
Title :	Water Quality in Ireland 2004-2006
Author :	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S.; Tierney, D.; Bowman, J.
Series :	EPA, Wexford
Year :	2009
Title :	The identification, characterization and conservation value of isoetid lakes in Ireland
Author :	Free, G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 19 (3): 264–273
Year :	2010
Title :	Otter tracking study of Roaringwater Bay
Author :	De Jongh, A.; O'Neill, L.
Series :	Unpublished draft report to NPWS
Year :	2010
Title :	Addressing the conservation and rehabilitation of <i>Margaritifera margaritifera</i> populations in the Republic of Ireland within the framework of the habitats and species directive
Author :	Moorkens, E.
Series :	Journal of Conchology, 40: 339
Year :	2010
Title :	Water quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	EPA, Wexford
Year :	2011
Title :	Comparison of field- and GIS-based assessments of barriers to Atlantic salmon migration: a case study in the Nore Catchment, Republic of Ireland
Author :	Gargan, P.G.; Roche, W.K.; Keane, S.; King, J.J.; Cullagh, A.; Mills, P.; O'Keeffe, J.
Series :	Journal of Applied Ichthyology, 27 (Suppl. 3): 66-72

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2012
Title :	A report on the sub-littoral environment around selected navigation markers in the north west sector of Lough Corrib
Author :	Roden, C.
Series :	Unpublished report to RPS Group
Year :	2013
Title :	Aspects of brook lamprey (<i>Lampetra planeri</i> Bloch) spawning in Irish waters
Author :	Rooney, S.M.; O'Gorman, N.M.; Green, F.; King, J.J.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, 113B(1): 13-25
Year :	2013
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author :	Campbell, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment, 470–471: 216–223
Year :	2014
Title :	Assessing near-bed velocity in a recruiting population of the endangered freshwater pearl mussel (<i>Margaritifera margaritifera</i>) in Ireland
Author :	Moorkens, E.; Killeen, I.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 24(6): 853-862
Year :	2015
Title :	Behaviour of sea lamprey (<i>Petromyzon marinus</i> L.) at man-made obstacles during upriver spawning migration: use of telemetry to assess efficacy of weir modifications for improved passage
Author :	Rooney, S.M.; Wightman, G.D.; O Conchuir, R.; King, J.J.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, 115B: 1-12
Year :	2015
Title :	River engineering works and lamprey ammocoetes; impacts, recovery, mitigation
Author :	King, J.J.; Wightman, G.D.; Hanna, G.; Gilligan, N.
Series :	Water and Environment Journal, 29: 482-488
Year :	2015
Title :	The flora and conservation status of petrifying springs in Ireland
Author :	Lyons, M.D.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2016
Title :	The Status of Irish Salmon Stocks in 2015 with Precautionary Catch Advice for 2016
Author :	SSCS (Standing Scientific Committee on Salmon)
Series :	Independent Scientific Report to Inland Fisheries Ireland

Spatial data sources

Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitats and to resolve any issues arising
Used For :	3110, 3130, 3140 (map 3)
Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset and RBSB13_SACs_DrainagePatterns_5k dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	potential 7110; digital elevation model; drainage patterns (maps 4 and 6)
Year :	2003
Title :	Turf Cutting Impact Assessment Project
GIS Operations :	Ecotope dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 5)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes, 91D0 (maps 5 and 8)
Year :	2013
Title :	National Survey of Limestone Pavement and Associated Habitats in Ireland distribution data
GIS Operations :	Dataset clipped to the SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	8240 (map 7)
Year :	Revision 2010
Title :	National Survey of Native Woodlands 2003-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	91A0 (map 8)
Year :	Revision 2012
Title :	Margaritifera Sensitive Areas data
GIS Operations :	Relevant catchment boundary identified. Expert opinion used as necessary to resolve any issues arising
Used For :	1029 (map 9)
Year :	2017
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1029, 1092, 1393 (maps 9 and 10)
Year :	2012
Title :	NPWS lesser horseshoe bat database
GIS Operations :	Relevant roost identified by clipping to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1303 (map 11)
Year :	2007
Title :	Forest Inventory and Planning System (FIPS)
GIS Operations :	Dataset clipped to 2.5km buffer centred on roost location
Used For :	1303 (map 11)

Year :	2010
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	Creation of 80m buffer on aquatic side of lake data; creation of 10m buffer on terrestrial side of lake data. These datasets combined with derived OSi Discovery Series river and canal datasets. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising. Creation of 250m buffer on aquatic side of lake boundary to highlight potential commuting points
Used For :	1355 (map 12)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	Creation of 10m buffer on terrestrial side of river banks data; creation of 20m buffer applied to canal centreline data. Creation of 20m buffer applied to river and stream centreline data; These datasets combined with derived OSI 1:5000 vector lake buffer data. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1355 (no map)
Year :	2013
Title :	<i>Najas flexilis</i> data
GIS Operations :	Lake habitat for species clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1833 (map 13)

Conservation Objectives for : Lough Corrib SAC [000297]

3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)

To restore the favourable conservation condition of Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The distribution of lake habitat 3110 in Lough Corrib SAC has not been fully surveyed. Krause and King (1994) recorded it in the "western arm proper". Within Lough Corrib, it is likely to be restricted to this 'western arm' (the north-western bay). It may, however, occur elsewhere along the northern or western shoreline of Lough Corrib, in Ballydoo Lough (N. of Corrib) and in small lakes in the Owenriff catchment. Two measures of extent should be used: 1. the area of the lake itself; 2. the extent of the vegetation communities/zones that typify the habitat. Further information on this and all other attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 3 for indicative lake habitat distribution	The selection of the SAC for lake habitat 3110 was based on data on the macrophyte flora of Lough Corrib, particularly the north-western bay, from Krause and King (1994). Despite the occurrence of slender naiad (<i>Najas flexilis</i>) in this bay, the vegetation appears to be typical of lake habitat 3110. It is possible that habitat 3110 occurs elsewhere along the northern and western shores of Lough Corrib, on acid geology, as well as within some smaller lakes in the SAC, e.g. Lough Ateeen in the Owenriff catchment
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant species, see the Article 17 habitat assessment for 3110 (NPWS, 2013) and O Connor (2015)
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	Further work is necessary to describe the characteristic zonation and other spatial patterns in lake habitat 3110 (see O Connor, 2015)
Vegetation distribution: maximum depth	Metres	Restore maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. Further work is necessary to develop indicative targets for lake habitat 3110. Recent investigations have indicated a significant decline in depth of colonisation throughout Lough Corrib (Roden, 2012; Roden and Murphy, in prep.)
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced

Lake substratum quality	Various	Restore appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that the oligotrophic soft water habitat is associated with a range of nutrient-poor substrates, from stones, cobble and gravel, through sands, silt, clay and peat. Substratum particle size is likely to vary with depth and along the shoreline within a single lake. Lake substratum quality in Lough Corrib is impaired as a result of peat deposition and possibly also nutrient enrichment (Roden, 2012; Roden and Murphy, in prep.)
Water quality: transparency	Metres	Restore appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. Specific targets have yet to be established for lake habitat 3110. Habitat 3110 is associated with very clear water. The OECD fixed boundary system set transparency targets for oligotrophic lakes of $\geq 6\text{m}$ annual mean Secchi disk depth, and $\geq 3\text{m}$ annual minimum Secchi disk depth. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m. Secchi depth did not exceed 2m in the 'western arm' of Lough Corrib and approximately 5m in the northern basin in 2012 (Roden, 2012)
Water quality: nutrients	$\mu\text{g/l P}$; mg/l N	Restore the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species	As a nutrient-poor habitat, oligotrophic and Water Framework Directive (WFD) 'high' status targets apply. Where a lake has nutrient concentrations that are lower than these targets, there should be no decline within class, i.e. no upward trend in nutrient concentrations. For lake habitat 3110, annual average Total Phosphorus (TP) concentration should be $\leq 10\mu\text{g/l TP}$, average annual total ammonia concentration should be $\leq 0.040\text{ mg/l N}$ and annual 95th percentile for total ammonia should be $\leq 0.090\text{ mg/l N}$. See also the European Communities Environmental Objectives (Surface Waters) Regulations 2009. TP has exceeded the $10\mu\text{g/l}$ target in Upper Corrib in a number of recent years (Clabby et al., 2008; McGarrigle et al., 2010)
Water quality: phytoplankton biomass	$\mu\text{g/l Chlorophyll } a$	Restore appropriate water quality to support the habitat, including high chlorophyll <i>a</i> status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3110. Where a lake has a chlorophyll <i>a</i> concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll <i>a</i> concentration must be $< 5.8\mu\text{g/l}$. The annual average chlorophyll <i>a</i> concentration should be $< 2.5\mu\text{g/l}$ and the annual peak chlorophyll <i>a</i> concentration should be $\leq 8.0\mu\text{g/l}$. See also the European Communities Environmental Objectives (Surface Waters) Regulations 2009. Maximum chlorophyll <i>a</i> in Upper Corrib has exceeded the OECD target of $\leq 8.0\mu\text{g/l}$ in five of the nine monitoring cycles from 1976-2009 (McGarrigle et al., 2010)
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The Environmental Protection Agency (EPA) has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, lake habitat 3110 requires WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Restore/maintain trace/absent attached algal biomass ($< 5\%$ cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in lake habitat 3110 should, therefore, be trace/absent ($< 5\%$ cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, lake habitat 3110 requires high phytobenthos status

Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for the lake habitat. The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for lake habitat 3110 is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥ 0.90 , as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in soft water lake habitats. In Europe, acidification of isoetid lakes can lead to loss of isoetids and dominance by submerged <i>Sphagnum</i> mosses and <i>Juncus bulbosus</i> (Arts, 2002). The specific requirements of lake habitat 3110, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. For lake habitat 3110, and adopting a precautionary approach based on Arts (2002), minimum pH should not be < 5.5 pH units. Maximum pH should be < 9.0 pH units, in line with the surface water standards established for soft waters (where water hardness is ≤ 100 mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009)
Water colour	mg/l PtCo	Restore/maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 38 mg/l PtCo (Free et al., 2000) and 33 mg/l PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be < 50 mg/l PtCo. Water colour can be very low (20 mg/l PtCo or even < 10 mg/l PtCo) in oligotrophic soft water lakes (3110), where the peatland in the lake's catchment is intact. Roden (2012) recorded very dark water and poor visibility in Upper Corrib and the western arm
Dissolved organic carbon (DOC)	mg/l	Restore/maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Restore/maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes. Roden recorded low transparency, very hard water, poor visibility and peat deposition in Lough Corrib, all of which suggest increased turbidity (Roden, 2012)

Fringing habitat : Hectares
area and condition

Maintain the area and
condition of fringing
habitats necessary to
support the natural
structure and functioning
of habitat 3110

Most lake shorelines have fringing habitats of reedswamp, other swamp, fen, marsh or wet woodland that intergrade with and support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species-richness than the lake habitats themselves. Lough Corrib has important areas of fen, limestone pavement, marsh, reedswamp and some woodland along its shoreline. See also the conservation objectives for associated Annex I habitats and Annex II species within the SAC

Conservation Objectives for : Lough Corrib SAC [000297]

3130 Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea

To restore the favourable conservation condition of Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The full distribution and characteristics of lake habitat 3130 in Lough Corrib SAC have not been mapped. While the characteristic species slender naiad (<i>Najas flexilis</i>) was recorded in the western arm of Lough Corrib, that area appears to be dominated by lake habitat 3110, with lake habitat 3130 found towards the northern basin proper. The division between lake habitats 3130 and 3140 may be difficult to determine, and both habitats may occur throughout the lake. Habitat 3130 is thought likely to dominate Ballycuike Lake. Two measures of extent should be used: 1. the area of the lake itself; 2. the extent of the vegetation communities/zones that typify the habitat. For additional information see Krause and King (1994). Further information on this and all other attributes is contained in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015) and the <i>Najas flexilis</i> supporting document
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 3 for indicative lake habitat distribution	The characteristics and distribution of lake habitat 3130 in Ireland are not yet fully understood. The Annex II macrophyte slender naiad (<i>Najas flexilis</i>) is considered to be characteristic of the habitat and occurs in Lough Corrib. Based on Environmental Protection Agency (EPA) macrophyte data, lake habitat 3130 is also likely to occur in Ballycuike Lough (Loch Bhaile Ui Choirc)
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant species, see the Article 17 habitat assessment for lake habitat 3130 (NPWS, 2013) and O Connor (2015)
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	Further work is necessary to describe the characteristic zonation and other spatial patterns in lake habitat 3130 (see O Connor, 2015)
Vegetation distribution: maximum depth	Metres	Restore maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. Further work is necessary to develop indicative targets for lake habitat 3130. Recent investigations have indicated a significant decline in depth of colonisation throughout Lough Corrib (Roden, 2012; Roden and Murphy, in prep.)
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced

Lake substratum quality	Various	Restore appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that lake habitat 3130 is associated with a range of substrate types that are more productive/base-rich relative to the substratum of lake habitat 3110. Substratum particle size is likely to vary with depth and along the shoreline within a single lake, however it should be noted that <i>Najas flexilis</i> is typically found on soft substrata of mud, silt or fine sand (Preston and Croft, 2001; Roden, 2002, 2004). Lake substratum quality in Lough Corrib is impaired as a result of peat deposition and possibly also nutrient enrichment (Roden, 2012; Roden and Murphy, in prep.)
Water quality: transparency	Metres	Restore appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. Specific targets have yet to be established for lake habitat 3130 (O Connor, 2015). Habitat 3130 is associated with clear water, as evidenced by the growth of the character species <i>Najas flexilis</i> at depths of up to 10m. The OECD fixed boundary system set transparency targets for oligotrophic lakes of $\geq 6\text{m}$ annual mean Secchi disk depth, and $\geq 3\text{m}$ annual minimum Secchi disk depth. There is likely to be some variation across lakes with habitat 3130 in Secchi depth and site-specific conditions should also be considered. Secchi depth did not exceed 2m in the 'western arm' of Lough Corrib and approximately 5m in the northern basin in 2012 (Roden, 2012)
Water quality: nutrients	$\mu\text{g/l P}$; mg/l N	Restore the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species	Lake habitat 3130 is associated with high water quality, with low dissolved nutrients. It is naturally more productive than 3110, probably reflecting higher concentrations of nutrients such as calcium, rather than P alone. 3130 may reach favourable condition slightly above the oligotrophic boundary for nutrients, but in the absence of habitat-specific targets, the targets are Water Framework Directive (WFD) 'High Status' or oligotrophic (OECD, 1982). The "good-moderate" boundary is too enriched to support the habitat. Annual average Total Phosphorus (TP) concentration should be $\leq 10\mu\text{g/l}$ TP, average annual total ammonia should be $\leq 0.04\text{mg/l N}$ and annual 95th percentile for total ammonia should be $\leq 0.09\text{mg/l N}$. Where nutrient concentrations are lower, there should be no upward trend. See also the European Communities Environmental Objectives (Surface Waters) Regulations 2009. TP has exceeded the $10\mu\text{g/l}$ target in Upper Corrib in recent years (Clabby et al., 2008; McGarrigle et al., 2010)
Water quality: phytoplankton biomass	$\mu\text{g/l Chlorophyll } a$	Restore appropriate water quality to support the habitat, including high chlorophyll <i>a</i> status	Lake habitat 3130 is associated with high water quality, and naturally low algal growth. As for nutrients, the targets are WFD 'High Status' or oligotrophic (OECD, 1982). The "good-moderate" boundary is too enriched to support the habitat. The average growing season (March-October) chlorophyll <i>a</i> concentration must be $< 5.8\mu\text{g/l}$. The annual average chlorophyll <i>a</i> should be $< 2.5\mu\text{g/l}$ and the annual peak chlorophyll <i>a</i> should be $< 8.0\mu\text{g/l}$. Where a lake has a chlorophyll <i>a</i> concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. See also the European Communities Environmental Objectives (Surface Waters) Regulations 2009. Maximum chlorophyll <i>a</i> in Upper Corrib has exceeded the OECD target of $\leq 8.0\mu\text{g/l}$ in five of the nine monitoring cycles from 1976-2009 (McGarrigle et al., 2010)

Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, lake habitat 3130 requires WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Restore/maintain trace/absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in lake habitat 3130 should, therefore, be trace/absent (<5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, lake habitat 3130 requires high phytobenthos status
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for the soft water lake habitat with base-rich influences (3130). The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for lake habitat 3130 is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥ 0.90 , as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in habitat 3130. Acidification reduces the abundance and reproductive capacity of <i>Najas flexilis</i> (Wingfield et al., 2004). The specific requirements of lake habitat 3130, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. In line with targets for <i>Najas flexilis</i> , median pH values should be greater than 7 pH units. Water and sediment alkalinity and concentrations of cations (notably calcium) should be appropriate to the habitat. The target for WFD Acidification/Alkalisiation status is high. Maximum pH should be <9.0 pH units, in line with the surface water standards. See the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water colour	mg/l PtCo	Restore/maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mg/l PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be <50mg/l PtCo. Water colour is generally <30mg/l PtCo or, more naturally, <20mg/l PtCo in lake habitat 3130, where the peatland in the lake's catchment is intact. Roden (2012) recorded very dark water and poor visibility in Upper Corrib and the western arm
Dissolved organic carbon (DOC)	mg/l	Restore/maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.

Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Restore/maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes. Roden recorded low transparency, very hard water, poor visibility and peat deposition in Lough Corrib, all of which suggest increased turbidity (Roden, 2012)
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3130	Most lake shorelines have fringing habitats of reedswamp, other swamp, fen, marsh or wet woodland that intergrade with and support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species-richness than the lake habitats themselves. Lough Corrib has important areas of fen, limestone pavement, marsh, reedswamp and some woodland along its shoreline. See also the conservation objectives for associated Annex I habitats and Annex II species within the SAC

Conservation Objectives for : Lough Corrib SAC [000297]

3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.

To restore the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The hard water lake habitat (3140) is found in Lough Corrib, notably the southern basin. Its exact distribution and area has not been mapped however, and it is likely to also extend along the eastern side of the northern basin. For additional information see Heuff (1984), Mooney and O'Connell (1990), Krause and King (1994) and Roden and Murphy (in prep.). Further information on this and all other attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 3 for indicative lake habitat distribution	The distribution of the hard water lake habitat (3140) in Lough Corrib is determined, in the main, by geology and water chemistry. The hydrological regime (water circulation) in the Lough Corrib basins influences water mixing and, therefore, water chemistry. As a result, lake habitat 3140 is considered to dominate the southern basin, but is also likely to be widespread in the northern basin
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical species (cyanobacteria, algae, higher plants and water beetles), see the Article 17 habitat assessment for lake habitat 3140 (NPWS, 2013) and O Connor (2015). Lough Corrib is, naturally, a 'typical' marl lake as described by Roden and Murphy (2013; in prep.). Monitoring in 2012 demonstrated that the hard water vegetation in Lough Corrib is in bad condition, with shallow euphotic depth, some dead/dying charophytes and absent and decaying krustenstein (Roden and Murphy, in prep.)
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.). Charophyte zonation was reasonably intact in Lough Corrib in 2012, with <i>Chara curta</i> , <i>C. rudis</i> , <i>C. virgata</i> and <i>C. denudata</i> present, however the zones had become compressed since surveyed in 2004 and <i>C. contraria</i> and <i>Nitella flexilis</i> zones were not recorded (Roden and Murphy, in prep.). The krustenstein zone was either absent or decaying (Roden and Murphy, in prep.)
Vegetation distribution: maximum depth	Metres	Restore maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question, but is typically expected to be deep in clear, hard water lakes. An indicative target of more than 6m has been developed for hard water lakes (3140) (see Roden and Murphy, 2013; in prep.). Extremely clear marl lakes can have charophyte vegetation to far greater depths, such as Lough Rea (charophytes to 10-11m), or Coolorta (>9m) (Roden and Murphy, in prep.). In 2004, the euphotic zone of Lough Corrib extended to 6m, but in 2012 the maximum depth of vegetation was 4.2m (Roden and Murphy, in prep.). Decaying charophytes were recorded at 3m (Roden and Murphy, in prep.)

Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	The hydrological regime of lakes with habitat 3140 is driven by groundwater flows. Groundwater can discharge directly to the lake, via springs or seepages, or to in-flowing rivers. Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime, particularly the groundwater contribution, must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced
Lake substratum quality	Various	Restore appropriate substratum type, extent and chemistry to support the vegetation	The hard water lake habitat is associated with a range of base-rich substratum types, from marl and limestone bedrock, through rocks, cobbles, gravel, muds and even peat. Lake substratum quality in Lough Corrib is impaired as a result of peat deposition, likely also nutrient enrichment, krustenstein decay and colonisation by zebra mussels (<i>Dreissena polymorpha</i>) (Roden, 2012; Roden and Murphy, in prep.). Further research into substratum quality (notably calcium, iron and nutrient concentrations) in the hard water lake habitat would be beneficial
Water quality: transparency	Metres	Restore appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A target has been set for hard water lakes (3140) of >6m (Roden and Murphy, in prep.). The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth and ≥3m annual minimum Secchi disk depth. Hard water lakes typically have high transparency, particularly in the very clear and typical marl forms (Roden and Murphy, in prep.). Secchi depth was 4m in lake habitat 3140 in 2012 (Roden and Murphy, in prep.)
Water quality: nutrients	µg/l P; mg/l N	Restore the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species	Lake habitat 3140 is typically associated with high water quality, including low dissolved nutrients. Some forms of the habitat appear to be naturally more productive than others, e.g. the machair form may be naturally more nutrient-rich. The default target for typical marl lakes is Water Framework Directive (WFD) 'High Status' or oligotrophic (OECD, 1982). Annual average Total Phosphorus (TP) concentration should be ≤10µg/l TP, average annual total ammonia should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. Where nutrient concentrations are lower than the targets, there should be no upward trend in nutrient concentrations. For further information see the European Communities Environmental Objectives (Surface Waters) Regulations 2009. TP has exceeded the 10µg/l target in Lower Corrib in a number of recent years (Clabby et al., 2008; McGarrigle et al., 2010)

Water quality: phytoplankton biomass	µg/l Chlorophyll <i>a</i>	Maintain appropriate water quality to support the habitat, including high chlorophyll <i>a</i> status	Lake habitat 3140 is associated with high water quality, as demonstrated by naturally low algal growth. As for nutrients, the default target is WFD 'High Status' or oligotrophic (OECD, 1982). Average growing season (March-October) chlorophyll <i>a</i> concentration must be <5.8µg/l. Annual average chlorophyll <i>a</i> concentration should be <2.5µg/l and the annual peak should be <8.0µg/l. Where chlorophyll <i>a</i> concentrations are lower than the targets, there should be no upward trend in phytoplankton biomass. See the European Communities Environmental Objectives (Surface Waters) Regulations 2009. Maximum chlorophyll <i>a</i> in Lower Corrib exceeded the OECD target of ≤8.0 µg/l in five of the six monitoring cycles from 1976-2000 (McGarrigle et al., 2010). In recent years, however maximum concentrations have dropped to c.8µg/l, probably as a result of zebra mussel (<i>Dreissena polymorpha</i>) activity
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The Environmental Protection Agency (EPA) has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, the default target for lake habitat 3140 is WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Restore/maintain trace/absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in hard water lakes (3140) should, therefore, be trace/absent (<5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, the default target for lake habitat 3140 is high phytobenthos status
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Restore high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for hard water lakes (3140). The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for lake habitat 3140 is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Water) Regulations 2009
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	The specific requirements of lake habitat 3140, in terms of water and sediment pH, alkalinity and cation concentration, have not been fully determined. Acidification is not considered a threat to habitat 3140, however eutrophication can lead to at least temporary increases in pH to toxic levels (>9/9.5 pH units). Maximum pH should be <9.0 pH units, in line with the surface water standards. See the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water colour	mg/l PtCo	Restore/maintain appropriate water colour to support the habitat	Increased colour decreases light penetration and reduces the area of macrophyte habitat, particularly at the lower euphotic depths. Higher colour also appears to favour angiosperms over charophytes in hard water lakes (Roden and Murphy, in prep.). The primary source of increased colour in Ireland is peatland disturbance. No habitat-specific or national standards for water colour exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mg/l PtCo (Free et al., 2006). Lake habitat 3140 is typically associated with very clear waters and expected colour would be <10 or, more likely, <5mg/l PtCo. Higher colour is found in some hard water lakes with significant areas of peatland in their catchment, but it is not clear whether this is natural or the result of peatland degradation. Roden and Murphy (in prep.) recorded dark water in Lough Corrib

Dissolved organic carbon (DOC)	mg/l	Restore/maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate unit	Restore/maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3140	Most lake shorelines have fringing habitats of reedswamp, other swamp, fen, marsh or wet woodland that intergrade with and support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species-richness than the lake habitats themselves. Fringing fen habitats can be particularly important around hard water lakes, notably the Annex I habitats alkaline fen, <i>Cladium</i> fen and petrifying springs (habitat codes 7230, 7210 and 7220). Lough Corrib has important areas of fen, limestone pavement, marsh, reedswamp and some woodland along its shoreline. See also the conservation objectives for associated Annex I habitats and Annex II species within the SAC

Conservation Objectives for : Lough Corrib SAC [000297]

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 Lough Corrib 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 3260 is broad, from upland bryophyte/macroalgal dominated stretches, to lowland depositing rivers with pondweeds and starworts. Selection of SACs for the habitat used this broad interpretation. Site-specific objectives for the habitat concentrate upon high conservation value sub-types. Little is known, however, about the characteristics or sub-types in Lough Corrib SAC. Many of the rivers were included in the SAC for Atlantic salmon (<i>Salmo salar</i>). Most of the rivers are in arterial drainage schemes that have altered aquatic plant distribution and species composition. 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 Owenriff River within this SAC, because the mussel requires environmental conditions closer to natural background levels
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, little is known about the distribution of the habitat and its sub-types in this SAC. The vegetation of the River Corrib was documented in Mooney and O'Connell (1990). Macrophyte vegetation has expanded in the Owenriff River resulting in a decline in the condition of this priority freshwater pearl mussel (<i>Margaritifera margaritifera</i>) population and its habitat (NPWS, 2010). The Cornamonna, Owennaraha, Owenakilla and other rivers flowing into the north-western part of Lough Corrib are worthy of further investigation
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	Any high conservation value sub-types in the SAC will be associated with natural, fast and highly variable flows. Owing to regular disturbance (through variations in flow), river macrophytes rarely reach a climax condition but frequently occur as transient communities. 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 of the sub-types of this habitat, 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
Hydrological regime: groundwater discharge	Metres per second	Maintain appropriate hydrological regimes	It is likely that rivers over limestone bedrock have a significant groundwater contribution. There may be tufa formation associated with such groundwater springs and seepages. Such petrifying springs are an in-stream form of the Habitats Directive priority Annex I habitat "Petrifying springs with tufa formation (Cratoneurion)" (7220) and of high conservation value

Substratum composition: particle size range	Millimetres	Maintain appropriate substratum particle size range, quantity and quality, subject to natural process	Although many of the high conservation value sub-types are dominated by coarse substrata, for certain sub-types, notably tidal forms, fine substrata are required. The size and distribution of particles is 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 for rooted plant communities
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. Bryophyte-rich and tufaceous streams and rivers are considered highly sensitive to nutrient enrichment and are likely to require high status waters. Water quality for other sub-types should reach a minimum of Water Framework Directive (WFD) good status, in terms of nutrient and oxygenation standards, and EQRs (Ecological Quality Ratios) for macroinvertebrates and phytobenthos
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 fully defined. The typical species may include higher plants, bryophytes, macroalgae and microalgae, and invertebrates
Floodplain connectivity: area	Hectares	The area of active floodplain at and upstream of the habitat should be maintained	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)
Riparian habitat: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the habitat and its sub-types	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 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 also the conservation objectives for associated Annex I habitats and Annex II species within the SAC

Conservation Objectives for : Lough Corrib SAC [000297]

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)

To maintain the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) in Lough Corrib SAC in owing list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) occurs mainly as small areas and in intimate association with other habitats in this SAC including other grassland types, fens and limestone pavements and is therefore difficult to map separately. O'Neill et al. (2013) surveyed and mapped some grassland sites within the SAC in detail and the surveys of limestone pavement sites carried out by Wilson and Fernandez (2013) included associated grassland habitats; however, as all areas of this habitat within the SAC have not been identified, the total area is unknown
Habitat distribution	Occurrence	No decline, subject to natural processes	See notes for area above
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present, including two "high quality" species	Attribute and target based on O'Neill et al. (2013), where the list of positive indicator species, including high quality species, as identified by the Irish Semi-natural Grasslands Survey (ISGS) is presented. O'Neill et al. (2013) should be consulted for further details
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%	Attribute and target based on O'Neill et al. (2013), where the list of negative indicator species as identified by the ISGS is presented
Vegetation composition: non-native species	Percentage 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)
Vegetation composition: woody species and bracken	Percentage at a representative number of monitoring stops	Cover of woody species (except certain listed species) and bracken (<i>Pteridium aquilinum</i>) not more than 5% cover	Attribute and target based on O'Neill et al. (2013). Woody species that can occur above 5% cover are juniper (<i>Juniperus communis</i>), burnet rose (<i>Rosa spinosissima</i>), mountain avens (<i>Dryas octopetala</i>) and hoary rock-rose (<i>Helianthemum oelandicum</i>)
Vegetation structure: broadleaf herb: grass ratio	Percentage at a representative number of monitoring stops	Broadleaf herb component of vegetation between 40% and 90%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: sward height	Percentage at a representative number of monitoring stops	At least 30% of sward between 5cm and 40cm tall	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: litter	Percentage at a representative number of monitoring stops	Litter cover not more than 25%	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare soil	Percentage at a representative number of monitoring stops	Not more than 10% bare soil	Attribute and target based on O'Neill et al. (2013)
Physical structure: disturbance	Square metres	Area showing signs of serious grazing or other disturbance less than 20m ²	Attribute and target based on O'Neill et al. (2013)

Conservation Objectives for : Lough Corrib SAC [000297]

6410 **Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)**

To maintain the favourable conservation condition of *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) in Lough Corrib 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>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) occurs mainly as small areas and in intimate association with other habitats in this SAC such as other grassland types and fens and is therefore difficult to map separately. O'Neill et al. (2013) surveyed and mapped some grassland sites within Lough Corrib SAC. However, the full extent of this habitat in this SAC is currently unknown
Habitat distribution	Occurrence	No decline, subject to natural processes	See notes for area above
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present, including one "high quality" species as listed in O'Neill et al. (2013)	Attribute and target based on O'Neill et al. (2013), where the list of positive indicator species, including high quality species, as identified by the Irish Semi-natural Grasslands Survey (ISGS) is presented. O'Neill et al. (2013) should be consulted for further details
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%	Attribute and target based on O'Neill et al. (2013), where the list of negative indicator species as identified by the ISGS is presented
Vegetation composition: non-native species	Percentage 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)
Vegetation composition: moss species	Percentage at a representative number of monitoring stops	Hair mosses (<i>Polytrichum</i> spp.) not more than 25% cover	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: woody species and bracken	Percentage at a representative number of monitoring stops	Cover of woody species and bracken (<i>Pteridium aquilinum</i>) not more than 5%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: broadleaf herb: grass ratio	Percentage at a representative number of monitoring stops	Broadleaf herb component of vegetation between 40% and 90%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: sward height	Percentage at a representative number of monitoring stops	At least 30% of sward between 10cm and 80cm tall	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: litter	Percentage at a representative number of monitoring stops	Litter cover not more than 25%	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare soil	Percentage at a representative number of monitoring stops	Not more than 10% bare soil	Attribute and target based on O'Neill et al. (2013)
Physical structure: disturbance	Square metres	Area showing signs of serious grazing or other disturbance less than 20m ²	Attribute and target based on O'Neill et al. (2013)

Conservation Objectives for : Lough Corrib SAC [000297]

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs* in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore the area of active raised bog to 78.8ha, subject to natural processes	There are two raised bogs for which Active Raised Bog (ARB) has been selected in Lough Corrib SAC: Addergoole Bog and Lough Tee Bog. The total area of ARB habitat for these two bogs was mapped as 45.2ha. The area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 72.0ha. See map 4. However, it is estimated that only 24.1ha is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 69.3ha. Eco-hydrological assessments of cutover bog estimate that an additional 9.5ha of peat-forming habitats could be restored. The long-term target for ARB is therefore 78.8ha. See the Lough Corrib SAC conservation objectives supporting document for raised bog habitats for further details on this and the following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 5 for distribution in 2012	ARB currently occurs on the north-eastern and southern parts of Addergoole Bog and the north-western part of Lough Tee Bog. DRB occurs over much of the remainder of the high bog at Addergoole and also occurs at Lough Tee Bog. Such areas will require restoration measures. See also the conservation objective for Bog woodland (91D0)
High bog area	Hectares	No decline in extent of high bog subject to the conservation requirements of the SAC. See map 4 for mapped extent	The area of HB within Addergoole Bog in 2012 (latest figure available) is 157.4ha and 79.6ha at Lough Tee Bog (DAHG, 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout each site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm and water levels should not be more than 10cm below the bog surface, except for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 6 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect the raised bog ecosystem and the services it provides	Cutting has continued until recently around the eastern and southern margins of Addergoole Bog. Remnant semi-natural margins occur elsewhere (locally along the north-east and east margins of the site) and there are interesting transitional wetland habitats to the east of the high bog. Transitional areas between Lough Tee Bog and the adjacent mineral soils mostly corresponds with cutover bog at different stages of re-colonisation by vegetation. Eco-hydrological assessments are evaluating the potential for ARB on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 39.4ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). The target area of active raised bog for the site has been set at 78.8ha (see habitat area target above)

Vegetation quality: microtopographical features	Hectares	Restore adequate cover of high quality microtopographical features	High quality microtopography (hummocks, hollows and pools) occurs at both Addergoole and Lough Tee bogs; however, both have been negatively affected by burning
Vegetation quality: bog moss (<i>Sphagnum</i>) species	Percentage cover	Restore adequate cover of bog moss (<i>Sphagnum</i>) species to ensure peat-forming capacity	<i>Sphagnum</i> cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as <i>Sphagnum austinii</i> are particularly good peat formers
Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions, but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions, but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	Addergoole Bog is noted for the presence of a soak system, a rare feature of Irish raised bogs, which occurs in the centre of the bog near two lakes. This soak includes an area of Bog woodland (91D0) which is a priority Annex I habitat and a qualifying interest for the SAC (see also the conservation objective for 91D0)
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds/ridges emerging or expanding, and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (<i>Narthecium ossifragum</i>), deergrass (<i>Trichophorum germanicum</i>) and hare's-tail cotton-grass (<i>Eriophorum vaginatum</i>) forming tussocks; abundant magellanic bog-moss (<i>Sphagnum magellanicum</i>) in pools previously dominated by <i>Sphagnum</i> species typical of very wet conditions (e.g. feathery bog-moss (<i>S. cuspidatum</i>)); and indicators of frequent burning events such as abundant <i>Cladonia floerkeana</i> and high cover of carnation sedge (<i>Carex panicea</i>) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	The most common non-native invasive species include lodgepole pine (<i>Pinus contorta</i>), rhododendron (<i>Rhododendron ponticum</i>) and pitcherplant (<i>Sarracenia purpurea</i>)
Air quality: nitrogen deposition	kg N/ha/yr	Air quality surrounding the bogs close to natural reference conditions. The total nitrogen deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest nitrogen deposition figures for the area around the bogs in Lough Corrib SAC suggests that the current level is approximately 8.5kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in marginal areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater and run-off from surrounding mineral lands)

Conservation Objectives for : Lough Corrib SAC [000297]

7120 Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Lough Corrib SAC

Attribute	Measure	Target	Notes
-----------	---------	--------	-------

Conservation Objectives for : Lough Corrib SAC [000297]

7150 Depressions on peat substrates of the Rhynchosporion

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Lough Corrib SAC

Attribute	Measure	Target	Notes
-----------	---------	--------	-------

Conservation Objectives for : Lough Corrib SAC [000297]

7210 Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae

To maintain the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae in Lough Corrib 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	Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion davallianae have not been mapped in detail for Lough Corrib SAC and thus total area of the qualifying habitat is unknown. While the full extent of Annex I fen habitats (both this habitat and Alkaline fens (7230)) within the SAC is currently unknown, their area is extensive and they often occur in association with and transitional to other habitats including <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) (6410), Active raised bogs (7110), Petrifying springs with tufa formation (Cratoneurion) (7220) and Limestone pavements (8240) (NPWS internal files). The conservation objectives for all these habitats in the SAC should be used in conjunction with each other as appropriate
Habitat distribution	Occurrence	No decline, subject to natural processes	The full distribution of this habitat in this SAC is currently unknown - see notes for area above
Ecosystem function: hydrology	Metres	Maintain appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat
Ecosystem function: peat formation	Flood duration	Maintain active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time (Jim Ryan, pers. comm.)
Ecosystem function: water quality	Water chemistry measures	Maintain appropriate water quality, particularly nutrient levels, to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus with the latter tending to be the limiting nutrient
Vegetation structure: typical species	Presence	Maintain vegetation cover of typical species including brown mosses and vascular plants	Mosses listed for fen habitat in this SAC includes <i>Campylopus stellatus</i> , while vascular plants include saw sedge (<i>Cladium mariscus</i>), slender sedge (<i>C. lasiocarpa</i>), long-stalked yellow sedge (<i>C. lepidocarpa</i>), black bog-rush (<i>Schoenus nigricans</i>), water mint (<i>Mentha aquatica</i>), wild angelica (<i>Angelica sylvestris</i>) and meadow thistle (<i>Cirsium dissectum</i>). Slender cottongrass (<i>Eriophorum gracile</i>) is known from fen habitat in this SAC (NPWS internal files)
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
Vegetation composition: trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014). Scrub and trees will tend to invade if fen conditions become drier
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground not more than 10%. Where tufa is present, disturbed bare ground not more than 1%	Attribute and target based on Perrin et al. (2014). While grazing may be appropriate in this habitat, excessive areas of disturbed bare ground may develop due to unsuitable grazing regimes

Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Areas showing signs of drainage as a result of drainage ditches or heavy trampling not more than 10%	Attribute and target based Perrin et al. (2014). Drainage can result in loss of characteristic species and transition to drier habitats
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species on the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016)

Conservation Objectives for : Lough Corrib SAC [000297]

7220 Petrifying springs with tufa formation (Cratoneurion)

To maintain the favourable conservation condition of Petrifying springs with tufa formation (Cratoneurion)* in Lough Corrib 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	Petrifying springs with tufa formation (Cratoneurion) have not been mapped within Lough Corrib SAC and thus the total area of the qualifying habitat in the SAC is unknown. However, the necessary ecological conditions required for this habitat occur around Lough Corrib
Habitat distribution	Occurrence	No decline, subject to natural processes	As mentioned above, this habitat has not been mapped within the SAC. It is often associated with other habitats including Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion davallianae (7210), Alkaline fens (7230) and Limestone pavements (8240). The conservation objectives for all these habitats in the SAC should be used in conjunction with each other as appropriate. Lyons and Kelly (2016) describe eight plant communities of Irish petrifying springs based on relevé data. Further information on the vegetation communities associated with this habitat is presented in Lyons and Kelly (2016)
Hydrological regime: height of water table; water flow	Metres; metres per second	Maintain appropriate hydrological regimes	Petrifying springs rely on permanent irrigation, usually from upwelling groundwater sources or seepage sources (Lyons and Kelly, 2013). In karst areas, water tends to flow away rapidly over bare rock surfaces, even on fairly flat ground (Lyons and Kelly, 2013). Water flow should not be altered anthropogenically. See Lyons and Kelly (2016) for further details
Water quality - nitrate level	mg/l	No increase from baseline nitrate level and less than 10mg/l	Target based on data from McGarrigle et al. (2010). See Lyons and Kelly (2016) for further details
Water quality - phosphate level	µg/l	No increase from baseline phosphate level and less than 15µg/l	Based on data from Lyons (2015). See Lyons and Kelly (2016) for further details
Vegetation composition: positive indicator species	Number per spring	At least three positive/high quality indicator species as listed in Lyons and Kelly (2016) and no loss from baseline number	Based on Lyons and Kelly (2016), where the lists of positive and high quality indicator species are presented
Vegetation composition: negative indicator species	Cover (DAFOR scale)	Potentially negative indicator species should not be Dominant or Abundant; invasive species should be absent	Based on Lyons and Kelly (2016), where the lists of potentially negative herbaceous, bryophyte (and alga) and woody species are presented. See Lyons and Kelly (2016) also for details on potentially invasive species, including sycamore (<i>Acer pseudoplatanus</i>) which is invasive in non-wooded springs and a negative indicator species in wooded springs. If two or more potentially negative bryophyte species are present, and if at least two are Frequent, or at least one is Abundant, then the habitat fails for this attribute. See Lyons and Kelly (2016) for further details
Vegetation structure: sward height	Centimetres	Field layer height between 10cm and 50cm (except for bryophyte-dominated ground <10cm)	See Lyons and Kelly (2016) for further details
Physical structure: trampling/dung	Cover (DAFOR scale)	Cover should not be Dominant or Abundant	See Lyons and Kelly (2016) for further details

Conservation Objectives for : Lough Corrib SAC [000297]

7230

Alkaline fens

To maintain the favourable conservation condition of Alkaline fens in Lough Corrib 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	Alkaline fens have not been mapped in detail for Lough Corrib SAC and thus total area of the qualifying habitat is unknown. While the full extent of Annex I fen habitats (both this habitat and Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion davallianae (7210)) within the SAC is currently unknown, their area is extensive and they often occur in association with and transitional to other habitats including <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) (6410), Active raised bogs (7110), Petrifying springs with tufa formation (Cratoneurion) (7220) and Limestone pavements (8240) (NPWS internal files). The conservation objectives for all these habitats in the SAC should be used in conjunction with each other as appropriate
Habitat distribution	Occurrence	No decline, subject to natural processes	The full distribution of this habitat in this SAC is currently unknown - see notes for area above
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	Relevant nutrients and their natural ranges are yet to be defined. However, nitrogen deposition is noted as being relevant to this habitat in NPWS (2013)
Ecosystem function: peat formation	Flood duration	Maintain active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time (Jim Ryan, pers. comm.)
Ecosystem function: hydrology	Metres	Maintain appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat
Ecosystem function: water quality	Water chemistry measures	Maintain appropriate water quality, particularly nutrient levels, to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus, with the latter tending to be the limiting nutrient
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Further information on the vegetation communities associated with alkaline fens in the uplands is presented in Perrin et al. (2014)
Vegetation composition: number of positive indicator species (brown mosses)	Number of species at a representative number of 2m x 2m monitoring stops	Number of brown moss species present at each monitoring stop is at least one	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. Mosses listed for fen in this SAC includes <i>Campylopus stellatus</i> (NPWS internal files)
Vegetation composition: number of positive indicator species (vascular plants)	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive vascular plant indicator species present at each monitoring stop is at least two for small-sedge flushes and at least three for black bog-rush (<i>Schoenus nigricans</i>) flush and bottle sedge (<i>Carex rostrata</i>) fen	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. Vascular plants listed for fen in this SAC include saw sedge (<i>Cladium mariscus</i>), slender sedge (<i>C. lasiocarpa</i>), long-stalked yellow sedge (<i>C. lepidocarpa</i>), black bog-rush (<i>Schoenus nigricans</i>), water mint (<i>Mentha aquatica</i>), wild angelica (<i>Angelica sylvestris</i>) and meadow thistle (<i>Cirsium dissectum</i>). Slender cottongrass (<i>Eriophorum gracile</i>) is known from fen habitat in this SAC (NPWS internal files)

Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of brown moss species and positive vascular plant indicator species at least 20% for small-sedge flushes and at least 75% cover for black bog-rush (<i>Schoenus nigricans</i>) flush and bottle sedge (<i>Carex rostrata</i>) fen	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target Perrin et al. (2014). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based Perrin et al. (2014). Scrub and trees will tend to invade if fen conditions become drier
Vegetation composition: soft rush and common reed cover	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of soft rush (<i>Juncus effusus</i>) and common reed (<i>Phragmites australis</i>) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: height	Percentage of leaves/shoots at a representative number of 2m x 2m monitoring stops	Proportion of live leaves and/or flowering shoots of vascular plants that are more than 5cm above the ground surface should be at least 50%	Attribute and target based on Perrin et al. (2014). Vegetation heights lower than these would indicate undesirable levels of grazing
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014). While grazing may be appropriate in this habitat, excessive areas of disturbed bare ground may develop due to unsuitable grazing regimes
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%	Attribute and target based Perrin et al. (2014). Drainage can result in loss of characteristic species and transition to drier habitats
Physical structure: tufa formations	Percentage cover in local vicinity of a representative number of 2m x 2m monitoring stops	Disturbed proportion of vegetation cover where tufa is present is less than 1%	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species on the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016)

Conservation Objectives for : Lough Corrib SAC [000297]

8240 Limestone pavements

To maintain the favourable conservation condition of Limestone pavements* in Lough Corrib 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	Limestone pavements often occur in intimate association with other habitats including the Annex I habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (6210), Petrifying springs with tufa formation (Cratoneurion) (7220) and Alkaline fens (7230). Therefore, these habitats cannot easily be mapped or considered separately. Conservation objectives for all these habitats should be used in conjunction with each other as appropriate. In Lough Corrib SAC, limestone pavements occur along the southern and eastern margins of Lough Corrib and more extensively in the southern part of the SAC. However, the total area of the Annex I habitat in the SAC is unknown. Wilson and Fernandez (2013) mapped the indicative area in the southern part, including mosaics with other habitats (map 7)
Distribution	Occurrence	No decline, subject to natural processes. Map 7 shows the indicative distribution in the southern part of the SAC, including mosaics with other habitats	See notes for area above. This habitat can be split into exposed pavement and wooded pavement (Wilson and Fernandez, 2013)
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present	Attribute and target based on Wilson and Fernandez (2013), where the positive indicator species for exposed and wooded pavement are listed
Vegetation composition: bryophyte layer	Percentage at a representative number of monitoring stops	Bryophyte cover at least 50% on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Collective cover of negative indicator species on exposed pavement not more than 1%	Attribute and target based on Wilson and Fernandez (2013), where the negative indicator species are listed. Negative indicator species for wooded pavement overlap with non-native species (below)
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1% on exposed pavement; on wooded pavement not more than 10% with no regeneration	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: scrub	Percentage at a representative number of monitoring stops	Scrub cover no more than 25% of exposed pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: bracken cover	Percentage at a representative number of monitoring stops	Bracken (<i>Pteridium aquilinum</i>) cover no more than 10% on exposed pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation structure: woodland canopy	Percentage at a representative number of monitoring stops	Canopy cover on wooded pavement at least 30%	Attribute and target based on Wilson and Fernandez (2013). Wooded limestone pavement is usually low-growing hazel (<i>Coryllus avellana</i>) woodland. Atlantic hazel woodland is an internationally rare woodland type. Despite its low stature it is nonetheless an important habitat for woodland species
Vegetation structure: dead wood	Occurrence in a representative number of monitoring stops	Sufficient quantity of dead wood on wooded pavement to provide habitat for saproxylic organisms	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Physical structure: disturbance	Occurrence in a representative number of monitoring stops	No evidence of grazing pressure on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)

Indicators of local distinctiveness Occurrence

Indicators of local distinctiveness are maintained

This includes species on the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016), and other rare or localised species, as well as archaeological and geological features, which often support distinctive species

Conservation Objectives for : Lough Corrib SAC [000297]

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

To maintain the favourable conservation condition of Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles in Lough Corrib 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	Most of the woodland in Lough Corrib SAC occurs as narrow belts of low woodland around the lake, with occasional larger stands. Old sessile oakwoods are likely to occur as mosaics with other woodland types and the total extent within the SAC is unknown. As part of the National Survey of Native Woodlands (NSNW), Perrin et al. (2008) surveyed a number of sites in the SAC; one (Annaghwood; NSNW site no. 1624), contained this habitat (see map 8). It is important to note that further unsurveyed areas of old oak woodland are likely to be present within the SAC, including at the Hill of Doon and on some of the islands in the lake (NPWS internal files)
Habitat distribution	Occurrence	No decline. Surveyed location shown on map 8	Distribution shown based on Perrin et al. (2008). It is important to note that further unsurveyed areas are likely to be present within the SAC. See note on area above
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large"; woods at least 25ha in size and "small" woods at least 3ha in size.	The sizes of at least some of the existing woodlands need to be increased in order to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). Topographical and land ownership constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer	Described in Perrin et al (2008) and NPWS internal files
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Based on data from Perrin et al. (2008)
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>) 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 ³ per hectare; number per hectare	At least 30m ³ /ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local distinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-data and other rare or localised species. Perrin and Daly (2010) identified Annaghwood (NSNW site code 1624) as "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 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	The following are the most common invasive species in this woodland type: rhododendron (<i>Rhododendron ponticum</i>), cherry laurel (<i>Prunus laurocerasus</i>), sycamore (<i>Acer pseudoplatanus</i>) and beech (<i>Fagus sylvatica</i>)

Conservation Objectives for : Lough Corrib SAC [000297]

91D0 Bog woodland

To maintain the favourable conservation condition of Bog woodland* in Lough Corrib 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 1.22ha. See map 8	Bog woodland occurs on Addergoole Bog in Lough Corrib SAC and is regarded as a component of the Active raised bogs habitat (7110) of that bog. Thus, the conservation objective and supporting document for active raised bog are also relevant to this habitat and common attributes have not been repeated here. The latest survey for bog woodland on Addergoole was carried out by the Raised Bog Monitoring Project (RBMP) in 2012 (Fernandez et al., 2014)
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 8	Bog woodland occurs at one known location in this SAC, on Addergoole Bog. This is the most westerly known location for this habitat in Ireland
Vegetation composition: positive indicator species	Number in a representative number of monitoring stops	Birch (<i>Betula pubescens</i>), bog moss (<i>Sphagnum</i>) species and at least five other indicator species present	Bog woodland is typically species-poor but with a characteristic and distinctive flora. Positive indicator species are listed in Cross and Lynn (2013). Fernandez et al. (2014) note that Scot's pine (<i>Pinus sylvestris</i>) could be considered to be a positive indicator species; however, strong regeneration of the species can indicate that the site is drying out
Vegetation composition: negative indicator species	Percentage cover at a representative number of monitoring stops	Both native and non-native invasive species absent or under control. Total cover should be less than 10%	Negative indicator species include bracken (<i>Pteridium aquilinum</i>) and bramble (<i>Rubus fruticosus</i>), which can become invasive if the site begins drying out
Woodland structure: cover and height of birch	Percentage cover and metres at a representative number of monitoring stops	A minimum 30% cover of birch (<i>Betula pubescens</i>) with a median canopy height of 4m	Attribute and target based on bog woodland monitoring survey (Cross and Lynn, 2013)
Woodland structure: dwarf shrub cover	Percentage cover at a representative number of monitoring stops	Dwarf shrub cover not more than 50%	Attribute and target based on bog woodland monitoring survey (Cross and Lynn, 2013)
Woodland structure: ling cover	Percentage cover at a representative number of monitoring stops	Ling (<i>Calluna vulgaris</i>) cover not more than 40%	Attribute and target based on bog woodland monitoring survey (Cross and Lynn, 2013)
Woodland structure: bryophyte cover	Percentage cover at a representative number of monitoring stops	Bryophyte cover at least 50%, with bog moss (<i>Sphagnum</i> spp.) cover at least 25%	Attribute and target based on bog woodland monitoring survey (Cross and Lynn, 2013)
Woodland structure: tree size classes	Occurrence	Each size class present	Size classes are defined in Cross and Lynn (2013). The presence of all size classes suggests that a woodland has good structural variety with trees of varying ages
Woodland structure: senescent and dead wood	Occurrence	Senescent or dead wood present	Mature and veteran trees and dead wood are important for bryophytes, lichens, saproxylic organisms and some bird species. Their retention within a woodland is important to ensure continuity of habitats/niches and propagule sources over time. However, as birch (<i>Betula pubescens</i>) trees seldom exceed 30cm in diameter in this habitat and dead wood rots quickly and is engulfed by bog mosses (<i>Sphagnum</i> spp.), volume of dead wood may not be as high as in other woodland types

Conservation Objectives for : Lough Corrib SAC [000297]

1029 Freshwater Pearl Mussel *Margaritifera margaritifera*

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

Attribute	Measure	Target	Notes
Distribution	Kilometres	Maintain at 9.1km. See map 9	The conservation objective applies to the Owenriff freshwater pearl mussel (<i>Margaritifera margaritifera</i>) population in Lough Corrib SAC, which is of international importance and one of eight Irish populations prioritised for conservation action (Moorkens, 2010; NPWS, 2011). Its distribution is well-documented and full baseline monitoring took place in 2004 (Moorkens, 2004). The species is widespread in the Owenriff catchment, being found in the lower reaches of the Glengawbeg River, from Lough Agraftard to just upstream of the mouth of Lough Corrib in the Owenriff, and also in the Derrygauna tributary (Moorkens, 2004; NPWS, 2010). The Derrygauna River is in Connemara Bog Complex SAC (002034). The target length relates to the part of the distribution within Lough Corrib SAC. The objective is for the species to be sufficiently widespread to maintain itself on a long-term basis as a viable component of the Owenriff system. See NPWS (2010) for further information
Population size	Number of adult mussels	Restore Owenriff population to at least one million adult mussels	The Owenriff population was estimated as c.1 million in 2009 (NPWS, 2010). NPWS (2013) estimated that it had reduced to 940,000 in 2012, based on a 1% per year decline owing to insufficient recruitment. Declines were detected in 2011, 2014 and 2015. A large kill followed a drought in 2014 (Moorkens, 2015). The Owenriff population has been surveyed frequently since the 1990s, and monitored regularly since the baseline survey in 2004 (Moorkens, 2004, 2005, 2006, 2009, 2015, 2017; Moorkens and Killeen, 2008, 2014). Mussels are abundant (over 250 per 100m, often 150/m ²) from the hatchery at Canrawer East to upstream of Oughterard wastewater treatment plant (WWTP) discharge (Moorkens, 2004). The target is for the species to be sufficiently abundant to maintain itself on a long-term basis as a viable component of the Owenriff 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 ≤65mm are considered 'young mussels' and may be found buried in the substratum and/or beneath adult mussels. Mussels ≤30mm are 'juvenile mussels' and are always buried in the substratum. See the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Owenriff had one of the best population profiles of any Irish population (Moorkens, 2004, 2009). NPWS (2010) summarises demographic work up to 2010. In 2013, it passed the targets, but failed both targets in 2011 (0% ≤65mm), 2014 (13.6% ≤65mm; 2% ≤30mm) and 2016 (10% ≤65mm; 0% ≤30mm) (Moorkens, 2011, 2015, 2017). In 2014, juveniles died owing to a combination of low flows and algal growth. In 2016, the smallest mussel was 11mm. The Owenriff population is 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 Owenriff 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. Significant kills have been recorded on a number of occasions in the Owenriff, notably in 2004 and 2014. The Owenriff failed the target for dead shells in 2009, 2011, 2015 and 2016, but passed in 2014; and failed the 5% target in 2011, 2014 and 2015, but passed in 2016 (Moorkens, 2009, 2011, 2015, 2017; NPWS, 2010). 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 Owenriff system
Suitable habitat: extent	Kilometres	Restore suitable habitat in more than 8.3km in the Owenriff and Glenawbeg rivers (see map 9) and any additional stretches necessary for salmonid spawning	The extent of the freshwater pearl mussel habitat in the Owenriff is well-documented; from the early surveys of Ross (1984, 1988) and Moorkens (1995, 1996) to full baseline monitoring in 2004 (Moorkens, 2004). Most of the available habitat in the Owenriff system is occupied by adult mussels, but below carrying capacity (Moorkens, 2004, 2005, 2006, 2009, 2011, 2015, 2017; Moorkens and Killeen, 2008, 2014). Annual monitoring has shown that episodes of poor habitat condition are causing loss of juveniles in the Owenriff, with very poor conditions recorded in 2011, 2014 and 2015, but near-favourable conditions in 2013 and 2016. Flow, macroalgal, macrophyte and sedimentation impacts are all concerns. Pollution appears to be chronic and episodes of good mussel habitat condition are found at higher flows. 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 Owenriff system
Suitable habitat: condition	Kilometres	Restore condition of suitable habitat	The 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 nutrient enrichment. Pressures throughout the catchment contribute to such impacts. The habitat in the Owenriff cannot support sufficient juvenile survival owing to nutrient and sediment pollution and hydrological impacts (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 Owenriff 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	These EQRs correspond to high ecological status for these two Water Framework Directive biological quality elements. They represent high water quality with very low nutrient concentrations (oligotrophic conditions). In 2009, the Owenriff River failed the macroinvertebrate standard at all sites and passed the phytobenthos standard (Ní Chatháin, 2009; Williams, 2009; 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 Owenriff 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 habitat in the Owenriff failed the macrophyte and the filamentous algal targets in 2009 (Moorkens, 2009; NPWS, 2010). Abundances of up to 100% filamentous algae and/or <i>Myriophyllum</i> were recorded in the best mussel habitat (Williams, 2009; NPWS, 2010). High cover abundance of both algae and macrophytes has been recorded regularly in the Owenriff from 2004-present, indicating on-going nutrient enrichment. In 2016, the algal target was exceeded in 57 of 65 quadrats and both filamentous algal and diatom biomass was elevated (Moorkens, 2017). Algae were abundant in 2015 and 2014 (Moorkens, 2015). Episodic poor habitat condition is leading to losses of juveniles. Good condition is linked to higher flows. Sufficient recruitment of juvenile 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 Owenriff 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 habitat for the species in the Owenriff is unsuitable for the recruitment of juveniles owing to sedimentation and enrichment. The habitat failed this target in 2009 and significant sedimentation was recorded during all monitoring to 2009 (NPWS, 2010). Silt plumes and/or infiltration have been recorded 2010-2016 and the target was failed in 2011 and 2015 (Moorkens, 2011, 2015). Episodic poor habitat condition is leading to losses of juveniles. Good condition is linked to higher flows. Sufficient survival of juvenile 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 Owenriff 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. In 2009, the Owenriff failed the redox target, with averages at three locations of 18.9%, 24.2% and 24.5% at 5cm depth, giving an overall average of 22.5% (Moorkens, 2009; NPWS, 2010). The Owenriff passed the redox target in 2014 (average of 14.6%) and failed in 2011 (24%) and 2015 (22%) (Moorkens, 2011, 2015). In 2016, the average was 10.5%, and 100% of measurements had <20% loss (Moorkens, 2017). Episodic poor habitat condition is leading to losses of juveniles. Good condition is linked to higher flows. 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 Owenriff system

Hydrological regime: flow variability	Metres per second	Restore appropriate hydrological regimes	The availability of suitable habitat is largely determined by flow (catchment geology being 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 sediment or growth of algae/macrophytes and 4) low flows do not cause stress to mussels in terms of exposure, water temperatures, food availability or aspects of the reproductive cycle; see Moorkens and Killeen (2014). Groundwater inflow to the substratum also contributes to water-cycling and favourable habitat condition. Hydrological change and wetland loss in the Owenriff are significant concerns. 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 Owenriff 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 densities and biomass of host fish were associated with high numbers of juvenile mussels. 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 fish in 2009, possibly owing to mussel stress (Johnston, 2009; NPWS, 2010). A fish host survey is planned for 2017/18
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the population	Riparian habitats, including those along lake fringes, even where not part of a natural floodplain, are integral to the structure and functioning of river systems. Fringing habitats aid in settlement of fine suspended material, protect banks from erosion, contribute to nutrient cycling and the aquatic food web (e.g. allochthonous matter such as leaf fall), and provide habitat (refuge and resources) for certain life-stages of fish, birds and aquatic invertebrates. Shade may be important in suppressing algal/macrophyte growth in enriched rivers and moderating temperatures. Fringing habitats are dependent on rivers/lakes, particularly water levels, and support wetland communities and species of conservation concern. Riparian wetlands and woodland are very important in the Owenriff and wetland damage is a significant 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 Owenriff system

Conservation Objectives for : Lough Corrib SAC [000297]**1092 White-clawed Crayfish *Austropotamobius pallipes***

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

Attribute	Measure	Target	Notes
Distribution: rivers	Occurrence	No reduction from baseline. See map 10	White-clawed crayfish (<i>Austropotamobius pallipes</i>) is recorded from the entire lengths of the four main tributaries of the River Clare. There are post-1996 records from the following tributaries: Abbert, Grange, Dalgan and Sinking Rivers. It is also present in some minor lower order streams within the Clare catchment
Distribution: Lough Corrib	Occurrence	No reduction from baseline. See map 10	The distribution of crayfish in Lough Corrib is uncertain. It certainly occurs in three 1km squares in the northern section of the lower basin (M2341, M2342, M2941) and is probably more widely distributed
Population structure: recruitment	Occurrence of juveniles and females with eggs	Juveniles and/or females with eggs in all occupied tributaries and occupied parts of Lough Corrib	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 decline 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 throughout the occupied habitat

Conservation Objectives for : Lough Corrib SAC [000297]

1095 Sea Lamprey *Petromyzon marinus*

To restore the favourable conservation condition of Sea Lamprey in Lough Corrib 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	Sea lamprey (<i>Petromyzon marinus</i>) traditionally congregate and build spawning nests in the River Corrib in Galway city, both up- and downstream of the Salmon Weir Bridge. Their further upstream passage is impeded by the regulating weir immediately upstream. The combination of barriers to passage and low flows can impede further upstream passage in Irish catchments and prevent or reduce penetration and extensive colonisation (Gargan et al., 2011; Rooney et al., 2015). Sea lamprey have been recorded passing through the denil fish passage facility at the regulating weir. However, no quantitative assessment has been made, nor has any annual record been maintained. Sea lamprey have also been observed using their sucker mouths to project themselves up the damp concrete faces of the weir structure at low water levels (J. King, Inland Fisheries Ireland (IFI), pers. comm.)
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on Harvey and Cowx (2003) and O'Connor (2007)
Juvenile density in fine sediment	Juveniles/m ²	Mean catchment juvenile density at least 1/m ²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on Harvey and Cowx (2003). No sites surveyed in 2006 (O'Connor, 2007) or 2013 (IFI, unpublished data) were positive for sea lamprey ammocoetes
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed habitat mapping by Inland Fisheries Ireland (IFI). Lampreys spawn in clean gravels. Artificial barriers can prevent lampreys from accessing suitable spawning habitat. As mentioned above, artificial barriers are currently preventing lamprey from accessing suitable spawning habitat above the regulating weir in the River Corrib
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, with a minimum of four positive sites in a catchment, which are at least 5km apart	Artificial barriers can prevent juvenile lampreys from accessing the full extent of suitable habitat. 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 : Lough Corrib SAC [000297]

1096 Brook Lamprey *Lampetra planeri*

To maintain the favourable conservation condition of Brook Lamprey in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage of river accessible	Access to all watercourses down to first order streams	Artificial barriers can block or cause difficulties to brook 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 JNCC (2005). It is impossible to distinguish between brook and river lamprey ammocoetes in the field (Gardiner, 2003), hence they are considered together in this target
Juvenile density in fine sediment	Ammocoetes/m ²	Mean catchment ammocoete density of brook/river lamprey at least 5/m ²	Ammocoetes burrow in areas of fine sediment in still water. Attribute target revised upward based on more recent proposals of JNCC (2005) and replacing initial proposals of Harvey and Cowx (2003). New criterion set at 5 ammocoetes/m ² on a catchment basis. The majority of sub-catchments in the SAC achieved this target in 2013 (IFI, unpublished data)
Extent and distribution of spawning habitat	m ² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by Inland Fisheries Ireland (IFI). Brook lamprey spawning habitat attributes compiled in Rooney et al. (2013) and the particle size required is considered to be available very widely in all river systems within the SAC, apart from very steep and torrential areas of boulder and bedrock. It is not considered that spawning habitat is a limiting feature for the conservation status of this species
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Target of 50% presence in suitable habitat based on Irish experience to date in catchment-wide surveys. 50% of surveyed sites in the catchment were positive in 2013 (IFI, unpublished data) compared with 49% in 2006 (O'Connor, 2007). 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 : Lough Corrib SAC [000297]

1106 Salmon *Salmo salar*

To maintain the favourable conservation condition of Atlantic Salmon in Lough Corrib 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	There are no barriers to migration of salmon (<i>Salmo salar</i>) in Lough Corrib SAC. Salmon spawn in the headwaters of Lough Corrib tributaries. There is an artificial canal joining Lough Corrib and Lough Mask where salmon did not have access historically and does not constitute a limit on the distribution of salmon in Lough Corrib SAC
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 Corrib catchment is currently exceeding its CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling	The target is the 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. The habitat for salmon is good and habitat rehabilitation programmes have been undertaken throughout the Corrib catchment to restore drained channels and repair habitat damaged by overgrazing
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 : Lough Corrib SAC [000297]

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

To restore the favourable conservation condition of Lesser Horseshoe Bat in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population per roost	Number	Minimum number of 100 bats for summer roost (roost id. 217 in NPWS database). See map 11	A figure of 100 bats for summer roosts was set as a minimum qualifying standard (MQS) when SACs were being selected for lesser horseshoe bats (<i>Rhinolophus hipposideros</i>). NPWS conduct annual counts at each qualifying roost. Qualified means from the 2006-2012 data have been calculated whereby the year with the highest maximum count and the year with the lowest maximum count were removed and the mean of the remaining years was calculated. This mean, or the MQS (i.e. 100 bats), whichever is higher, is set as the target figure for the roost
Summer roosts	Condition	No decline	Lough Corrib SAC has been selected for lesser horseshoe bats because of the presence of one important summer roost (roost id. 217 in NPWS database). Damage or disturbance to the roost or to the habitat immediately surrounding the roost will lead to a decline in its condition (Kelleher and Marnell, 2006)
Number of auxillary roosts	Number and condition	No decline	Lesser horseshoe bat populations will use a variety of roosts during the year besides the main summer maternity roost. Such additional roosts within the SAC may be important as night roosts/satellite roosts etc. A database of all known lesser horseshoe roosts is available on the National Biodiversity Data Centre website. NB further unrecorded roosts may also be present within this SAC
Extent of potential foraging habitat	Hectares	No significant decline	Lesser horseshoe bats normally forage in woodlands/scrub within 2.5km of their roosts (Schofield, 2008). See map 11 which shows a 2.5km zone around the above named roost and identifies potential foraging grounds
Linear features	Kilometres	No significant loss, within 2.5km of qualifying roosts. See map 11	This species follows commuting routes from its roost to its foraging grounds. Lesser horseshoe bats will not cross open ground. Consequently, linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species, most importantly within 2.5km around each roost (Schofield, 2008)
Light pollution	Lux	No significant increase in artificial light intensity adjacent to named roost or along commuting routes within 2.5km of the roost. See map 11	Lesser horseshoes are very sensitive to light pollution and will avoid brightly lit areas. Inappropriate lighting around roosts may cause abandonment; lighting along commuting routes may cause preferred foraging areas to be abandoned, thus increasing the energetic cost for bats (Schofield, 2008)

Conservation Objectives for : Lough Corrib SAC [000297]**1355 Otter *Lutra lutra***

To maintain the favourable conservation condition of Otter in Lough Corrib 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 1,054ha along river banks/ lake shoreline/around ponds	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline and river banks identified as critical for otters (NPWS, 2007)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 314.2km	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 4,178ha	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 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)
Barriers to connectivity	Number	No significant increase. For guidance, see map 12	Otters will regularly commute across stretches of open water up to 500m e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed

Conservation Objectives for : Lough Corrib SAC [000297]

1393

Slender Green Feather-moss *Drepanocladus vernicosus*

To maintain the favourable conservation condition of Slender Green Feather-moss (Shining Sickie-moss) in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution of populations	Number and geographical spread of populations	No decline, subject to natural processes. See map 10 for known location at NW of Gortachalla Lough	(Please note that <i>Drepanocladus vernicosus</i> was reclassified as <i>Hamatocaulis vernicosus</i> by Hedenäs (1989)). The known population of slender green feather-moss (<i>Hamatocaulis vernicosus</i>) in Lough Corrib SAC occurs at NW of Gortachalla Lough in transition mire which is bounded to the west by acid bog. Data from NPWS surveys (NPWS internal files), Campbell (2013) and Campbell et al. (2015)
Population size	Number of individuals	No decline, subject to natural processes	The population at NW of Gortachalla Lough was estimated by Campbell (2013) to be 153,376,875 shoots (c.153,377,000 shoots). Counts of shoots were based on the mean of number of shoots in four 10cm x 10cm areas, extrapolated to 41,175 shoots/m ² in 3,725m ² (Campbell, 2013). See Campbell et al. (2015) for further details
Population cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage cover of slender green feather-moss (<i>Hamatocaulis vernicosus</i>) should be at least 45%	The mean percentage cover of slender green feather-moss (<i>Hamatocaulis vernicosus</i>) recorded in four 2m x 2m plots at NW of Gortachalla Lough was c.60% (Campbell, 2013). The target cover figure is a c.20% reduction of the recorded cover to allow for a margin of error and variability over monitoring seasons. See Campbell et al. (2015) for further details
Area of suitable habitat	Hectares	No decline, subject to natural processes	The area of occupancy at NW of Gortachalla Lough is estimated from mapping of GPS co-ordinates to be 6,209m ² . However, only c.60% of this is suitable habitat i.e. c.3,725m ² (0.373ha). See Campbell et al. (2015) for further details
Hydrological conditions: water table level	Metres	Maintain suitable hydrological conditions	Slender green feather-moss (<i>Hamatocaulis vernicosus</i>) is mostly confined to mesotrophic fens, a transitional habitat between acid bog and base-rich fen. This appears to occur in at least two forms in Ireland: upland transitional flushes, where the plants can occur in lawns that rise and fall with fluctuating water table levels; and wet lowland sedge meadows, where plants can be inundated in winter, but may be subject to some desiccation in the summer, such as at NW of Gortachalla Lough. Based on Campbell (2013) and Campbell et al. (2015)
Vegetation composition: tree cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage tree cover should be less than 15%	Slender green feather-moss (<i>Hamatocaulis vernicosus</i>) grows in moss-dominated, open communities, generally with a low cover of trees and shrubs. Campbell (2013) recorded 0% tree cover at NW of Gortachalla Lough. See also Campbell et al. (2015)
Vegetation composition: shrub cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage shrub cover should be less than 20%	Slender green feather-moss (<i>Hamatocaulis vernicosus</i>) grows in moss-dominated, open communities, generally with a low cover of trees and shrubs. Campbell (2013) recorded 0-1% shrub cover at NW of Gortachalla Lough. See also Campbell et al. (2015)
Vegetation composition: grass cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage grass species cover should be less than 25%	Slender green feather-moss (<i>Hamatocaulis vernicosus</i>) grows in moss-dominated, open communities, generally with a low cover of grasses, maintained by a low grazing intensity by rabbits (<i>Oryctolagus cuniculus</i>) at NW of Gortachalla Lough. Campbell (2013) recorded grass cover of 0-10% in four 2m x 2m plots at NW of Gortachalla Lough. See also Campbell et al. (2015)

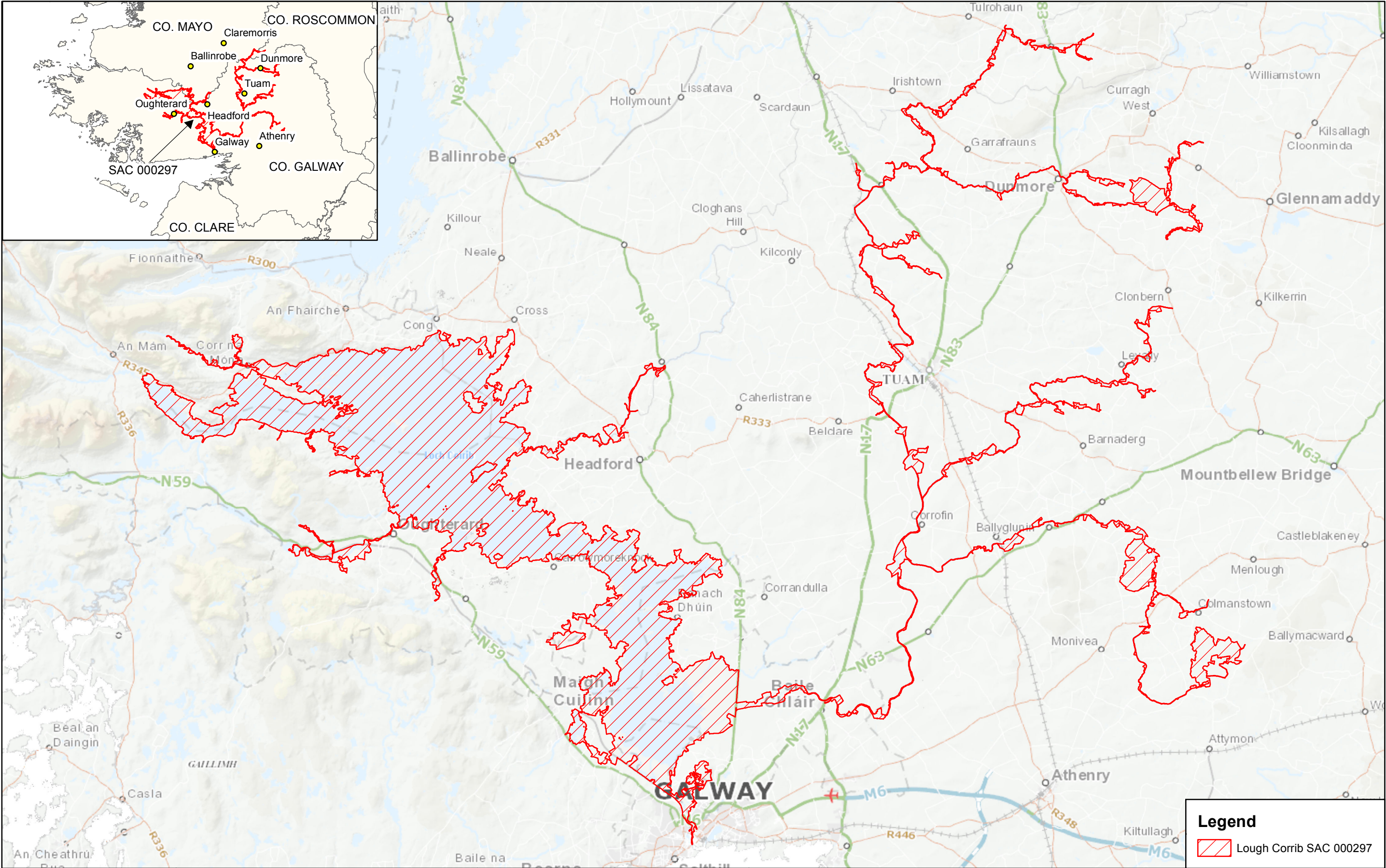
Vegetation composition: bryophyte cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage bryophyte cover should be more than 50%	Campbell (2013) recorded bryophyte cover of 34-95% in four 2m x 2m plots at NW of Gortachalla Lough. See also Campbell et al. (2015)
Vegetation composition: cover of <i>Calliergonella cuspidata</i>	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage cover of <i>Calliergonella cuspidata</i> should be less than 15%	<i>Calliergonella cuspidata</i> , a moss species often associated with high nutrient conditions, is usually present, but with low cover and never dominant. Cover of <i>Calliergonella cuspidata</i> was 0-3% in four 2m x 2m plots recorded by Campbell (2013) at NW of Gortachalla Lough. See also Campbell et al. (2015)
Vegetation structure: vegetation height	Centimetres in a representative number of 2m x 2m monitoring plots	Mean vegetation height should not exceed 40cm	Campbell (2013) recorded a mean vegetation height of 40cm in four 2m x 2m plots at NW of Gortachalla Lough. See also Campbell et al. (2015)

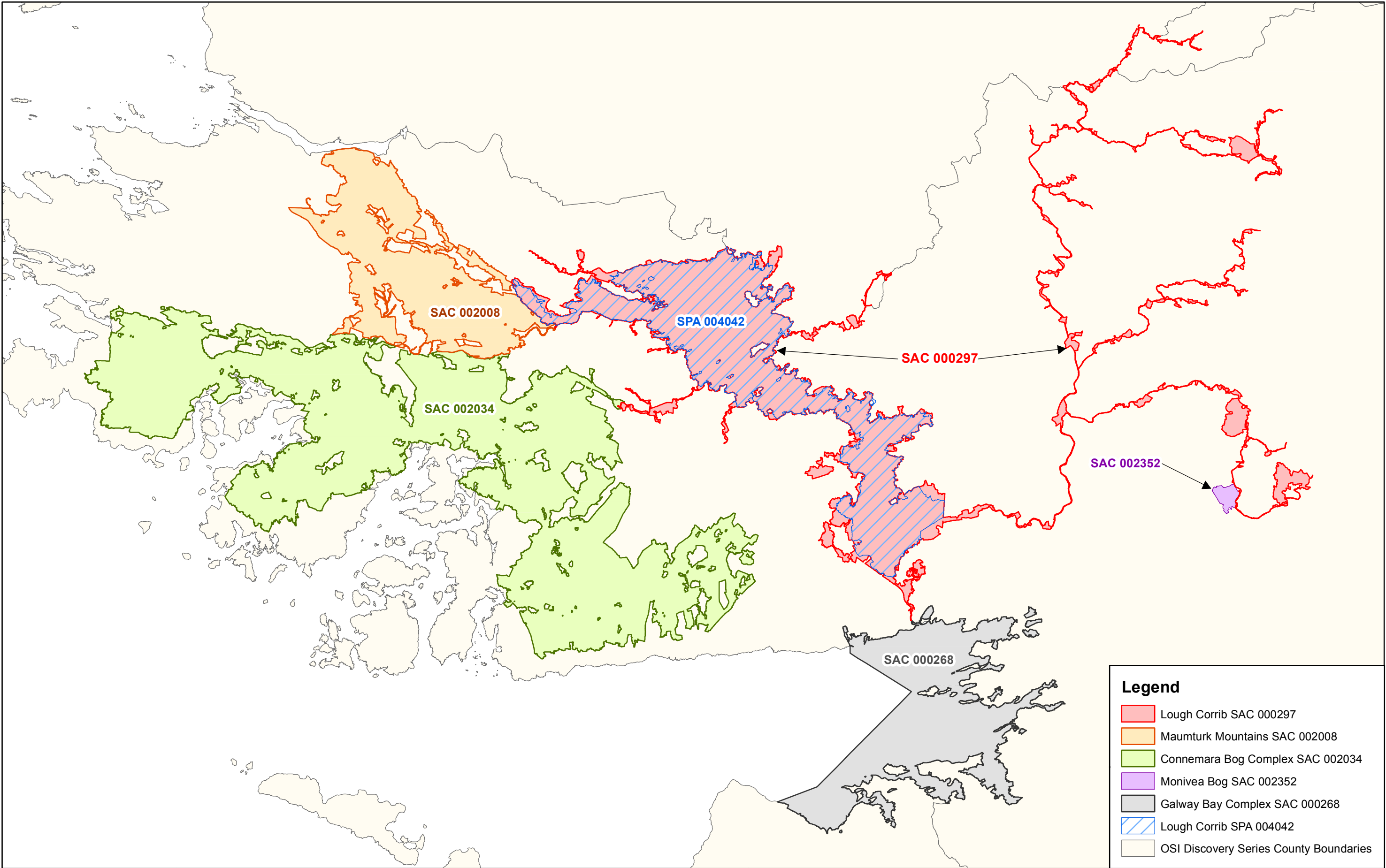
Conservation Objectives for : Lough Corrib SAC [000297]

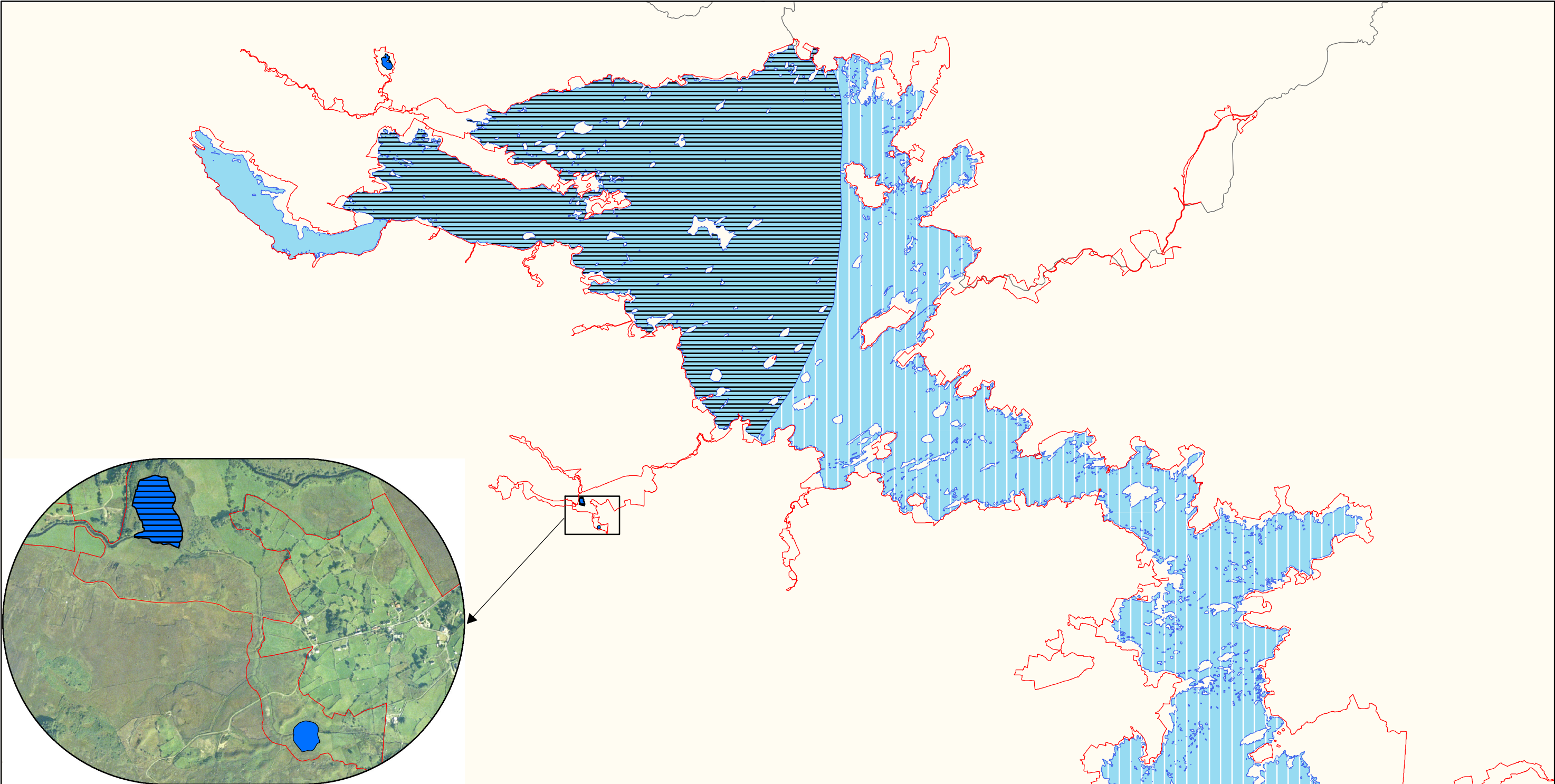
1833 Slender Naiad *Najas flexilis*

To restore the favourable conservation condition of Slender Naiad in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population extent	Hectares; distribution	Restore the spatial extent of <i>Najas flexilis</i> within the lake, subject to natural processes. See map 13 for known locations	See the <i>Najas flexilis</i> supporting document for further details
Population depth	Metres	Restore the depth range of <i>Najas flexilis</i> within the lake, subject to natural processes	See the <i>Najas flexilis</i> supporting document for further details
Population viability	Plant traits	Restore plant fitness, subject to natural processes	See the <i>Najas flexilis</i> supporting document for further details
Population abundance	Square metres	Restore the cover abundance of <i>Najas flexilis</i> , subject to natural processes	See the <i>Najas flexilis</i> supporting document for further details
Species distribution	Occurrence	Restore to at least the north-western bay, subject to natural processes	See the <i>Najas flexilis</i> supporting document for further details
Habitat extent	Hectares	Restore, subject to natural processes	See the <i>Najas flexilis</i> supporting document for further details
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat for the species	See the <i>Najas flexilis</i> supporting document for further details
Lake substratum quality	Various	Restore appropriate substratum type, extent and chemistry to support the population of the species	See the <i>Najas flexilis</i> supporting document for further details
Water quality	Various	Restore appropriate water quality to support the population of the species	See the <i>Najas flexilis</i> supporting document for further details
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the population of <i>Najas flexilis</i> , subject to natural processes	See the <i>Najas flexilis</i> supporting document for further details
Water colour	mg/l PtCo	Restore/maintain appropriate water colour to support the population of <i>Najas flexilis</i>	See the <i>Najas flexilis</i> supporting document for further details
Associated species	Species composition and abundance	Restore appropriate associated species and vegetation communities to support the population of <i>Najas flexilis</i>	See the <i>Najas flexilis</i> supporting document for further details
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the population of <i>Najas flexilis</i>	See the <i>Najas flexilis</i> supporting document for further details







Legend

- Lough Corrib SAC 000297
- OSI Discovery Series County Boundaries

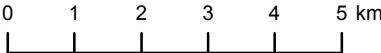
Indicative Lake Habitats

- Dominant 3110, Dominant Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorarae*)
- Dominant 3130, Dominant Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletalia uniflorarae* and/or *Isoeto-Nanojuncetalia*
- Dominant 3140, Dominant Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
- Potential 3110, Potential Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorarae*)
- Potential 3130, Potential Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletalia uniflorarae* and/or *Isoeto-Nanojuncetalia*
- Potential 3110 / Potential 3130, Potential Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorarae*) / Potential Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletalia uniflorarae* and/or *Isoeto-Nanojuncetalia*

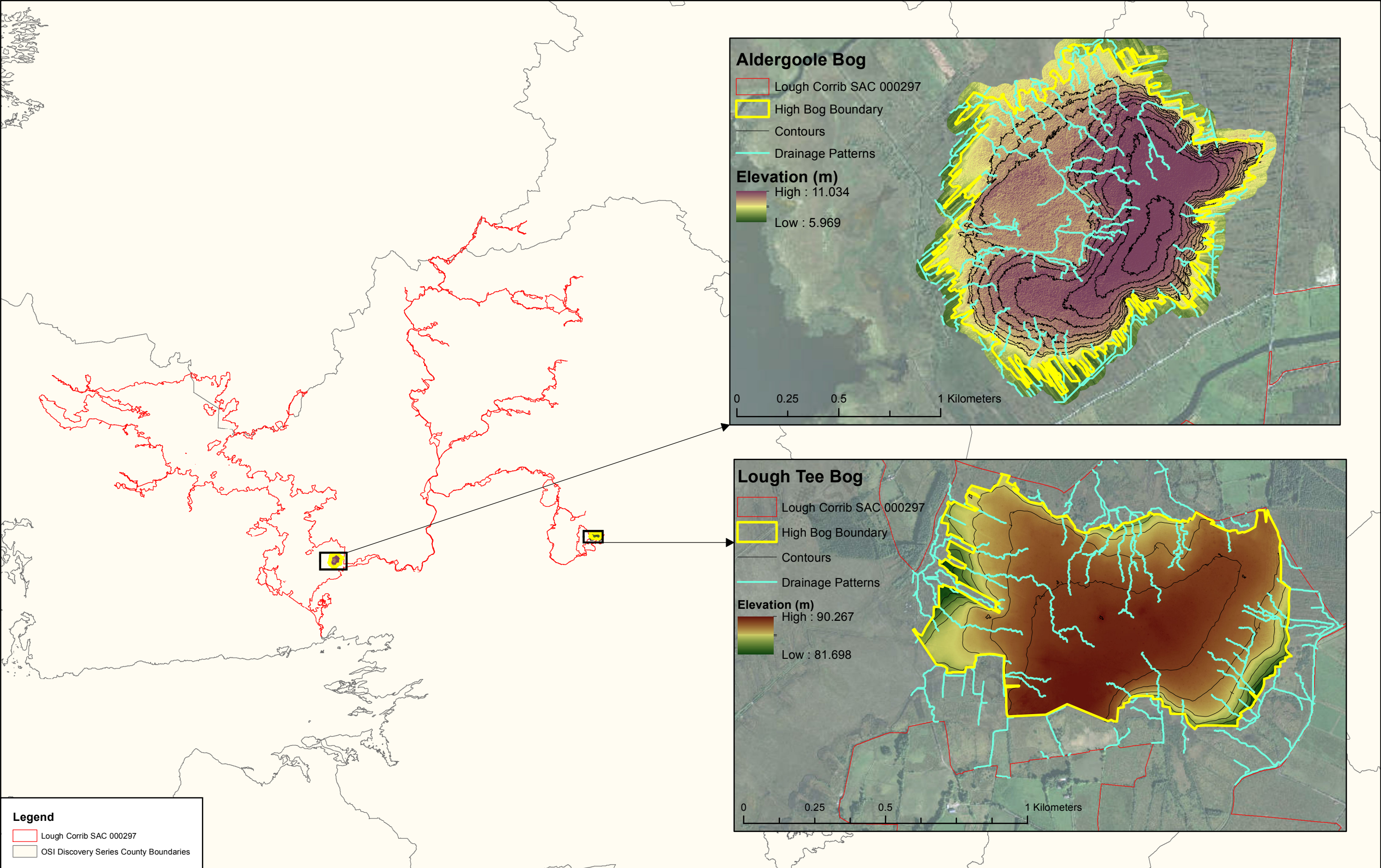
**MAP 3:
LOUGH CORRIB SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABITATS**

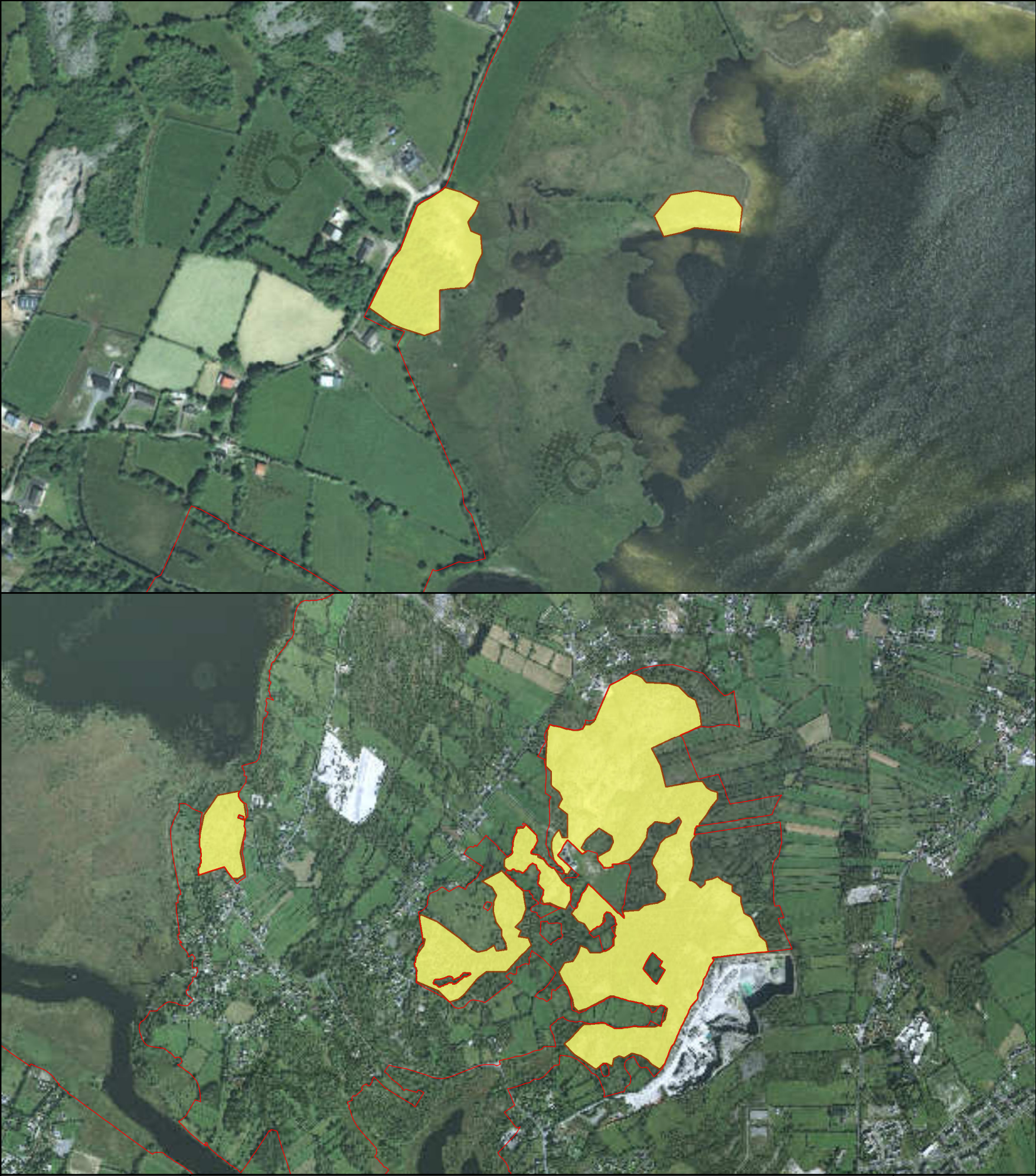
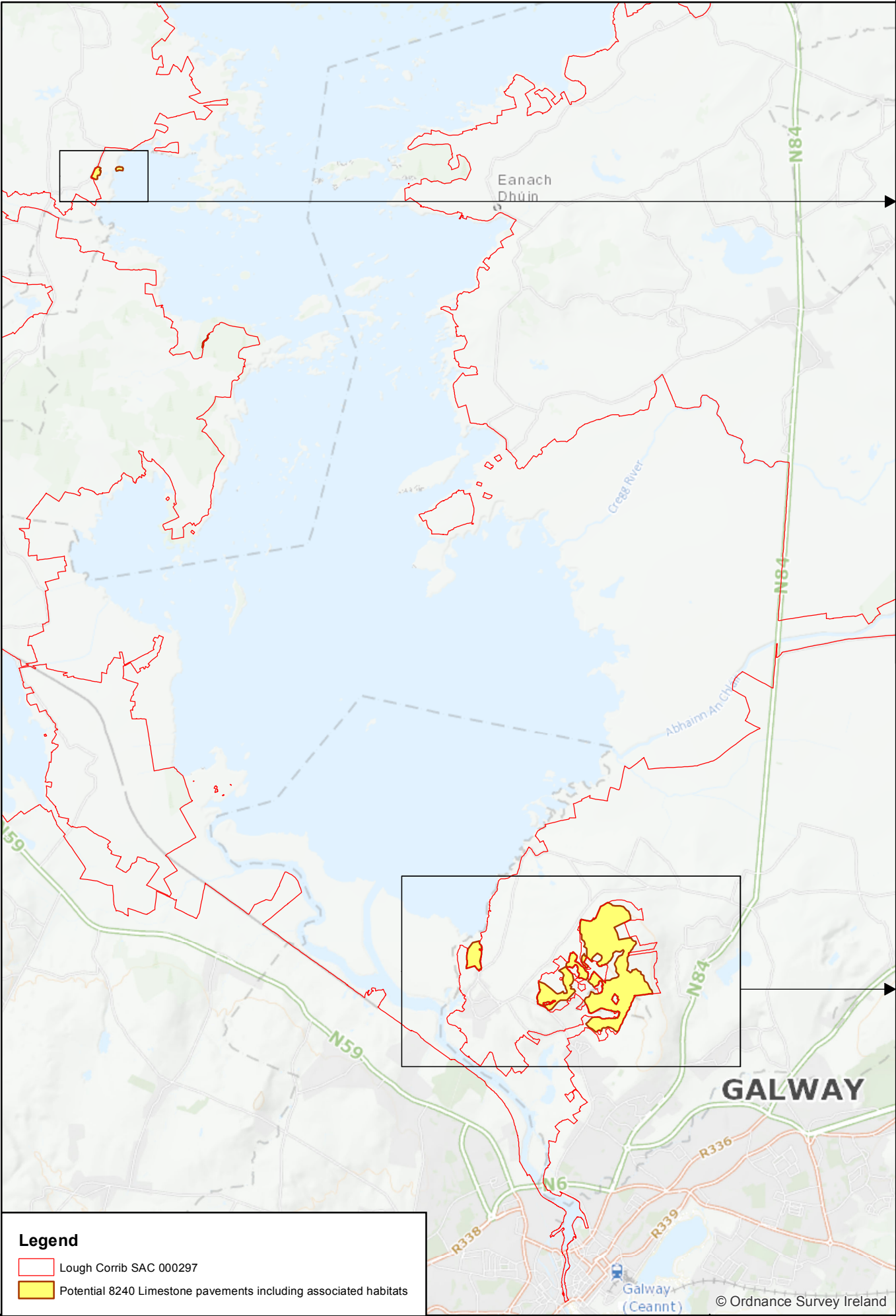
Map to be read in conjunction with the NPWS Conservation Objectives Document.

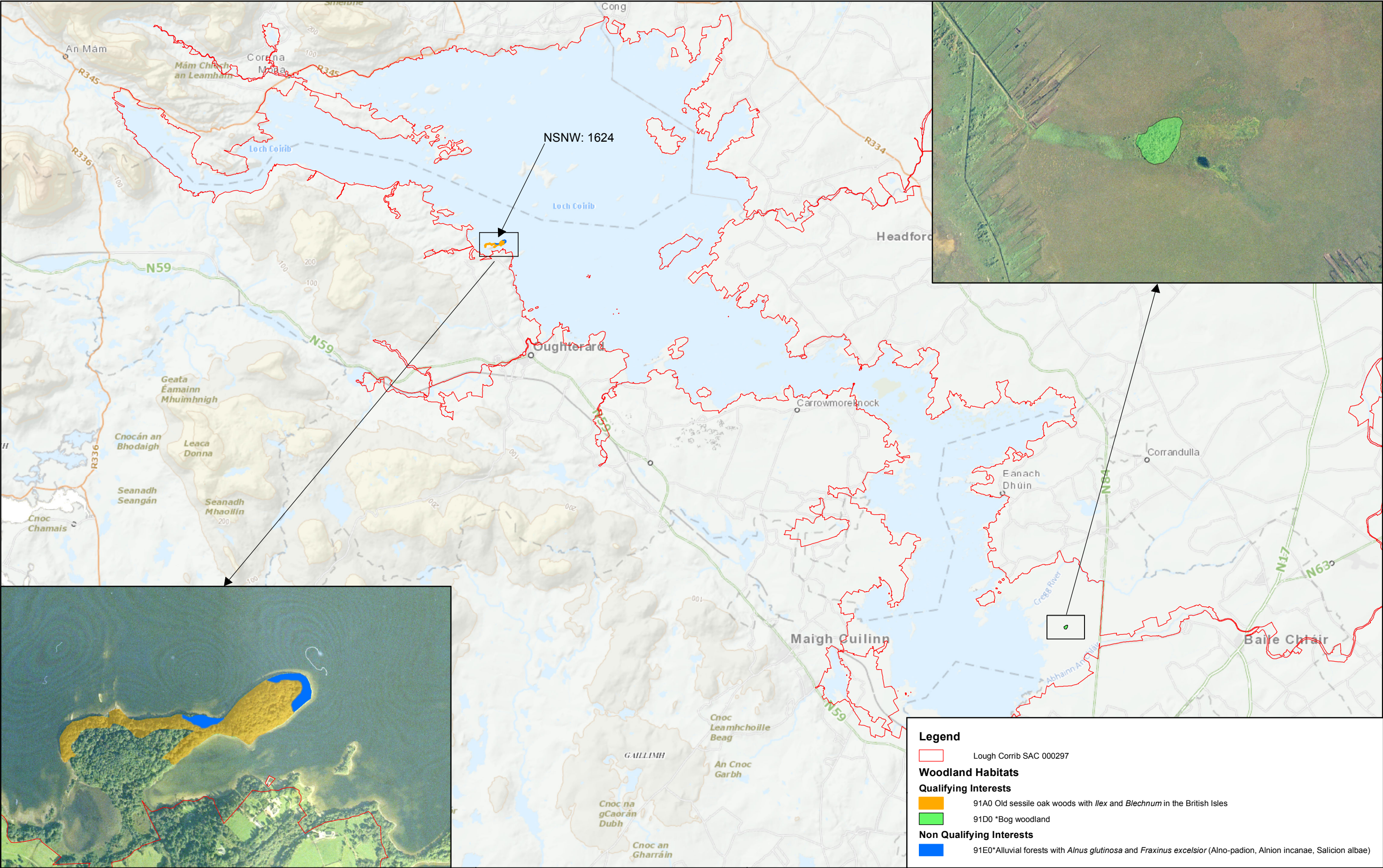
**SITE CODE:
SAC 000297; version 3.09.
CO. GALWAY / MAYO / ROSCOMMON**

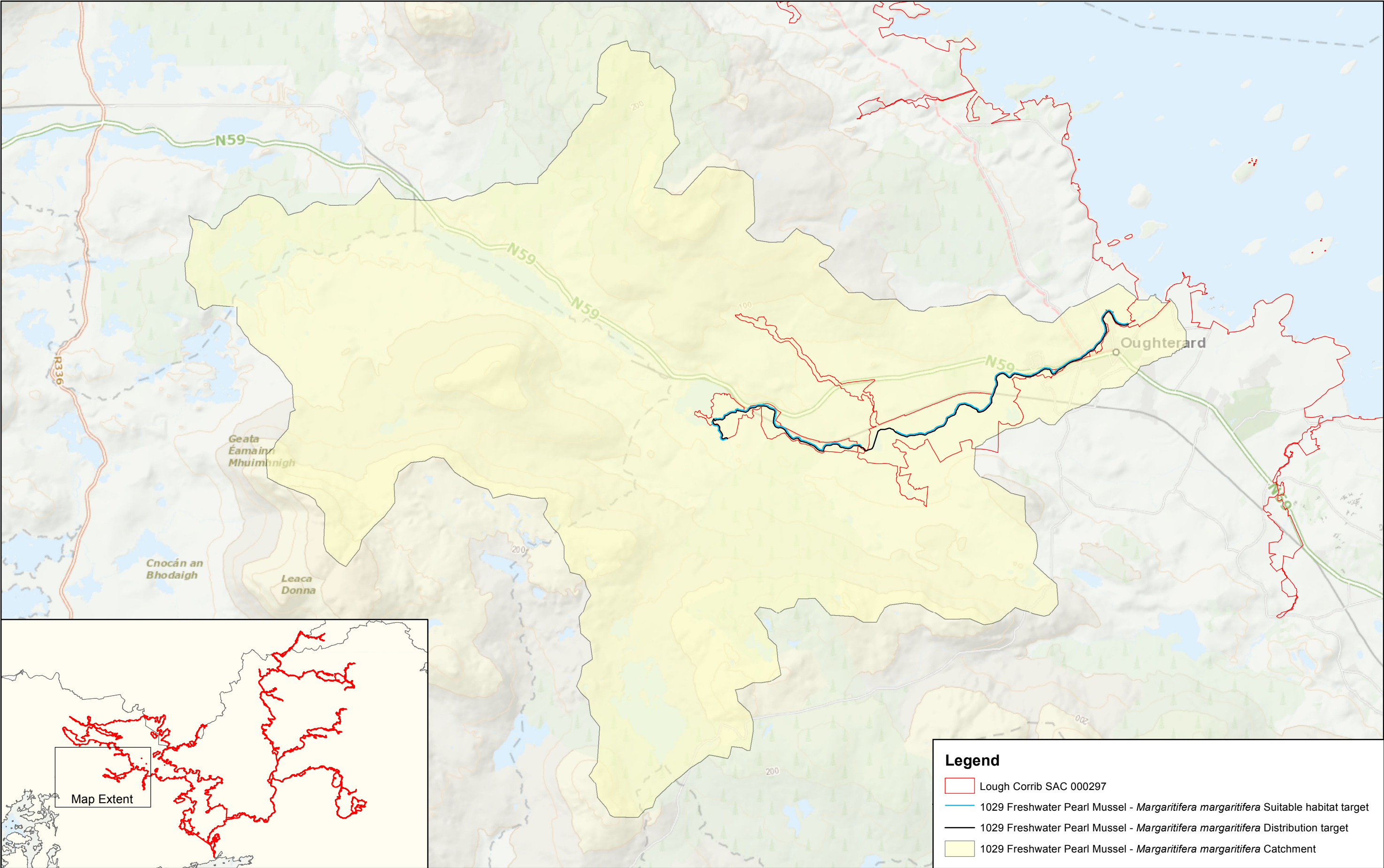




The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
Ordnance Survey of Ireland Licence No EN 0059216. © Ordnance Survey of Ireland Government of Ireland
Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

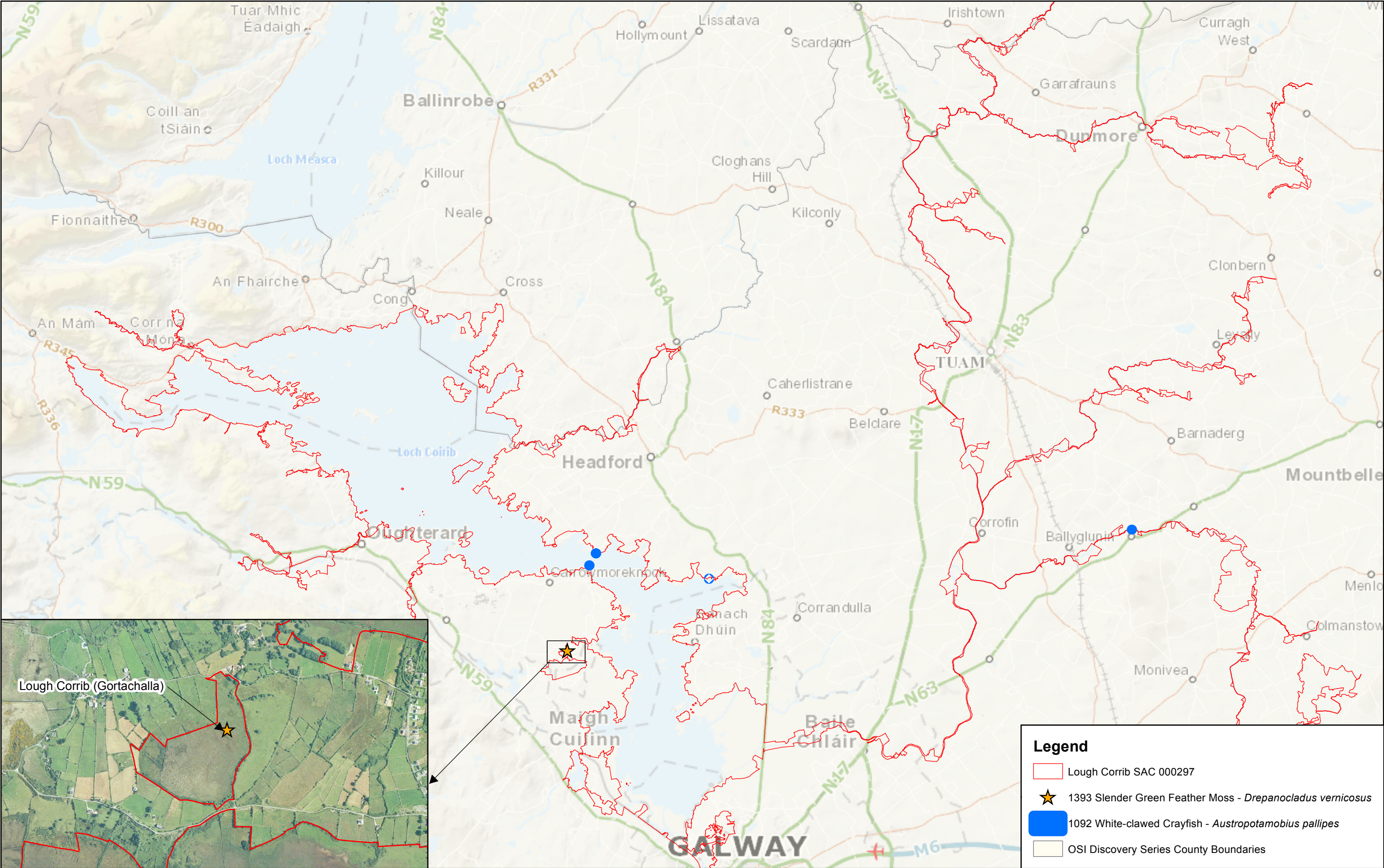


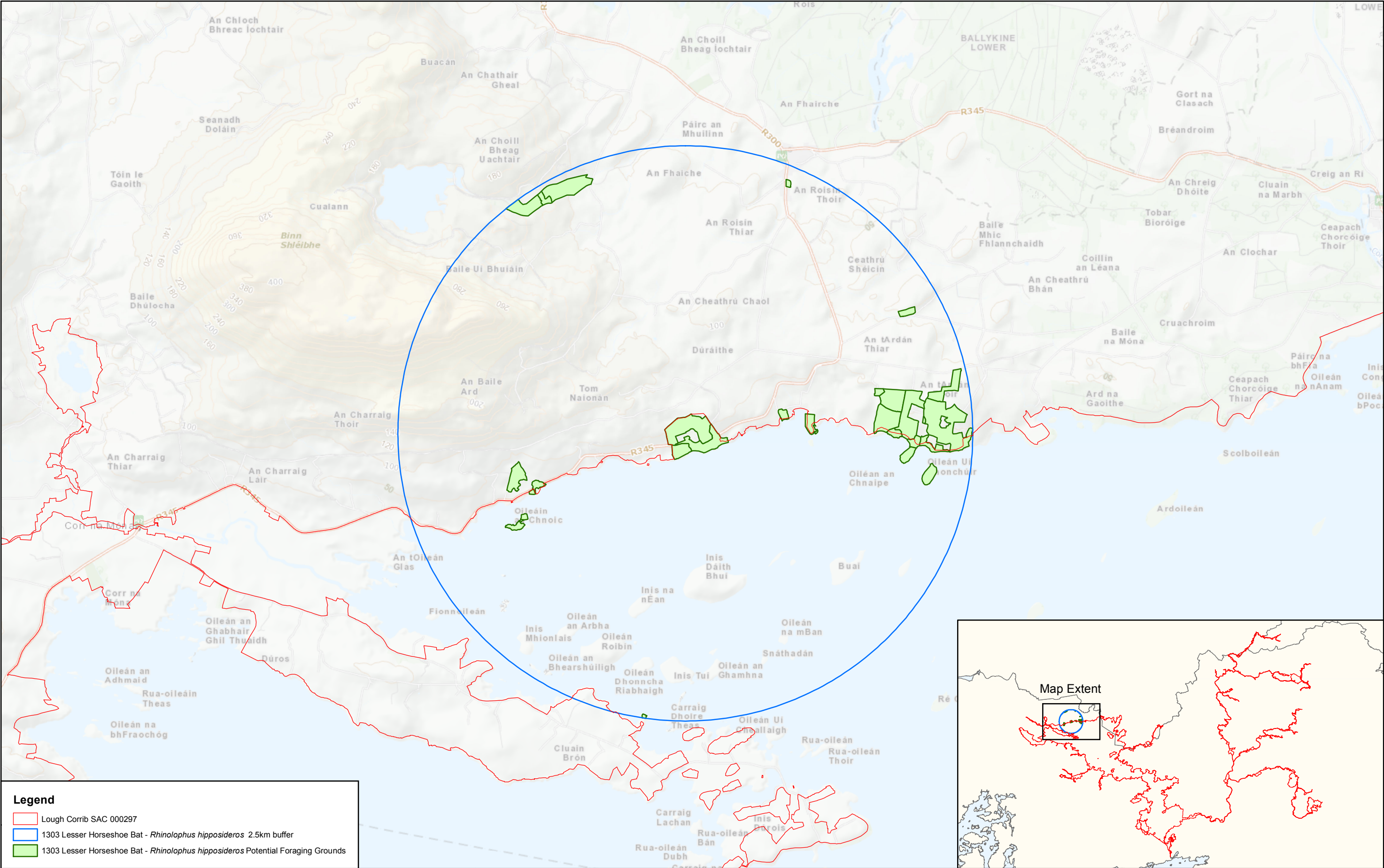


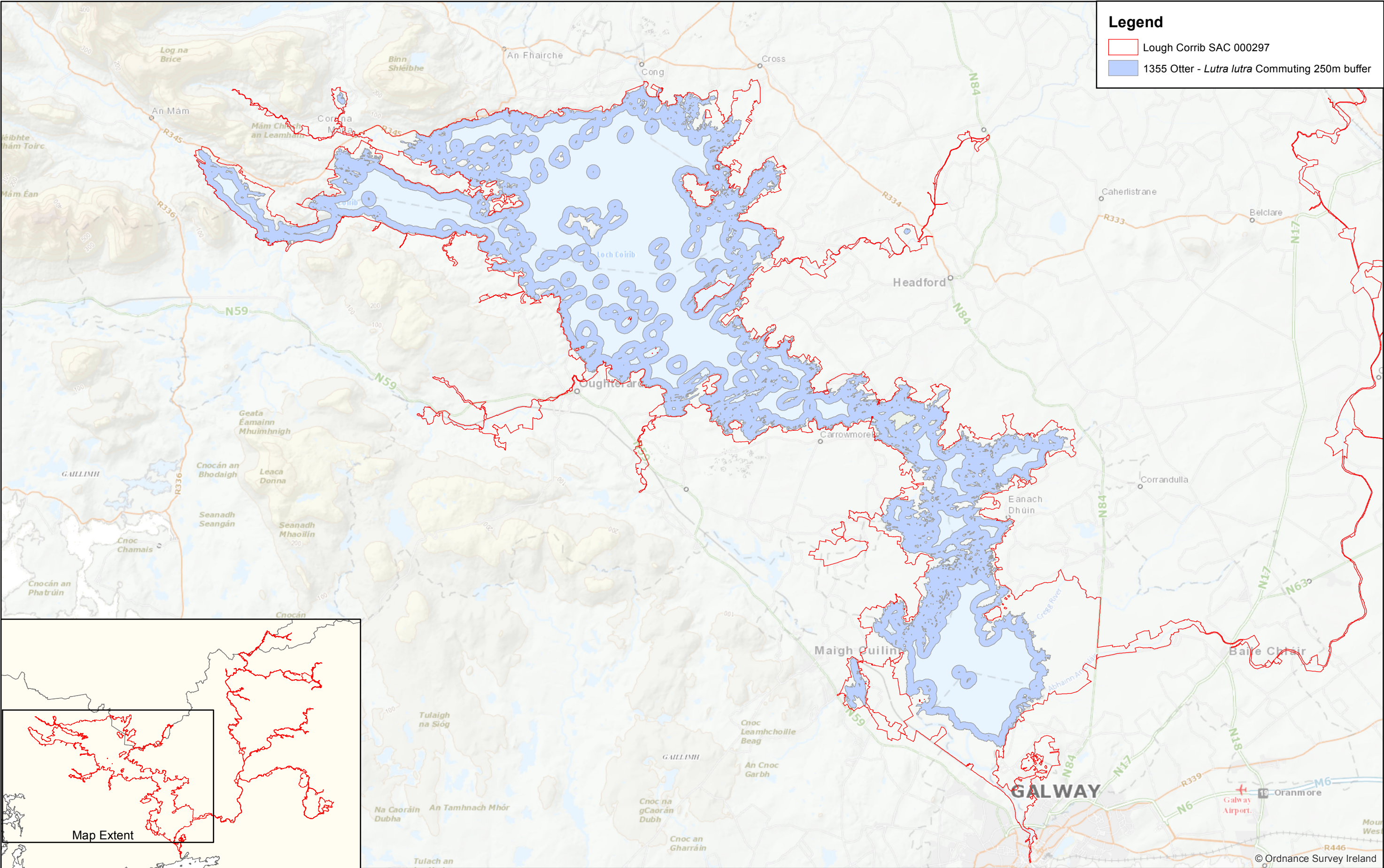


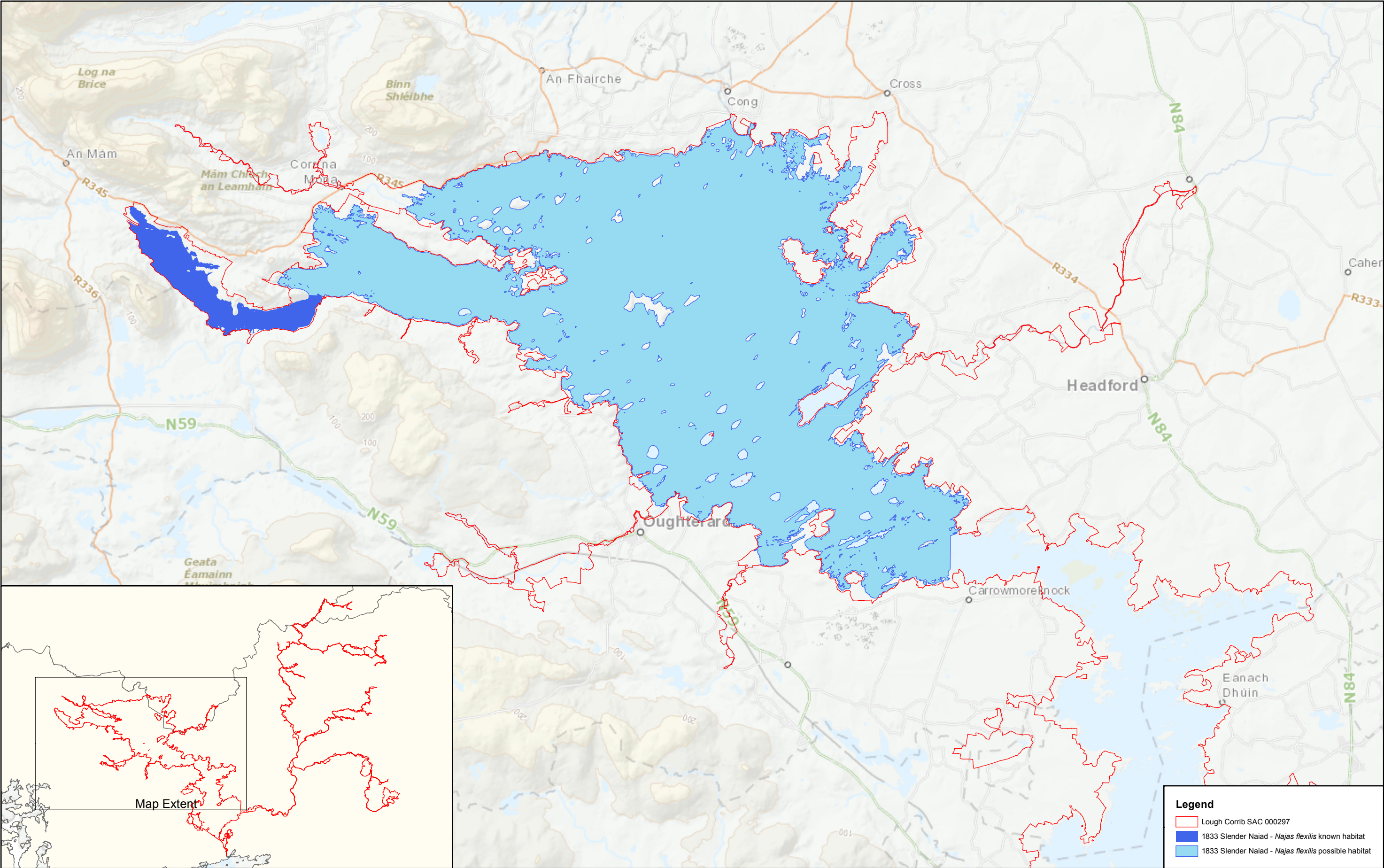


 <p>An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs</p>	<p>MAP 9: LOUGH CORRIB SAC CONSERVATION OBJECTIVES FRESHWATER PEARL MUSSEL - MARGARITIFERA MARGARITIFERA</p> <p>Map to be read in conjunction with the NPWS Conservation Objectives Document.</p>	<p>SITE CODE: SAC 000297; version 3.09. CO. GALWAY / MAYO / ROSCOMMON</p> <p>0 0.5 1 1.5 2 km</p>	<p>The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Ordnance Survey of Ireland Licence No EN 0059216. © Ordnance Survey of Ireland Government of Ireland</p> <p>Níl sna teorainneacha ar na léarscáileanna ach nod garshuimhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann</p>	<p>N</p>  <p>Map Version 1 Date: April 2017</p>
--	--	---	---	--









Legend

- Lough Corrib SAC 000297
- 1833 Slender Naiad - *Najas flexilis* known habitat
- 1833 Slender Naiad - *Najas flexilis* possible habitat

Conservation objectives for Lough Corrib SPA [004042]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A051	Gadwall	<i>Anas strepera</i>
A056	Shoveler	<i>Anas clypeata</i>
A059	Pochard	<i>Aythya ferina</i>
A061	Tufted Duck	<i>Aythya fuligula</i>
A065	Common Scoter	<i>Melanitta nigra</i>
A082	Hen Harrier	<i>Circus cyaneus</i>
A125	Coot	<i>Fulica atra</i>
A140	Golden Plover	<i>Pluvialis apricaria</i>



A179	Black-headed Gull	<i>Chroicocephalus ridibundus</i>
A182	Common Gull	<i>Larus canus</i>
A193	Common Tern	<i>Sterna hirundo</i>
A194	Arctic Tern	<i>Sterna paradisaea</i>
A395	Greenland White-fronted Goose	<i>Anser albifrons flavirostris</i>

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetland and Waterbirds" may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a second objective is included as follows:

Objective: To maintain or restore the favourable conservation condition of the wetland habitat at Lough Corrib SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

Citation: NPWS (2016) *Conservation objectives for Lough Corrib SPA [004042]. Generic Version 5.0.*
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.



Conservation objectives for Lough Coy SAC [002117]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
-------------	--------------------

3180	Turloughs*
------	------------

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Lough Coy SAC [002117]. Generic Version 5.0.*
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.



Conservation objectives for Lough Cutra SAC [000299]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

ADD HABITATS

Code	Common Name	Scientific Name
1303	Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>

Citation: NPWS (2016) *Conservation objectives for Lough Cutra SAC [000299]. Generic Version 5.0.*
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.



Conservation objectives for Lough Cutra SPA [004056]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A017	Cormorant	<i>Phalacrocorax carbo</i>



Citation: NPWS (2016) *Conservation objectives for Lough Cutra SPA [004056]. Generic Version 5.0.*
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.



Conservation objectives for Lough Fingall Complex SAC [000606]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
3180	Turloughs*
4060	Alpine and Boreal heaths
5130	<i>Juniperus communis</i> formations on heaths or calcareous grasslands
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco Brometalia</i>) (* important orchid sites)*
7210	Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> *
8240	Limestone pavements*
* denotes a priority habitat	



Code	Common Name	Scientific Name
1303	Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>

Citation: NPWS (2016) *Conservation objectives for Lough Fingall Complex SAC [000606]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*



Conservation objectives for Lough Rea SAC [000304]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
------	-------------

3140	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp.
------	--

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Lough Rea SAC [000304]. Generic Version 5.0.*
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.



Conservation objectives for Lough Rea SPA [004134]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A056	Shoveler	<i>Anas clypeata</i>
A125	Coot	<i>Fulica atra</i>

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetland and Waterbirds" may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one



or more of the species of Special Conservation Interest. Thus, a second objective is included as follows:

Objective: To maintain or restore the favourable conservation condition of the wetland habitat at Lough Rea SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

Citation: NPWS (2016) *Conservation objectives for Lough Rea SPA [004134]. Generic Version 5.0.*
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Conservation objectives for Moneen Mountain SAC [000054]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
3180	Turloughs*
4060	Alpine and Boreal heaths
5130	<i>Juniperus communis</i> formations on heaths or calcareous grasslands
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco Brometalia</i>) (* important orchid sites)*
7220	Petrifying springs with tufa formation (<i>Cratoneurion</i>)*
8240	Limestone pavements*
* denotes a priority habitat	



Code	Common Name	Scientific Name
1065	Marsh Fritillary	<i>Euphydryas aurinia</i>
1303	Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>

Citation: NPWS (2016) Conservation objectives for Moneen Mountain SAC [000054]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

National Parks and Wildlife Service

Conservation Objectives Series

Monivea Bog SAC 002352



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



**National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,
7 Ely Place, Dublin 2, Ireland.
Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie**

Citation:

**NPWS (201) Conservation Objectives: Monivea Bog SAC 002352. Version 1.
National Parks and Wildlife Service, Department of Arts, Heritage and the
Gaeltacht.**

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

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Notes/Guidelines:

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

Qualifying Interests

** indicates a priority habitat under the Habitats Directive*

002352	Monivea Bog SAC
<hr/>	
7110	Active raised bogsE
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion

Please note that this SAC adjoins Lough Corrib SAC (000297). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjoining site as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly K.; Crowley W.; Denyer J.; Duff K.; Smith G.
Series :	Irish Wildlife Manual No. 81
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2014
Title :	Monivea Bog (SAC 002352), Co. Galway, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2015
Title :	Monivea Bog SAC (002352) Conservation objectives supporting document- raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	potential 7110; digital elevation model; drainage patterns (maps 3 and 5)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 4)

Conservation Objectives for : Monivea Bog SAC [002352]

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Monivea Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 32.0ha, subject to natural processes	Active Raised Bog (ARB) habitat was mapped at 7.0ha by Fernandez et al. (2014). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 25.8ha. See map 3. However, it is estimated that only 12.9ha of this is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 19.9ha. Eco-hydrological assessments of the cutover estimates that an additional 12.1ha of bog forming habitats could be restored. The long term target for ARB is therefore 32.0ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 4 for distribution in 2012	ARB habitat at Monivea Bog is central, sub-central ecotopes and active flush only, and occurs mainly on the western part of the bog. DRB occurs on both the western, south-eastern and north-eastern parts of the bog, which will require restoration measures. There is also potential for ARB restoration on cutover areas of the bog (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 3	The area of high bog within Monivea Bog SAC in 2012 (latest figure available) was 130.6ha (DAHG 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 5 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 16.0ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). Target area of active raised bog for the site has been set at 32.0ha (see area target above)
Vegetation quality: microtopographical features	Hectares	Restore adequate cover of high quality microtopographical features	Hummock and hollow microtopography, with interlocking pools and lawns is well developed on Monivea Bog
Vegetation quality: bog moss (<i>Sphagnum</i>) species	Percentage cover	Restore adequate cover of bog moss (<i>Sphagnum</i>) species to ensure peat-forming capacity	<i>Sphagnum</i> cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as <i>Sphagnum austinii</i> are particularly good peat formers. <i>Sphagnum</i> cover and distribution also varies naturally across a site

Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	Soak systems, flushes, swallow holes and open water are the main features of local distinctiveness on Monivea Bog
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds/ridges emerging or expanding, and burning evidence
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Native negative indicator species that suggest drying out include abundant bog asphodel (<i>Narthecium ossifragum</i>), deergrass (<i>Trichophorum germanicum</i>) and harestail cotton-grass (<i>Eriophorum vaginatum</i>) forming tussocks; abundant magellanic bog-moss (<i>Sphagnum magellanicum</i>) in pools previously dominated by <i>Sphagnum</i> species typical of very wet conditions (e.g. feathery bog-moss (<i>S. cuspidatum</i>)). Indicators of frequent burning events include abundant <i>Cladonia floerkeana</i> and high cover of carnation sedge (<i>Carex panicea</i>) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species on raised bogs include lodgepole pine (<i>Pinus contorta</i>), rhododendron (<i>Rhododendron ponticum</i>), and pitcherplant (<i>Sarracenia purpurea</i>)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Monivea Bog suggests that the current level is approximately 10.6kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in marginal areas and lagg zone surrounding the high bog varies due to influences of different water types (bog water, regional groundwater, and runoff from surrounding mineral lands)

Conservation Objectives for : Monivea Bog SAC [002352]

7120 Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Monivea Bog SAC

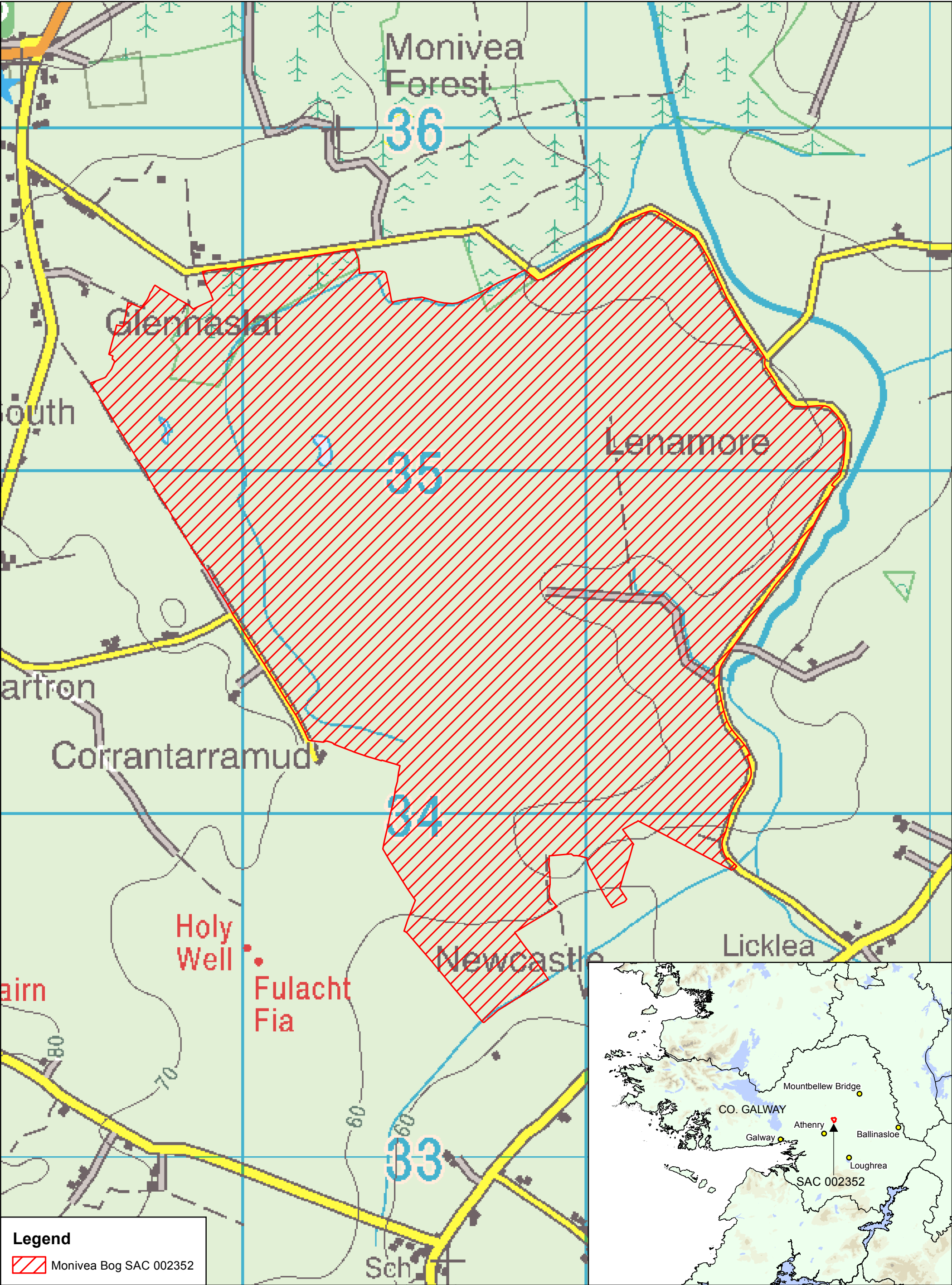
Attribute	Measure	Target	Notes
-----------	---------	--------	-------

Conservation Objectives for : Monivea Bog SAC [002352]

7150 Depressions on peat substrates of the Rhynchosporion

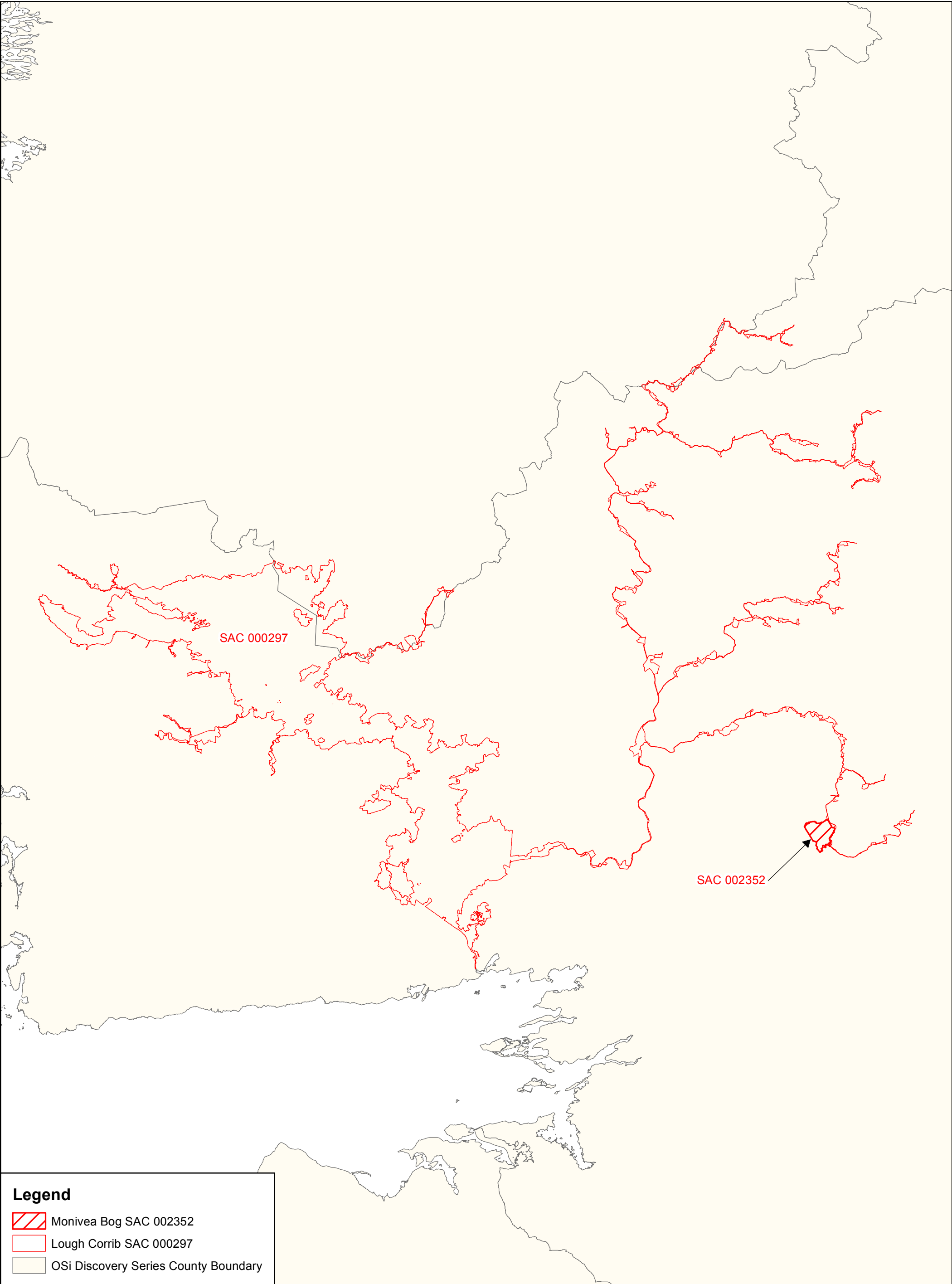
Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Monivea Bog SAC

Attribute	Measure	Target	Notes
-----------	---------	--------	-------






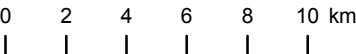
Legend

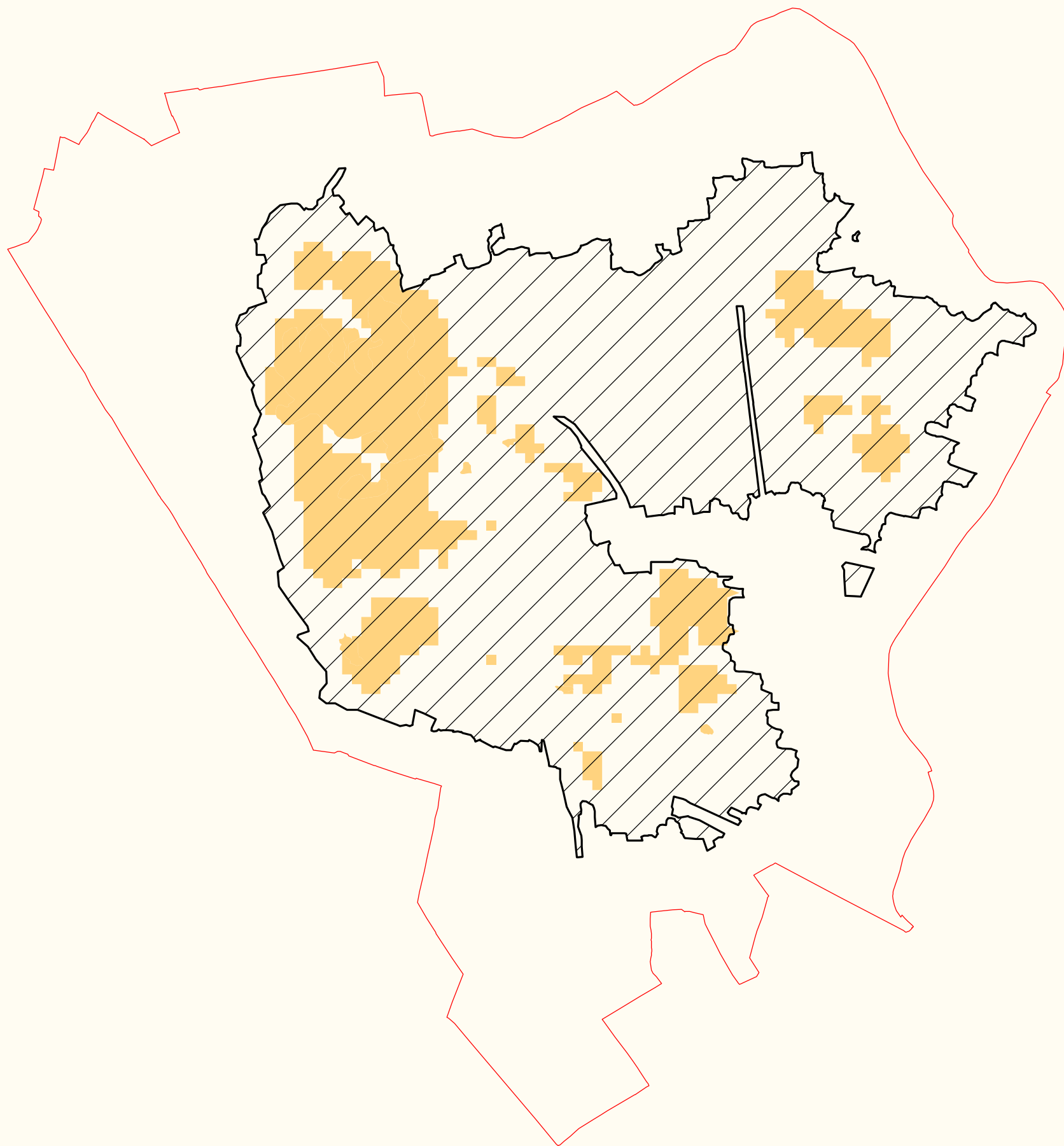
 Monivea Bog SAC 002352






Legend

-  Monivea Bog SAC 002352
-  Lough Corrib SAC 000297
-  OSi Discovery Series County Boundary

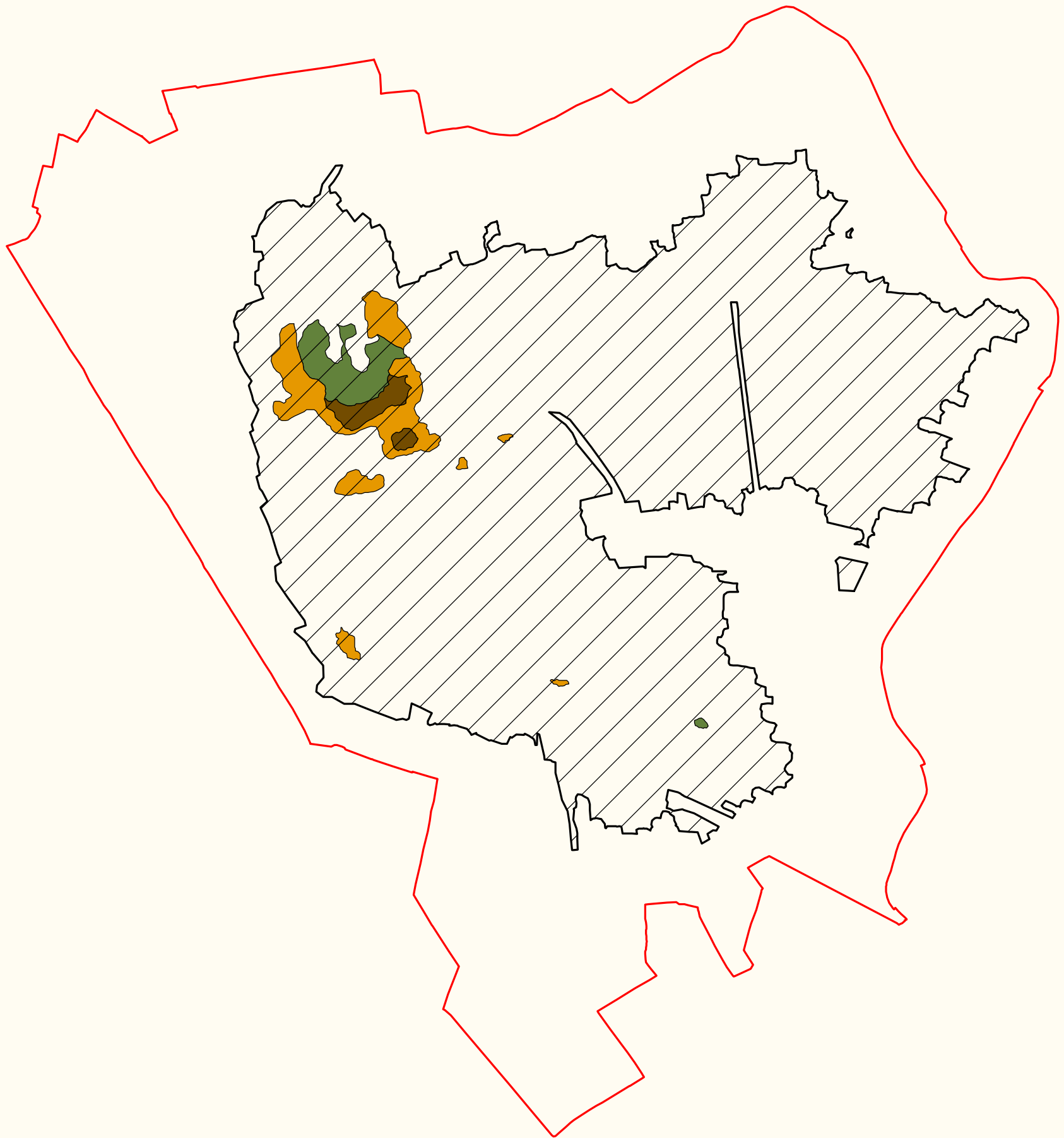




Legend

-  Monivea Bog SAC 002352
-  High Bog Boundary
-  Potential *7110 Active Raised Bogs





Legend

Monivea Bog SAC 002352

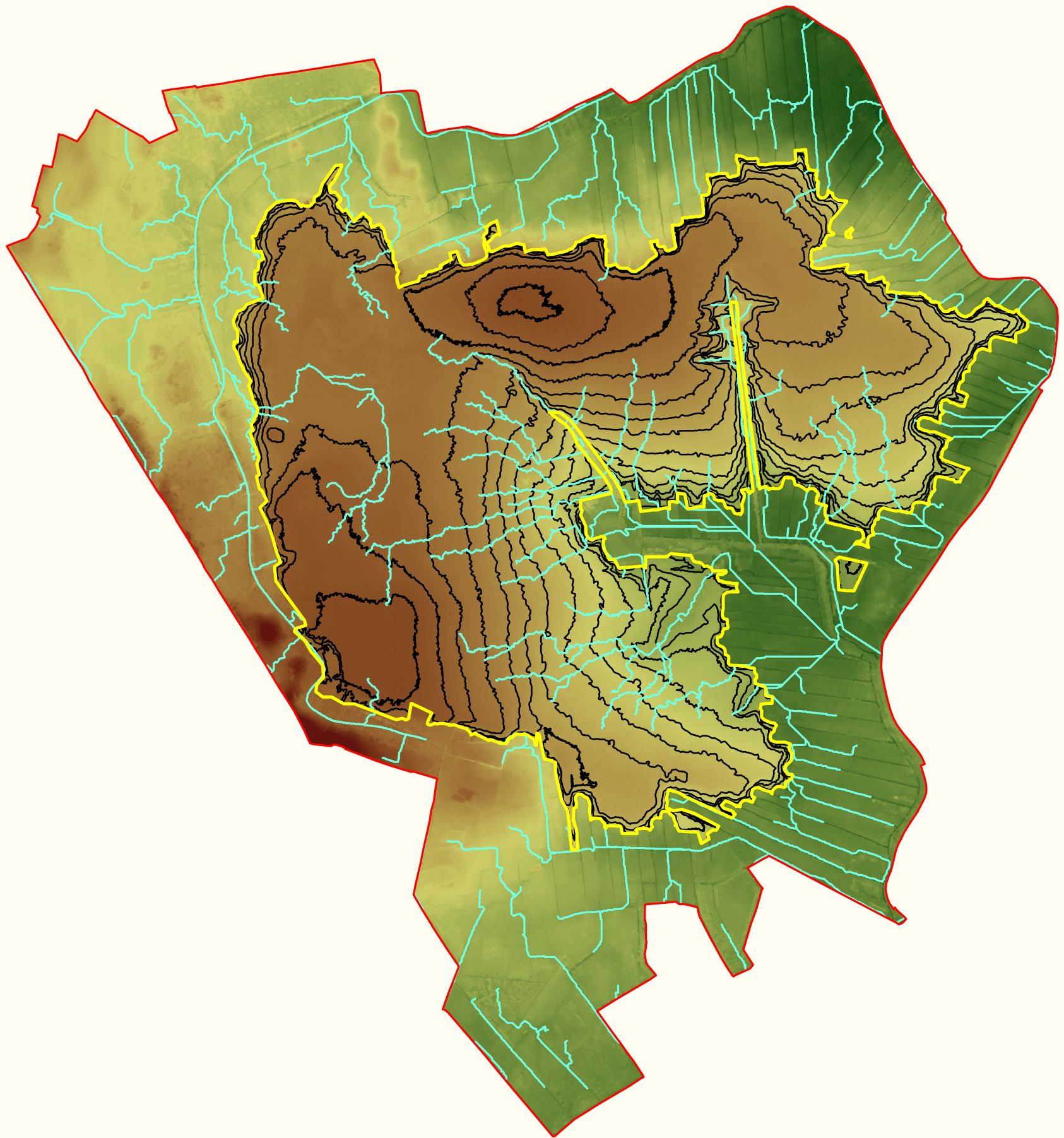
High Bog Boundary

Active Raised Bogs Ecotopes

Central ecotope

Soaks / active flush

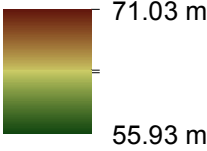
Sub-central ecotope



Legend

- Monivea Bog SAC 002352
- High Bog Boundary
- Drainage Patterns
- Contours

Elevation

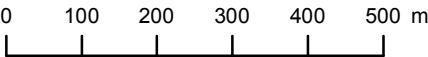


An Roinn
Ealaíon, Oidhreacht agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

**MAP 5:
MONIVEA BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS**

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

SITE CODE:
SAC 002352; version 3.02. Co. Galway



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

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



Map Version 1
Date: Nov 2015



Conservation objectives for Peterswell Turlough SAC [000318]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
-------------	--------------------

3180	Turloughs*
------	------------

3270	Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidenton</i> p.p. vegetation
------	--

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Peterswell Turlough SAC [000318]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*



Conservation objectives for Rahasane Turlough SAC [000322]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
------	-------------

3180	Turloughs*
------	------------

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Rahasane Turlough SAC [000322]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*

Conservation objectives for Rahasane Turlough SPA [004089]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A038	Whooper Swan	<i>Cygnus cygnus</i>
A050	Wigeon	<i>Anas penelope</i>
A140	Golden Plover	<i>Pluvialis apricaria</i>
A156	Black-tailed Godwit	<i>Limosa limosa</i>
A395	Greenland White-fronted Goose	<i>Anser albifrons flavirostris</i>



To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetland and Waterbirds" may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a second objective is included as follows:

Objective: To maintain or restore the favourable conservation condition of the wetland habitat at Rahasane Turlough SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

Citation: NPWS (2016) *Conservation objectives for Rahasane Turlough SPA [004089]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*



Conservation objectives for Slieve Aughty Mountains SPA [004168]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A082	Hen Harrier	<i>Circus cyaneus</i>
A098	Merlin	<i>Falco columbarius</i>



Citation: NPWS (2016) *Conservation objectives for Slieve Aughty Mountains SPA [004168]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.*



Conservation objectives for Sonnagh Bog SAC [001913]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
-------------	--------------------

7130	Blanket bogs (* if active bog)
------	--------------------------------

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Sonnagh Bog SAC [001913]. Generic Version 5.0.*
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.



Conservation objectives for Termon Lough SAC [001321]

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

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

Code	Description
------	-------------

3180	Turloughs*
------	------------

* denotes a priority habitat



Citation: NPWS (2016) *Conservation objectives for Termon Lough SAC [001321]. Generic Version 5.0.*
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.



Registered Office

**24 Grove Island
Corbally
Limerick
Ireland**

T: +353 (0) 61 345463
e: info@jbaconsulting.com

**JBA Consulting Engineers and
Scientists Limited**

Registration number 444752

Visit our website
www.jbaconsulting.com



The Office of Public Works
Head Office
Jonathan Swift Street
Trim
Co. Meath
C15 NX36

Telephone: (0761) 106000, (046) 942 6000
E-mail: floodinfo@opw.ie
Website: www.floodinfo.ie