Natura Impact Statement

Sligo Bay & Drowse

2018
Natura Impact Statement

For

River Basin (35) Sligo Bay & Drowse (Drowes)
Flood Risk Management Plan

Areas for Further Assessment included in the Plan:

<table>
<thead>
<tr>
<th>Area Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuil Mhúine</td>
<td>Collooney</td>
</tr>
<tr>
<td>Baile an Mhóta</td>
<td>Ballymote</td>
</tr>
<tr>
<td>Baile Easa Dara &amp; màguaird</td>
<td>Ballysadare &amp; Environs</td>
</tr>
<tr>
<td>Goirtin</td>
<td>Gorteen</td>
</tr>
<tr>
<td>Cúil Aine</td>
<td>Coolaney</td>
</tr>
<tr>
<td>Baile Shligigh (Ráth Bracháin san áireamh)</td>
<td>Sligo Town (Incl Rathbraghan)</td>
</tr>
<tr>
<td>Cluainín</td>
<td>Manorhamilton</td>
</tr>
<tr>
<td>Baile Idir dhá Abhainn</td>
<td>Riverstown</td>
</tr>
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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.

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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 Ila)
  - Natura Impact Statement (Volume Ila – Appendix B) – this report
  - Addendum to the Environmental Report (Volume Iib)
  - SEA Statement (Volume IIc)

Sligo Bay - Drowes Catchment Flood Risk Management Plan, Unit of Management 35

Natura Impact Statement

Revision History

<table>
<thead>
<tr>
<th>Revision Ref / Date Issued</th>
<th>Amendments</th>
<th>Issued to</th>
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</thead>
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<td>Draft / June 2016</td>
<td></td>
<td>Office of Public Works</td>
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<tr>
<td>Draft Final / August 2016</td>
<td>Amendments following OPW comments</td>
<td>Office of Public Works</td>
</tr>
<tr>
<td>Version 4.0 / 03 August 2017</td>
<td>Final issue for DEPR adoption of plan</td>
<td>John Martin, Paul Stewart, OPW</td>
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<tr>
<td>Version 6.0 / 30 November 2017</td>
<td>Updates following further DEPR review.</td>
<td>John Martin, Paul Stewart, OPW</td>
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<tr>
<td>V7.0 / 14 December 2017</td>
<td>Minor updates</td>
<td>John Martin, Paul Stewart, OPW</td>
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<tr>
<td>V8.0 / 30 January 2018</td>
<td>NIS Updates</td>
<td>Paul Stewart, OPW</td>
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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 Richael Duffy. 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 MCIIEEM
  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 measures proposed for the Sligo Bay-Drowes Unit of Management (UoM), also referred to as the River Basin.

The Sligo Bay-Drowes River Basin lies within County Sligo 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. A stage 2 AA is required to assess the measures and objectives of the CFRAM Plan for UoM35. This Stage 2 AA will be presented as a Natura Impact Report, which will specify details of the Plan, associated objectives and measures and analyse the potential negative effects on the Natura 2000 sites 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 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-14-1.

![Image of stages: Stage 1 - Screening for AA, Stage 2 - AA, Stage 3 - Alternative Solutions, Stage 4 - IROPI]

**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).

**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:


B.2 Sligo Bay - Drowes CFRAM Plan

Unit of Management (UoM) 35, also referred to as Sligo Bay-Drowes or River Basin 35, is predominantly within County Sligo but also incorporates the north of County Leitrim. UoM35 covers an area of 1,603 km² of the Western River Basin District (RBD). The main settlement in this River Basin is Sligo town.

B.2.1 Objectives of the Western CFRAM Programme

The Sligo Bay - Drowes 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) 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 were selected 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 Unit of Management;
- Areas for Further Assessment (AFA) Level; and
- 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 NIR considers impacts posed by measures at the AFA Level, i.e. the measures of economically viable options for areas screened in due to properties being at risk in the 1% AEP fluvial event and 0.5% coastal event. Further details of measures at all SSAs is discussed in the Preliminary Options Report for River Basin 35.

Unit of Management Level

At this scale measures that could provide benefits to multiple AFAs within the Unit of Management and other areas were considered, along with the spatial and temporal coherence of measures being considered at smaller spatial scales. FRM management 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); and
- 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, measures 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 River Basin. 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 this River Basin included the consideration of a range of flood management measures at different spatial scales within River Basin. 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 35 would be adapted, has been assessed.

Certain controls would remain in place for example the Governments Guidelines on Planning and Flood Risk. The Galway County Development Plan 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 negative for the environmental objectives dealing with water and ecology and would have a long term negative impact on humans and local economy particularly in the areas liable to flooding.

There are no other viable alternatives to the FRMP. Alternative flood defence wall designs including demountable and automatic raising walls are not cost beneficial and so not viable alternatives. Should extra funding be available, defences of this type may alleviate the visual and architectural impacts of the proposed measures.

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 in the River Basin 35

Following a comprehensive multi-criteria option assessment process, preferred flood risk management options were recommended in the CFRAM Plan for each River Basin and AFA. 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.

Methods that are applicable to all areas are assessed for potential significant impacts to Natura 2000 sites in Table B-14-1. The Areas for Further Assessment (AFAs) of flood risk in River Basin 35 were Ballymote, Ballysdare, Collooney, Coolaney, Gorteen, Manorhamilton, Rathbraghan, Riverstown and Sligo town.
Ballymote, Ballysdare, Collooney, Gorteen, Manorhamilton and Riverstown were screened out due to no properties being at risk in the 1% AEP fluvial event. Coolaney, Sligo and Rathbraghan 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 35. The measures of the preferred options for River Basin 35, selected based on the outcome of these assessments, are detailed in and are shown in Figure B-14-2 and Figure B-14-3. Only options proposed for Rathbraghan and Coolaney were found to be economically viable with respect to current levels of flood risk.

<table>
<thead>
<tr>
<th>Methods</th>
<th>Significance of impact</th>
<th>Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention: Sustainable Planning and Development Management</td>
<td>Potential significant impact</td>
<td>Application of guidelines that support sustainable development will promote positive impacts during operation but may cause negative impacts during implication at a project level.</td>
</tr>
<tr>
<td>Prevention: Sustainable Drainage Systems (SUDS)</td>
<td>Potential significant impact</td>
<td>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.</td>
</tr>
<tr>
<td>Protection: Voluntary Home Relocation Scheme</td>
<td>Potential significant impact</td>
<td>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.</td>
</tr>
<tr>
<td>Prevention: Local Adaption Planning</td>
<td>Potential significant impact</td>
<td>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.</td>
</tr>
<tr>
<td>Prevention: Land Use Management and Natural Flood Risk Management Methods</td>
<td>Potential significant impact</td>
<td>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.</td>
</tr>
<tr>
<td>Methods</td>
<td>Significance of impact</td>
<td>Reasoning</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Protection: Minor Works Scheme</td>
<td>Potential significant impact</td>
<td>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.</td>
</tr>
<tr>
<td>Protection: Maintenance of Arterial Drainage Schemes</td>
<td>Potential significant impact</td>
<td>There is one Arterial Drainage Scheme within Sligo Bay Drowse River Basin, namely Bonet Arterial Drainage Scheme. 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 will require assessment at a project level.</td>
</tr>
<tr>
<td>Protection: Maintenance of Drainage Districts</td>
<td>Potential significant impact</td>
<td>Works that occur within one of the four Drainage Districts in this River Basin, namely Coolaney, Drumcliff, Dunmoran and Owenmore may involve substantial clearance, alteration and protection works that could impact upon protected habitats and species and so, will require Appropriate Assessment at a project level.</td>
</tr>
<tr>
<td>Maintenance of Channels Not Part of a Scheme</td>
<td>Potential significant impact</td>
<td>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.</td>
</tr>
<tr>
<td>Preparedness: Flood Forecasting</td>
<td>None anticipated</td>
<td>This service will involve the issuing of flood forecasts and general alerts at both national and catchment scales. It will not result is physical actions and therefore is not likely to cause significant impacts to Natura 2000 sites.</td>
</tr>
<tr>
<td>Methods</td>
<td>Significance of impact</td>
<td>Reasoning</td>
</tr>
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</tr>
<tr>
<td>Preparedness: Review of Emergency Response Plans for Severe Weather</td>
<td>Potential significant impact</td>
<td>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.</td>
</tr>
<tr>
<td>Preparedness: Promotion of Individual and Community Resilience</td>
<td>Potential significant impact</td>
<td>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.</td>
</tr>
<tr>
<td>Preparedness: Individual Property Protection</td>
<td>Potential significant impact</td>
<td>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.</td>
</tr>
<tr>
<td>Preparedness: Flood-Related Data Collection</td>
<td>Potential significant impact</td>
<td>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 will require improvements and installation of new gauges. Plans or projects involved in these processes will require further assessment.</td>
</tr>
<tr>
<td>Flood forecasting and warning systems</td>
<td>Potential significant impact</td>
<td>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.</td>
</tr>
</tbody>
</table>

All three of the AFAs within Sligo Bay Drowse River Basin where flood risk has been identified in the 1% AEP fluvial or 0.5% AEP tidal events are hydraulically independent. As such there are no catchment or sub-catchment structural measures that will provide benefit to more than one of these AFAs and no further screening of structural measures at the sub-catchment level has been undertaken.
### Table B-14-2: Preferred options and associated structural measures for UoM35

<table>
<thead>
<tr>
<th>AFA Name</th>
<th>Preferred Option</th>
<th>Structural Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rathbraghan</td>
<td>Storage Embankment</td>
<td>This involves the construction of an embankment measuring 415m long and 1.2m average height to store / attenuate flood water in larger events and associated controlled outfall to prevent overland flooding of properties downstream (including the Woodlands Estate and the Nursing Home) when flow exceeds the existing culvert capacity. The preferred option is located on an un-named stream that is a tributary of the Willsborough stream, which discharges into Sligo Harbour.</td>
</tr>
<tr>
<td>Coolaney</td>
<td>Flood Embankment</td>
<td>Flood embankment to the 1% AEP design standard. This involves a 70m embankment 1m in height on the right bank to cut off the flow route.</td>
</tr>
</tbody>
</table>
Figure B-14-3 Location of flood embankment for Coolaney AFA.
B.3 Stage 1 - Screening for Appropriate Assessment

Assessment of the potential impacts of flood risk management objectives and 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 proposed objectives and measures are likely to have a significant effect, 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 Appropriate Assessment, reported in the form of a Natura Impact Statement.

The potentially viable flood relief works 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.

B.3.1 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 the Plan.

Figure B-14-4 shows the location of Natura 2000 sites, the study area and the AFA boundaries where the various plan measures apply.
Figure B-14-4. Natura 2000 sites in UoM 35
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 of the River Basin 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 Table B-14-3.

The 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 works, was taken for this assessment.

**Freshwater Pearl Mussel (FWMP) 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

Fifty-three 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). Twenty-seven Natura 2000 sites are within the River Basin. These 27 Natura 2000 sites will require further assessment for potential impacts.

Of the 26 Natura 2000 sites outside the River Basin, only two are hydrologically connected. The remaining 24 sites are within 15 km but are not hydrologically connected. These 24 will not need to be considered further due to lack of pathway for transporting impacts. The two sites, Cuilcagh – Anierin Uplands SAC and Inishmurray SPA, are located within 15 km and are connected by groundwater pathways only. Both of these sites have Groundwater Dependant Terrestrial Ecosystems as qualifying features and may potentially be susceptible to groundwater impacts. These two sites can be included with the original 27 sites that require further assessment for potential impacts.

Four sites have Freshwater Pearl Mussel as a Qualifying Interest and are within 35 km. Lough Eske and Ardnamona Wood SAC, West of Ardara/Maas Road SAC, Lough Corrib SAC and Mweelrea/Sheeffry/Effiff Complex SAC are not connected via surface or groundwater to the River Basin and therefore, do not require further assessment.

In conclusion, a total of 29 Natura 2000 sites are within, or hydrologically connected to the River Basin, 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, requiring further assessment are presented in Table B-14-4.

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

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<tr>
<th>Site code</th>
<th>SACs and SPAs listed</th>
<th>Within UoM</th>
<th>Distance (km)</th>
<th>FWPM</th>
<th>GWDTE</th>
<th>GW connected</th>
<th>SW connected</th>
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<td>Knockalongy And Knockachree Cliffs SAC</td>
<td>Required</td>
<td>Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IE0001673</td>
<td>Lough Arrow SAC</td>
<td>Required</td>
<td>Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts</td>
<td></td>
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</tr>
<tr>
<td>IE0004050</td>
<td>Lough Arrow SPA</td>
<td>Required</td>
<td>Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>IE0001976</td>
<td>Lough Gill SAC</td>
<td>Required</td>
<td>Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>IE0002006</td>
<td>Ox Mountains Bogs SAC</td>
<td>Required</td>
<td>Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>IE0004187</td>
<td>Sligo/Leitrim Uplands SPA</td>
<td>Required</td>
<td>Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts</td>
<td></td>
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</tr>
<tr>
<td>IE0001680</td>
<td>Streedagh Point Dunes SAC</td>
<td>Required</td>
<td>Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IE0000636</td>
<td>Templehouse And Cloonacleigha Loughs SAC</td>
<td>Required</td>
<td>Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>IE0000637</td>
<td>Turloughmore (Sligo) SAC</td>
<td>Required</td>
<td>Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>IE0000638</td>
<td>Union Wood SAC</td>
<td>Required</td>
<td>Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IE0001898</td>
<td>Unshin River SAC</td>
<td>Required</td>
<td>Pathways and / or sensitive ecological receptors present - At risk from potentially significant impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IE0004135</td>
<td>Ardboline Island and Horse Island SPA</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IE0000592</td>
<td>Bellanagare Bog SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IE0004105</td>
<td>Bellanagare Bog SPA</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>IE0000595</td>
<td>Callow Bog SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>IE0000614</td>
<td>Cloonshanville Bog SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>IE0000979</td>
<td>Corratirrim SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
<td></td>
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</tr>
<tr>
<td>IE0000604</td>
<td>Derrinea Bog SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
### B.5.1 Qualifying Interests

The qualifying interests for the Natura 2000 sites that were screened in are provided in Appendix B.14. Designated habitat types and species within the screened in SACs and SPAs have the potential to be affected by the implementation of the proposed Plan.

<table>
<thead>
<tr>
<th>Code</th>
<th>Site Description</th>
<th>Status</th>
<th>Impact Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE0004151</td>
<td>Donegal Bay SPA</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE0002303</td>
<td>Dunmuckrum Turloughs SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE0004115</td>
<td>Inishduff SPA</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE000458</td>
<td>Killala Bay/Moy Estuary SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE0004036</td>
<td>Killala Bay/Moy Estuary SPA</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE000516</td>
<td>Lackan Saltmarsh And Kilcummin Head SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE000297</td>
<td>Lough Corrib SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE000163</td>
<td>Lough Eske and Ardnamona Wood SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE00048</td>
<td>Lough Gara SPA</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE000633</td>
<td>Lough Hoe Bog SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE000428</td>
<td>Lough Melvin SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE000634</td>
<td>Lough Nabrickkeagh Bog SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE002144</td>
<td>Newport River SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE002298</td>
<td>River Moy SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE000191</td>
<td>St. John’s Point SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE002354</td>
<td>Tullaghanrock Bog SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
<tr>
<td>IE000179</td>
<td>West of Ardara/Maas Road SAC</td>
<td>Not Required</td>
<td>Outside UoM and no pathways present - not at risk from potentially significant impacts</td>
</tr>
</tbody>
</table>
**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 water bird 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 water birds that utilise it.

The conservation objectives were considered when carrying out the AA screening process for the proposed arterial drainage maintenance programme that may potentially impact on Natura 2000 sites.

The conservation objectives were considered when carrying out the AA screening process for the proposed arterial drainage maintenance programme 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 Plan, which in turn is informed by the current spatial planning in the towns and counties of the River Basin. The Western CFRAM proposed activities, and hence the River Basin 35 Plan, 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.

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 Johnston 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 UoM35. a brief description their potential cumulative impacts with the Plan.

<table>
<thead>
<tr>
<th>Plans and Policies</th>
<th>Description</th>
<th>Potential cumulative impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sligo County Development Plan 2017-2023</td>
<td>Sets out a strategy for the sustainable development and economic growth of County Sligo. The plan includes the sustainable use of natural resources and the conservation of environmental quality in its strategic goals. The plan aims to protect water quality within the County.</td>
<td>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.</td>
</tr>
<tr>
<td>Actions for Biodiversity 2011-2016, Ireland's National Biodiversity Plan</td>
<td>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.</td>
<td>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 considered 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.</td>
</tr>
<tr>
<td>County Sligo Draft Biodiversity Action Plan</td>
<td>Aims to promote, protect and enhance biodiversity and key habitats and species within Co. Sligo.</td>
<td>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.</td>
</tr>
<tr>
<td>National Peatland Strategy</td>
<td>Outlines principles and actions for the conservation and management of Ireland’s peatlands.</td>
<td>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 31 must be screened for in-combination and interactive</td>
</tr>
<tr>
<td>Plans and Policies</td>
<td>Description</td>
<td>Potential cumulative impacts</td>
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</tr>
<tr>
<td><strong>Forestry Programme 2014-2020: Ireland</strong></td>
<td>Aims to develop a competitive and sustainable forest sector through the implementation of measures, in particular afforestation, woodland creation and the prevention and restoration of damage to forests.</td>
<td>Forestry Programme - Interaction between land cover, land use and management, drainage maintenance and flood risk. NFRM approaches consider hydrological processes across a 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.</td>
</tr>
<tr>
<td><strong>River Basin Management Plan (RBMP) for the Western River Basin District in Ireland (2009-2015)</strong></td>
<td>The Western RMBP has been produced in accordance with the requirements of the WFD and outlines aims and objectives for achieving these within the Western RBD.</td>
<td>The plan aims to achieve good status for 74% of rivers by 2015, with 100% compliance to be achieved by 2027. Actions that may arise as a result of the RBMP and will be put in place to achieve good status will be considered 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.</td>
</tr>
<tr>
<td><strong>Garavogue Water Management Unit Action Plan</strong></td>
<td>Details the pressures, risks and programme of actions for the Garavogue Water Management Unit (WMU). The main pressures and risks to the WMU are nutrient enrichment, point source discharges from municipal and industrial discharges, quarries, landfills, agriculture, on-site domestic treatment systems, forestry, dangerous substances, morphology and abstractions. Of the 66 rivers in this WMU 70% are at High or Good status, just under 30% are at Moderate to Poor status. Out of the 10 lakes assessed within the WMU one is at High status, 3 at Good status, 5 at Moderate status and one at Poor status.</td>
<td>The proposed Plan should not result in the addition of nutrients to the system. However, the maintenance of channels could impact the aim regarding 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 effects to Natura 2000 sites are expected.</td>
</tr>
</tbody>
</table>
## Plans and Policies

<table>
<thead>
<tr>
<th>Description</th>
<th>Potential cumulative impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owenmore Water Management Unit Action Plan</strong></td>
<td>The proposed Plan should not result in the addition of nutrients to the system. However, the maintenance of channels could impact the aim regarding 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 effects to Natura 2000 sites are expected.</td>
</tr>
<tr>
<td>Details the pressures, risks and programme of actions for the Owenmore Water Management Unit (WMU). The main pressures and risks to the WMU are nutrient enrichment, point source discharges from municipal and industrial discharges, quarries, landfills, mine, agriculture, on-site domestic treatment systems, forestry, dangerous substances, morphology and abstractions. The majority of the river water bodies are at High (20) or Good (59) status with some river water bodies, such as the main channel of the Owenmore and upper reaches of the Unshin River, at Moderate (11) or Poor (10) status. For the 8 lakes within the WMU 4 are at Moderate status and 4 are at Good status.</td>
<td></td>
</tr>
<tr>
<td><strong>Groundwater Protection Schemes</strong></td>
<td>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. Assessment at a project level will need to be carried out to determine impact interactions and cumulative impacts that may occur as a result of measures. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.</td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td><strong>Water Services Strategic Plan 2015. (Irish Water).</strong></td>
<td>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, Addressing 6 key themes, the most relevant being the effective management of wastewater, and the protection and enhancement of the environment.</td>
</tr>
</tbody>
</table>
Plans and Policies | Description | Potential cumulative impacts
---|---|---
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 scheme, rewarding farmers for carrying out environmentally sound practices that meet the criteria set by the scheme. | 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. Maintenance that will occur as part of these schemes will need to be considered at a project level to ensure that the objectives of the argi-schemes are not compromised. 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 Food Harvest 2020 and Food Wise 2025 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 further assessment. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected at this level.

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 | The National Rural Development Programme 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 the National Rural Development Programme 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
<table>
<thead>
<tr>
<th>Plans and Policies</th>
<th>Description</th>
<th>Potential cumulative impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plans and Policies</td>
<td>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.</td>
<td>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 further assessment. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.</td>
</tr>
<tr>
<td>Freshwater Pearl Mussel Sub-Basin Management Plans</td>
<td>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.</td>
<td>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 further assessment 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 FRMP 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.</td>
</tr>
<tr>
<td>Environmental River Enhancement Programme (EREP)</td>
<td>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.</td>
<td>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.</td>
</tr>
<tr>
<td>Western River Basin District Eel Management Plan and National Report for Ireland on Eel Stock Recovery Plan (2008)</td>
<td>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</td>
<td>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.</td>
</tr>
<tr>
<td>Plans and Policies</td>
<td>Description</td>
<td>Potential cumulative impacts</td>
</tr>
<tr>
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<tr>
<td>development of Eel Management Plans in river basin districts.</td>
<td>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 assessed further to determine cumulative impacts with this Plan 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.</td>
<td></td>
</tr>
<tr>
<td>Shellfish Water Action Programmes</td>
<td>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.</td>
<td>There are currently various Shellfish Waters with Shellfish Action Programmes in Ireland. Any proposed CFREAM 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 assessed further 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.</td>
</tr>
<tr>
<td>Coillte District Strategic Plans:</td>
<td>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 further assessment. Project level assessment will ensure that cumulative impacts are addressed and therefore, no negative in-combination effects to Natura 2000 sites are expected.</td>
<td></td>
</tr>
<tr>
<td>Turf-cutting: Industrial scale and other</td>
<td>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 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.</td>
<td></td>
</tr>
</tbody>
</table>
B.6 Screening Conclusions and Recommendations

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-14-4 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 pressures upon designated features as a result of actions that will take place in the implementation of these plans, 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 Basins Plan and the plans and policies assessed.

Given the presence of pathways and the potential impacts posed by the proposed Plan on the 36 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.
B.7 Stage 2 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 35 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.

However, flood risk management measures at an AFA level are viable within this River Basin and have been proposed for Coolaney and Rathbraghan. Therefore, given the more localised nature of the potentially viable flood relief works, the potential significant effects on Natura 2000 sites within the vicinity of the potential works will be considered in Section B.8 below.

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.

B.7.2 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 dependant on the final locations and detailed design of the proposed measures.

Mitigation measures are detailed in Section B.10 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.
B.7.3 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 (Natura 2000 sites) 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 Natura 2000 sites

<table>
<thead>
<tr>
<th>Species</th>
<th>Natura 2000 sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arctic Tern</td>
<td>Inishmurray SPA</td>
</tr>
<tr>
<td>Atlantic salmon</td>
<td>Lough Gill SAC</td>
</tr>
<tr>
<td></td>
<td>Unshin River SAC</td>
</tr>
<tr>
<td>Barnacle Goose</td>
<td>Ballintemple and Ballygiligan SPA</td>
</tr>
<tr>
<td></td>
<td>Inishmurray SPA</td>
</tr>
<tr>
<td>Bar-tailed Godwit</td>
<td>Ballysadare Bay SPA</td>
</tr>
<tr>
<td></td>
<td>Drumcliff Bay SPA</td>
</tr>
<tr>
<td>Brook lamprey</td>
<td>Lough Gill SAC</td>
</tr>
<tr>
<td>Chough</td>
<td>Sligo/Leitrim Uplands SPA</td>
</tr>
<tr>
<td>Dunlin</td>
<td>Ballysadare Bay SPA</td>
</tr>
<tr>
<td>Geyer's whorl snail</td>
<td>Ben Bulben, Gleniff and Glenade Complex SAC</td>
</tr>
<tr>
<td></td>
<td>Ox Mountains Bogs SAC</td>
</tr>
<tr>
<td>Grey Plover</td>
<td>Ballysadare Bay SPA</td>
</tr>
<tr>
<td>Harbour seal</td>
<td>Ballysadare Bay SAC</td>
</tr>
<tr>
<td></td>
<td>Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC</td>
</tr>
<tr>
<td>Herring Gull</td>
<td>Inishmurray SPA</td>
</tr>
<tr>
<td>Killarney Fern</td>
<td>Knockalongy and Knockachree Cliffs SAC</td>
</tr>
<tr>
<td>Light-bellied Brent Goose</td>
<td>Ballysadare Bay SPA</td>
</tr>
<tr>
<td></td>
<td>Cummeen Strand SPA</td>
</tr>
<tr>
<td>Little Grebe</td>
<td>Lough Arrow SPA</td>
</tr>
<tr>
<td>Marsh fritillary</td>
<td>Bricklieve Mountains &amp; Keishcorran SAC</td>
</tr>
<tr>
<td></td>
<td>Bunduff Lough and Machair/Trawalua/Mullaghamore SAC</td>
</tr>
<tr>
<td>Marsh saxifrage</td>
<td>Ox Mountains Bogs SAC</td>
</tr>
<tr>
<td>Narrow-mouthed whorl snail</td>
<td>Ballysadare Bay SAC</td>
</tr>
<tr>
<td></td>
<td>Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC</td>
</tr>
<tr>
<td></td>
<td>Streedagh Point Dunes SAC</td>
</tr>
<tr>
<td>Otter</td>
<td>Ben Bulben, Gleniff and Glenade Complex SAC</td>
</tr>
<tr>
<td></td>
<td>Lough Gill SAC</td>
</tr>
<tr>
<td></td>
<td>Unshin River SAC</td>
</tr>
<tr>
<td>Oystercatcher</td>
<td>Cummeen Strand SPA</td>
</tr>
<tr>
<td>Peregrine</td>
<td>Sligo/Leitrim Uplands SPA</td>
</tr>
<tr>
<td>Petalwort</td>
<td>Bunduff Lough and Machair/Trawalua/Mullaghamore SAC</td>
</tr>
<tr>
<td>Redshank</td>
<td>Ballysadare Bay SPA</td>
</tr>
<tr>
<td></td>
<td>Cummeen Strand SPA</td>
</tr>
<tr>
<td>River lamprey</td>
<td>Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC</td>
</tr>
<tr>
<td></td>
<td>Lough Gill SAC</td>
</tr>
<tr>
<td>Sanderling</td>
<td>Drumcliff Bay SPA</td>
</tr>
<tr>
<td>Sea lamprey</td>
<td>Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC</td>
</tr>
<tr>
<td></td>
<td>Lough Gill SAC</td>
</tr>
<tr>
<td>Shag</td>
<td>Inishmurray SPA</td>
</tr>
<tr>
<td>Slender green feather-moss</td>
<td>Cuilcagh - Anierin Uplands SAC</td>
</tr>
<tr>
<td>Slender naiad</td>
<td>Glenade Lough SAC</td>
</tr>
<tr>
<td>Tufted Duck</td>
<td>Lough Arrow SPA</td>
</tr>
<tr>
<td>White-clawed Crayfish</td>
<td>Bricklieve Mountains &amp; Keishcorran SAC</td>
</tr>
<tr>
<td></td>
<td>Glenade Lough SAC</td>
</tr>
<tr>
<td></td>
<td>Lough Gill SAC</td>
</tr>
</tbody>
</table>
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 dependant on the final locations and detailed design of the proposed measures.

Mitigation measures are detailed in Section B.10 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.

B.7.4 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 or 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 dependant on the final locations and detailed design of the proposed measures.

Mitigation measures are detailed in Section B.10 to ensure that fragmentation will not adversely affect the integrity of a Natura 2000 site due to the implementation of the proposed Plan.

B.7.5 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.

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 dependant on the final locations and detailed design of the proposed measures.

Mitigation measures are detailed in Section B.10 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.

B.7.6 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 dependant on the final locations and detailed design of the proposed measures.

Mitigation measures are detailed in Section B.10 to ensure that changes to 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 **AFA Measures – potential significant effects**

As a location has been determined for a potential flood relief works within Coolaney and Rathbraghan, the potential impacts of the works are considered in relation to the screened in Natura 2000 sites that are within 5km of the potential scheme and have hydrological connectivity to the AFA area. Ben Bulben, Gleniff and Glenade Complex SAC (IE0000623) is located within 5 km of Rathbraghan AFA but is not hydrologically connected and therefore, is not considered further for significant impacts. As the potentially viable flood relief works are not at final design and changes may occur, all qualifying interests of the screened in Natura 2000 sites must be considered, although at project level not all qualifying interests may be impacted by the potential works. A full list of qualifying interests for these Natura 2000 sites are in Table B-14-7 and Table B-14-8.

Table B-14-7: Screened in Natura 2000 sites for AFA measures at Coolaney

<table>
<thead>
<tr>
<th>Site Name (Code)</th>
<th>Qualifying Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ballysadare Bay SAC (IE0000622)</td>
<td>Mudflats and sandflats not covered by seawater at low tide</td>
</tr>
<tr>
<td></td>
<td>Embryonic shifting dunes</td>
</tr>
<tr>
<td></td>
<td>Shifting dunes along the shoreline with Ammophila arenaria (white dunes)</td>
</tr>
<tr>
<td></td>
<td>Fixed coastal dunes with herbaceous vegetation (grey dunes)</td>
</tr>
<tr>
<td></td>
<td>Humid dune slacks</td>
</tr>
<tr>
<td>Templehouse and Cloonacleigha Loughs SAC (IE0000636)</td>
<td>Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.</td>
</tr>
<tr>
<td></td>
<td>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation</td>
</tr>
<tr>
<td>Unshin River SAC (IE0001898)</td>
<td>Otter Lutra lutra</td>
</tr>
<tr>
<td></td>
<td>Atlantic salmon Salmo salar</td>
</tr>
<tr>
<td></td>
<td>Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Paradion, Alnion incanae, Salicion albae)</td>
</tr>
<tr>
<td></td>
<td>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation</td>
</tr>
<tr>
<td></td>
<td>Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)</td>
</tr>
<tr>
<td></td>
<td>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinia caeruleae)</td>
</tr>
</tbody>
</table>
Ballysadare Bay SPA (IE0004129) | Light-bellied Brent Goose *Branta bernicla hrota*  
| Grey Plover *Pluvialis squatarola*  
| Dunlin *Calidris alpina*  
| Bar-tailed Godwit *Limosa lapponica*  
| Redshank *Tringa totanus*  
| Wetland and Waterbirds

### Table B-14-8: Screened in Natura 2000 sites for AFA measures at Rathbraghan

<table>
<thead>
<tr>
<th>Site Name (Code)</th>
<th>Qualifying Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ben Bulben, Gleniff and Glenade Complex SAC (IE0000623)</td>
<td>Not hydrologically connected</td>
</tr>
</tbody>
</table>
| Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (IE0000627) | River lamprey *Lampetra fluviatilis*  
| Sea lamprey *Petromyzon marinus*  
| Harbour seal *Phoca vitulina*  
| Narrow-mouthed whorl snail *Vertigo angustior*  
| Estuaries: Mudflats and sandflats not covered by seawater at low tide  
| Embryonic shifting dunes  
| Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)  
| Fixed coastal dunes with herbaceous vegetation (grey dunes)  
| *Juniperus communis* formations on heaths or calcareous grasslands  
| Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites*)  
| Petrifying springs with tufa formation (*Cratoneurion*) |
| Lough Gill SAC (IE0001976) | White-clawed Crayfish *Austropotamobius pallipes*  
| River lamprey *Lampetra fluviatilis*  
| Brook lamprey *Lampetra planeri*  
| Otter *Lutra lutra*  
| Sea lamprey *Petromyzon marinus*  
| Atlantic salmon *Salmo salar*  
| Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)  
| Natural eutrophic lakes with *Magnopatamion* or Hydrocharition - type vegetation  
| Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites*)  
| Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles |
| Drumcliff Bay SPA (IE0004013) | Sanderling *Calidris alba*  
| Bar-tailed Godwit *Limosa laponica* |
| Cummeen Strand SPA (IE0004035) | Light-bellied Brent Goose *Branta bernicla hrota*  
| Oystercatcher *Haematopus ostralegus*  
| Redshank *Tringa totanus* |
| Sligo/Leitrim Uplands SPA (IE0004187) | Peregrine *Falco peregrinus*  
| Chough *Pyrrhocorax pyrrhocorax* |

### B.8.1 Loss or reduction of habitat area

Significant direct habitat loss may occur as a result of potential AFA measures that may be implemented as part of the potential flood relief works at Coolaney and Rathbraghan. This could include the complete or partial removal or reduction in habitat area of key habitats present that are designated, as listed in Table B-14-7 and Table B-14-8, due to their specific nature e.g. Mudflats...
and sandflats not covered by sea water at low tide at Sligo Bay or habitats that are important for designated species e.g. wetland for waterbirds at Ballysadare Bay SPA.

Direct habitat loss that may occur through the redirection of foot or vehicular traffic, causing trampling of previously undisturbed habitats and/or through the erection of hard structures such as walls or embankments causing a total habitat loss e.g. as may occur during the creation of a diversion channel while creating the flood embankment at Coolaney to potential otter habitat on the Owenboy River. Direct habitat loss can also occur through significant reduction in habitat quality, causing an overall loss of habitat or a reduction in the suitable habitat area available for protected species. It could occur during construction if mitigation measures are not put in place to prevent contamination of water courses, or through the introduction and/or spread of non-native invasive species including Japanese knotweed, which has been identified as occurring at the mouth of the Willsborough (Stream) in Sligo harbour.

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 that will involve the development of physical structures could result in direct habitat loss with long term consequences e.g. if an otter holt was destroyed. Permanent structures, if sited inappropriately, could be located within sensitive and designated habitats, resulting in loss of that habitat e.g. wetlands at Sligo Harbour. Changes to normal physical processes through the construction of hard structures including flood walls and embankments, may impact natural erosion/ deposition processes, increase or decrease water table and result in a loss or reduction or habitat area e.g. preventing embryonic shifting dues from moving across a shoreline.

Indirect habitat loss may also occur through disruption of hydrological links to a designated site that supports surface or ground water dependant habitats. Increased siltation caused by changes to erosion as a result of the building of an embankment wall and cumulative impacts with other projects or plans, could build up causing mudbanks to develop. Physical changes such as these could impact upon the hydrological regime of Petrifying springs with tufa formation (Cratoneurion) at Ballincar or peatland and wetland habitats by the creation of physical barriers preventing surface and ground water flows.

Mitigation measures are detailed in Section B.10 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 at the available level of detail. The implementation of AFA works will require further assessment at a project level, at which stage more detailed mitigation measures can be designed as appropriate, using details determined in the final design.

### B.8.2 Disturbance to Key species

**Key species as listed under the Habitats and Birds Directive, that may be present at Coolaney are listed in Table B-14-7and include Otter, Salmon, Light-bellied Brent Goose, Grey Plover, Dublin, Bar-tailed Godwit and Redshank. These species can be impacted through noise, vibrational and visual disturbance.**

**Key species as listed under the Habitats and Birds Directive, that may be present at Rathbraghan are listed in Table B-14-8 and include Lamprey, Narrow-mouthed Whorl Snail, White-clawed Crayfish, Salmon, Otter, Sanderling, Bar-tailed Godwit, Brent Goose, Chough, Redshank and Oystercatcher. Several other protected species including the Marsh Fritillary Butterfly (Euphydra aurina), protected under the Habitats Directive and Rough Poppy (Papaver hybridum), protected under the Flora Protection Order 1999, are present at Cumeen Strand SAC/Drumcliff Bay (Sligo Bay) SAC. These species can also be impacted through noise, vibrational and visual disturbance.**

**Key vegetative species, e.g. Ash and Alder of Alluvial forests, are not likely to be impacted by noise or visual disturbance but may require assessment for significance of impact through vibrational disturbance at a more detailed project level.**

Wide-distributed species can be impacted from disturbance throughout their normal foraging, commuting and breeding range e.g. Light-bellied Brent Goose, Otter or Salmon. Species such as Narrow-mouthed Whorl Snail, are more localised in their range and distribution and as a result, may be more sensitive to local disturbance. Disturbance can occur during construction of measures or afterwards during the operational phase. It can affect animal behaviour, changing normal foraging and commuting routes and causing breeding species to abandon their young. All potential mitigation measures that may alter or increase footfall in areas where key species may
be present must be considered for impact and mitigated against. Visual impacts can arise from the presence of humans, equipment, structures and temporary or permanent lighting around the Willsborough Stream or Owenbeg River.

Seasonality of works will have to be taken into consideration as some key species may only be present, and therefore susceptible to disturbance, during certain seasons i.e. wintering and migratory birds at Sligo Bay. Seasonality of works can increase or decrease the significance of potential impacts so that works occurring outside of the sensitive seasonal period may have no impact but during the key season may have significant negative impact e.g. instream works on the Owenbeg within the Unshin River SAC, during October may occur while Salmon are spawning and could incur direct mortalities.

Mitigation measures are detailed in Section B.10 to ensure the potential for disturbance to key species will not adversely affect the integrity of a Natura 2000 site due to the implementation of the proposed Plan at the available level of detail during construction and operational phases. The implementation of AFA works will require further assessment at a project level, at which stage more detailed mitigation measures can be designed as appropriate, using details determined in the final design.

B.8.3 Habitat or species fragmentation

Breaking up of habitats through the destruction of wildlife corridors or disturbance, or a loss / reduction in habitat area can result in interference with ecological units fragmenting habitat and species populations. Singular habitat units may be formed and isolated species communities may suffer long term through lack of genetic exchange. Fragmentation can arise because of the direct or indirect erection of barriers to migratory movements where important corridors exist, e.g. Garavogue River leading to Lough Gill which is an important habitat for Brook lamprey, Sea Lamprey, River Lamprey and Salmon. It is a particular issue impacting linear developments and species that may utilise them e.g. salmon and otter in Lough Gill SAC.

Species and habitats such as Narrow-mouthed Whorl Snail, or Petrifying Springs with tufa formation (Cratoneurion) that are very localised in their range, require specific hydrological conditions and vegetative conditions. Obstruction of natural hydrological processes, through erection of physical structures or silting, can alter the water level of a habitat, causing it to dry out or increase in wetness levels. Altering the habitat in this way reduces it's suitability as a habitat for water dependant species and can cause fragmentation of suitable habitats.

The inappropriate implementation of flood relief measures can result in the installation of structures that may impede movement of a species and cause intensified inter-species competition. Permanent structures including flood walls and embankments may restrict movement of species or separate habitats, especially in a riverine and coastal setting. Salmon and lamprey are migratory species that require connectivity between rivers and lakes including at Lough Gill. The migration of these species could potentially be impacted by measures, including the construction of structures adjacent to rivers. Inappropriate installation of a culvert may block normal migratory routes, preventing salmon and lamprey from reaching their normal spawning grounds, reducing the opportunity for the sharing of genetic material e.g. on the Owenbeg River.

Mitigation measures are detailed in Section B.10 to ensure the potential for habitat or species fragmentation will not adversely affect the integrity of a Natura 2000 site due to the implementation of the proposed Plan at the available level of detail during construction and operational phases. The implementation of AFA works will require further assessment at a project level, at which stage more detailed mitigation measures can be designed as appropriate, using details determined in the final design.

B.8.4 Reduction in species density

The loss of suitable breeding and foraging habitat for coastal species including coastal, sea and riparian birds, either through disturbance or displacement, can cause a reduction in bird species population densities. Bird species such as Redshank or Dunlin, may leave previously suitable habitats to find alternative breeding or foraging habitat due to a reduction in successful breeding
attempts from disturbance related nest abandonment, or lack of suitable food, an indirect impact from water contamination events.

Erection of structures or alteration of hydrological networks, leading to hydromorphological changes downstream of one river can impact adjacent tributaries and could cause physical and genetic isolation of species such as White-clawed Crayfish at Lough Gill. Genetic isolation can cause a reduction in genetic diversity, and eventually may impact the density of the species nationally.

Drumcliff Bay is an important breeding area for Harbour Seal. Ballysadare Bay SAC also supports a population of Harbour Seal. Loss of breeding or foraging habitat may result in a reduction in species density of these species locally. Disturbance that may influence the movement of prey species, could result in further travel distances for foraging predators, requiring a higher calorie intake that may not be available. Inappropriate numbers of prey species through impacts to salmon could cause a reduction in species density of Harbour Seal due to an increase in unsuccessful breeding attempts from insufficient nutrition.

Mitigation measures are detailed in Section B.10 to ensure the potential for a reduction in species density will not adversely affect the integrity of a Natura 2000 site due to the implementation of the proposed Plan at the available level of detail during construction and operational phases. The implementation of AFA works will require further assessment at a project level, at which stage more detailed mitigation measures can be designed as appropriate, using details determined in the final design.

B.8.5 Changes in key indicators of conservation value

The key indicators of conservation value for the Natura sites outlined in Table B-14-7 and Table B-14-8 that are likely to be affected by the implementation of the proposed Plan include surface water and groundwater quality and quantity as these sites are hydrologically connected. Any deterioration in water quality or quantity during the construction phase or during operation could potentially result in direct or indirect adverse impacts, on a range of habitats and species that are surface water or groundwater dependant, such as Estuaries shoreline and associated habitats at Ballysadare and Sligo Bays, Owenbeg and Willisborough Rivers, Harbour Seals, Atlantic Salmon, Eurasian Otter and Freshwater Crayfish on Lough Gill. 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, including those connected through surface and groundwater.

Operational phase impacts could include newly erected flood walls interrupting groundwater flows and interacting with coastal/ riverine bodies causing changes to water table height, flow regime and flow rates. Discharges of silt laden waters or other pollutants can occur through improper management of runoff from hard structures erected as flood defence methods. During construction, discharge of silt laden runoff and pollutants such as hydrocarbons to coastal, freshwater and groundwater bodies around Sligo and Ballysadare Bay, can cause adverse impacts. Groundwater dependant terrestrial ecosystems and the habitats and species that depend on them, will be impacted by changes to water quantity and quality at both operational and construction phases. This can include water levels in wetlands and the birds that utilise these habitats at Cumeen Strand SPA, or wetland habitats supporting Narrow-mouthed Whorl Snail in Ballysadare Bay SAC and Cumeen Strand/Drumcliffe Bay (Sligo Bey) SAC. Therefore, all measures must be appropriately assessed for their suitability at a given location and all potential impacts must be considered at both construction and operational phase.

Mitigation measures are detailed in Section B.10 to ensure the potential for 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 at the available level of detail during construction and operational phases. The implementation of AFA works will require further assessment at a project level, at which stage more detailed mitigation measures can be designed as appropriate, using details determined in the final design.

B.9 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 of 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 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.10 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.10.1 Project Mitigation: Consenting Process**

As set out in Section B.9 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.10.2 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 surveys\(^5\)
• 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.

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.10.3 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.

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\(^5\) 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.

\(^6\) 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.10.4 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.11 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 35. 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.

Potentially viable flood relief works were identified for Coolaney and Rathbraghan AFAs within this River Basin, and some proposed details of physical works that may be carried out because of the Plan are available. However, the design of these works has not been finalised and may change before being implemented. While potential impacts that may occur as a result of these proposed measures have been identified, it is not possible to determine all potential impacts at this plan level without the final project details. Therefore, while this NIS considers the potential project level works, any measures that will be implemented will be required to be screened for AA 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 integrity of Natura 2000 sites, either alone or in combination with other plans, projects or policies.

B.12 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 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-14-9 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-14-9: Specific comments on the draft NIS for UoM 35

<table>
<thead>
<tr>
<th>Western CFRAM Specific Comments</th>
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<tbody>
<tr>
<td><strong>Dept. AHRRGA Responses</strong></td>
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<tr>
<td><strong>ID</strong></td>
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<td><strong>Description</strong></td>
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<td><strong>Action</strong></td>
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<tr>
<td>SUB-16-459 (UoM 35)</td>
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<tr>
<td>SEA Appendix B, Section B.5.5 Ushin River SAC, Potential risk to site resulting from FRMP. It appears that the first sentence within this paragraph was included in error and that it actually refers to section B.5.3 Cummeen Strand/Drumcliff Bay SAC. ‘The proposed preferred option is located on an un-named tributary of the Willsborough Stream, which discharges into the Cummeen Strand/Drumcliff Bay SAC. The preferred option is located on the southern river bank of the Owenboy River and immediately adjacent to the Ushin River SAC. The preferred option has the potential to cause damage and disturbance to designated habitats, and species and their supporting habitats, during construction via surface water and land and air pathways.’</td>
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<tr>
<td>This section of the NIS have been updated.</td>
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<td>SEA Appendix B.5.5 Ushin River SAC p B31. As with other draft Plans for different UoMs the effects or potential effects of sediment mobilisation is discussed. It would be useful to have details of the expected distance of travel for the type of sediment that could be released into the water as a result of proposed measures in order that potential impacts can be adequately assessed.</td>
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<tr>
<td>Sections of the NIS have been updated, however without specific details of the proposed measures specific quantification is not possible.</td>
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<td>Fresh Water Pearl Mussel (FWPM). Part of the catchment has been identified as a Margaritifera Sensitive area (Fig 7-8 p80). (border of Counties Sligo and Mayo around Easky Lough and Easky River) Whilst none of the planned works are in this area (works are planned downstream at Collaney AFA, detailed Appendix B-8). These works are planned to be adjacent to, rather than within the channel, however they still need to be adequately detailed and assessed and appropriate mitigation identified. Within the NIR no Natura sites are identified where FWPM are a QI. With regard to FWPM in the wider catchment no assessment, survey or mitigation is discussed and the only mention found is a commentary on the species on p76. In summary, the report mentions FWPM as a concern within the SEA Objectives (p100 table 9-1) but does not deal with the objective in the text.</td>
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<td>Details provided in section B-4-1.</td>
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B.13 References


### Appendix A: Natura 2000 sites screened in and their qualifying interests

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<th>Site code</th>
<th>Site name</th>
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<tr>
<td>IE0000492</td>
<td>Doocastle Turlough SAC</td>
<td>Turloughs</td>
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<td>IE0000497</td>
<td>Flughany Bog SAC</td>
<td>Active raised bogs</td>
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<td></td>
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<td>Degraded raised bogs still capable of natural regeneration</td>
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<td>Depressions on peat substrates of the Rhynchosporion</td>
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<td>IE0000584</td>
<td>Cuilcagh - Anierin Uplands SAC</td>
<td>Slender green feather-moss (<em>Drepanocladius vernicosus</em>)</td>
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<td>Alpine and Boreal heaths</td>
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<td>Blanket bogs (* if active bog)</td>
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<td></td>
<td>European dry heaths</td>
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<td>Natural dystrophic lakes and ponds</td>
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<td>Northern Atlantic wet heaths with <em>Erica tetralix</em></td>
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<td>Oligotrophic waters containing very few minerals of sandy plains (<em>Littorelletalia uniflorae</em>)</td>
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<td>Petrifying springs with tufa formation (<em>Cratoneurion</em>)</td>
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<td>Siliceous rocky slopes with chasmophytic vegetation</td>
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<td>Siliceous scree of the montane to snow levels (<em>Androsacetalia alpinae</em> and <em>Galeopsietalia ladani</em>)</td>
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<td>Species-rich <em>Nardus</em> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)</td>
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<td></td>
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<td>Transition mires and quaking bogs</td>
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<td>IE0000622</td>
<td>Ballysadare Bay SAC</td>
<td>Harbor seal (<em>Phoca vitulina</em>)</td>
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<td>Narrow-mouthed whorl snail (<em>Vertigo angustior</em>)</td>
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<td>Embryonic shifting dunes</td>
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<td>Fixed coastal dunes with herbaceous vegetation (grey dunes)</td>
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<td>Humid dune slacks</td>
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<td>Mudflats and sandflats not covered by seawater at low tide</td>
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<td>Shifting dunes along the shoreline with <em>Ammophila arenaria</em> (white dunes)</td>
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<td>IE0000623</td>
<td>Ben Bulben, Gleniff and Glenade Complex SAC</td>
<td>Geyer’s whorl snail (<em>Vertigo geyeri</em>)</td>
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<td></td>
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<td>Otter (<em>Lutra lutra</em>)</td>
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<td>Alkaline fens</td>
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<td>Alpine and Boreal heaths</td>
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<td>Calcareous and calcshist screes of the montane to alpine levels (<em>Thlaspietea rotundifolii</em>)</td>
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<td>Calcareous rocky slopes with chasmophytic vegetation</td>
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<td>European dry heaths</td>
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<td>Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels <em>Juniperus communis</em> formations on heaths or calcareous grasslands</td>
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<td>Northern Atlantic wet heaths with <em>Erica tetralix</em></td>
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<td>Petrifying springs with tufa formation (<em>Cratoneurion</em>)</td>
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<td>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<em>Festuco-Brometalia</em>) (* important orchid sites)</td>
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<td>Site code</td>
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<td>Qualifying Interests</td>
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<td>IE0000625</td>
<td>Bunduff Lough and Machair/Trawalua/Mullaghmore SAC</td>
<td>Siliceous scree of the montane to snow levels (<em>Androsacetalia alpinae and Galeopsietalia iadani</em>)&lt;br&gt;Species-rich <em>Nardus</em> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)&lt;br&gt;Transition mires and quaking bogs&lt;br&gt;Water courses of plain to montane levels with the Ranunculion fluitantis and <em>Callitricho-Batrachion</em> vegetation&lt;br&gt;Marsh fritillary (<em>Euphydryas aurinia</em>)&lt;br&gt;Petalwort (<em>Petalophyllum ralfsii</em>)&lt;br&gt;Alkaline fens&lt;br&gt;Fixed coastal dunes with herbaceous vegetation (grey dunes)&lt;br&gt;<em>Juniperus communis</em> formations on heaths or calcareous grasslands&lt;br&gt;Large shallow inlets and bays&lt;br&gt;Machairs (* in Ireland)&lt;br&gt;Mudflats and sandflats not covered by seawater at low tide&lt;br&gt;Reefs&lt;br&gt;Semi-natural dry grasslands and scrubland facies on calcareous substrates (<em>Festuco-Brometalia</em>) (* important orchid sites*)&lt;br&gt;Shifting dunes along the shoreline with <em>Ammophila arenaria</em> (white dunes)&lt;br&gt;Harbor seal (<em>Phoca vitulina</em>)&lt;br&gt;Narrow-mouthed whorl snail (<em>Vertigo angustior</em>)&lt;br&gt;River lamprey (<em>Lampetra fluviatilis</em>)&lt;br&gt;Sea lamprey (<em>Petromyzon marinus</em>)&lt;br&gt;Embryonic shifting dunes&lt;br&gt;Fixed coastal dunes with herbaceous vegetation (grey dunes)&lt;br&gt;<em>Juniperus communis</em> formations on heaths or calcareous grasslands&lt;br&gt;Mudflats and sandflats not covered by seawater at low tide&lt;br&gt;Petrifying springs with tufa formation (<em>Cratoneurion</em>)&lt;br&gt;Semi-natural dry grasslands and scrubland facies on calcareous substrates (<em>Festuco-Brometalia</em>) (* important orchid sites*)&lt;br&gt;Shifting dunes along the shoreline with <em>Ammophila arenaria</em> (white dunes)&lt;br&gt;Hard oligo-mesotrophic waters with benthic vegetation of <em>Chara</em> spp.&lt;br&gt;Water courses of plain to montane levels with the Ranunculion fluitantis and <em>Callitricho-Batrachion</em> vegetation&lt;br&gt;Turloughs&lt;br&gt;Old sessile oak woods with <em>Ilex</em> and <em>Blechnum</em> in the British Isles&lt;br&gt;Alpine and Boreal heaths&lt;br&gt;Blanket bogs (* if active bog*)&lt;br&gt;Calcareaous and calcshist scree of the montane to alpine levels (<em>Thlaspietea rotundifolii</em>)&lt;br&gt;Calcareaous rocky slopes with chasmophytic vegetation&lt;br&gt;European dry heaths</td>
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| IE0001656 | Bricklieve Mountains & Keishcorran SAC        | Northern Atlantic wet heaths with *Erica tetralix*  
Petrifying springs with tufa formation (*Cratoneurion*)  
Marsh fritillary (*Euphydryas aurinia*)  
White-clawed Crayfish (*Austropotamobius pallipes*)  
Calcareaous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*)  
Lowland hay meadows (*Alopecurietea pratensis, Sanguisorbietea officinalis*)  
Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites*)  
Turloughs                                                                                                                                 |
| IE0001669 | Knockalongy and Knockachree Cliffs SAC         | Killarney Fern (*Trichomanes speciosum*)                                                                                                                                                                                                                                                                                                            |
| IE0001673 | Lough Arrow SAC                                | Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.                                                                                                                                                                                                                                                                                 |
| IE0001680 | Streedagh Point Dunes SAC                      | Narrow-mouthed whorl snail (*Vertigo angustior*)  
Atlantic salt meadows (*Glaucopuccinellietalia maritimae*)  
Fixed coastal dunes with herbaceous vegetation (grey dunes)  
Mediterranean salt meadows (*Juncetalia maritimi*)  
Mudflats and sandflats not covered by seawater at low tide  
Perennial vegetation of stony banks  
Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)                                                                                                                                                                                                                         |
| IE0001898 | Unshin River SAC                               | Atlantic salmon (*Salmo salar*)  
Otter (*Lutra lutra*)  
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)  
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)  
Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites*)  
Water courses of plain to montane levels with the Ranunculion fluitantis and *Callitricho-Batrachion* vegetation                                                                                                                                                                                                 |
| IE0001899 | Cloonakillina Lough SAC                        | Transition mires and quaking bogs                                                                                                                                                                                                                                                                                                                        |
| IE0001919 | Glenade Lough SAC                              | Slender naiad (*Najas flexilis*)  
White-clawed Crayfish (*Austropotamobius pallipes*)  
Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation                                                                                                                                                                                                     |
| IE0001976 | Lough Gill SAC                                 | Atlantic salmon (*Salmo salar*)  
Brook lamprey (*Lampetra planeri*)  
Otter (*Lutra lutra*)  
River lamprey (*Lampetra fluviatilis*)  
Sea lamprey (*Petromyzon marinus*)  
White-clawed Crayfish (*Austropotamobius pallipes*)  
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)  
Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation  
Old sessile oak woods with flex and *Blechnum* in the British Isles |
<table>
<thead>
<tr>
<th>Site code</th>
<th>Site name</th>
<th>Qualifying Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE0002006</td>
<td>Ox Mountains Bogs SAC</td>
<td>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<em>Festuco-Brometalia</em>) (<em>important orchid sites</em>) Geyer’s whorl snail (<em>Vertigo geyeri</em>) Marsh saxifrage (<em>Saxifraga hirculus</em>) Blanket bogs (<em>if active bog</em>) Depressions on peat substrates of the <em>Rhynchosporion</em> European dry heaths Natural dystrophic lakes and ponds Northern Atlantic wet heaths with <em>Erica tetralix</em> Oligotrophic waters containing very few minerals of sandy plains (<em>Littorelletalia uniflorae</em>) Transition mires and quaking bogs</td>
</tr>
<tr>
<td>IE0002032</td>
<td>Boleybrack Mountain SAC</td>
<td>Blanket bogs (<em>if active bog</em>) European dry heaths Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<em>Molinion caeruleae</em>) Natural dystrophic lakes and ponds Northern Atlantic wet heaths with <em>Erica tetralix</em></td>
</tr>
<tr>
<td>IE0004013</td>
<td>Drumcliff Bay SPA</td>
<td>Bar-tailed Godwit (<em>Limosa lapponica</em>) Sanderling (<em>Calidris alba</em>)</td>
</tr>
<tr>
<td>IE0004035</td>
<td>Cummeen Strand SPA</td>
<td>Light-bellied Brent Goose (<em>Branta bernicla hrota</em>) Oystercatcher (<em>Haematopus ostralegus</em>) Redshank (<em>Tringa totanus</em>)</td>
</tr>
<tr>
<td>IE0004050</td>
<td>Lough Arrow SPA</td>
<td>Little Grebe (<em>Tachybaptus ruficollis</em>) Tufted Duck (<em>Aythya fuligula</em>)</td>
</tr>
<tr>
<td>IE0004068</td>
<td>Inishmurray SPA</td>
<td>Arctic Tern (<em>Sterna paradisaea</em>) Barnacle Goose (<em>Branta leucopsis</em>) Herring Gull (<em>Larus argentatus</em>) Shag (<em>Phalacrocorax aristotelis</em>)</td>
</tr>
<tr>
<td>IE0004129</td>
<td>Ballysadare Bay SPA</td>
<td>Bar-tailed Godwit (<em>Limosa lapponica</em>) Dunlin (<em>Calidris alpina</em>) Grey Plover (<em>Pluvialis squatarola</em>) Light-bellied Brent Goose (<em>Branta bernicla hrota</em>) Redshank (<em>Tringa totanus</em>)</td>
</tr>
<tr>
<td>IE0004187</td>
<td>Sligo/Leitrim Uplands SPA</td>
<td>Chough (<em>Pyrhocorax pyrrhocorax</em>) Peregrine (<em>Falco peregrinus</em>)</td>
</tr>
<tr>
<td>IE0004234</td>
<td>Ballintemple and Ballygiligan SPA</td>
<td>Barnacle Goose (<em>Branta leucopsis</em>)</td>
</tr>
</tbody>
</table>
Appendix B: Conservation objectives of screened Natura 2000 sites
Appendix B: Conservation objectives of screened Natura 2000 sites
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*

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>001403</td>
<td>Arroo Mountain SAC</td>
</tr>
<tr>
<td>4010</td>
<td>Northern Atlantic wet heaths with <em>Erica tetralix</em></td>
</tr>
<tr>
<td>4030</td>
<td>European dry heaths</td>
</tr>
<tr>
<td>4060</td>
<td>Alpine and Boreal heaths</td>
</tr>
<tr>
<td>7130</td>
<td>Blanket bogs (* if active bog)</td>
</tr>
<tr>
<td>7220</td>
<td>Petrifying springs with tufa formation (Cratoneurion)*</td>
</tr>
<tr>
<td>8120</td>
<td>Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)</td>
</tr>
<tr>
<td>8210</td>
<td>Calcareous rocky slopes with chasmophytic vegetation</td>
</tr>
</tbody>
</table>

Please note that this SAC overlaps with Sligo/Leitrim Uplands SPA (004187). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping site as appropriate.
### NPWS Documents

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Ireland Red List no. 8: Bryophytes</td>
<td>Lockhart, N.; Hodgetts, N.; Holyoak, D.</td>
<td>Ireland Red List series, NPWS</td>
</tr>
<tr>
<td>2016</td>
<td>Arroo Mountain SAC (site code: 1403) Conservation objectives supporting document- upland habitats- V1</td>
<td>NPWS</td>
<td>Conservation objectives supporting document</td>
</tr>
</tbody>
</table>

### Other References

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>A guide to habitats in Ireland</td>
<td>Fossitt, J.A.</td>
<td>The Heritage Council, Kilkenny</td>
</tr>
<tr>
<td>2013</td>
<td>Interpretation manual of European Union habitats- Eur 28</td>
<td>European Commission- DG Environment</td>
<td>European Commission</td>
</tr>
</tbody>
</table>
## Spatial data sources

<table>
<thead>
<tr>
<th><strong>Year</strong></th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
<td>National Survey of Upland Habitats- Phase 3</td>
</tr>
<tr>
<td><strong>GIS Operations</strong></td>
<td>Habitat dataset for site clipped to SAC boundary. Relevant QI selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising</td>
</tr>
<tr>
<td><strong>Used For</strong></td>
<td>4010, 4030, 4060, 7130, 7220, 8120, 8210 (maps 3 to 7)</td>
</tr>
</tbody>
</table>
**Conservation Objectives for: Arroo Mountain SAC [001403]**

**4010 Northern Atlantic wet heaths with Erica tetralix**

To restore the favourable conservation condition of Northern Atlantic wet heaths with *Erica tetralix* in Arroo Mountain SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Arroo Mountain SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of wet heath stated by Perrin et al. (2013) is 304.4ha, covering 7.7% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995, though erosion is noted as an impact. A summary of the mapping methodology and a brief discussion of restoration potential are presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 3</td>
<td>Wet heath was recorded by Perrin et al. (2013) mainly through the southern portion of the SAC. Extensive patches occur at Rassaun and Cloghmeen. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded six different wet heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: cross-leaved heath</td>
<td>Occurrence within 20m of a representative number of 2m x 2m monitoring stops</td>
<td>Cross-leaved heath (<em>Erica tetralix</em>) present near each monitoring stop</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of positive indicator species at least 50%</td>
<td>Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). Further details can be found in the uplands supporting document.</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of <em>Cladonia</em> and <em>Sphagnum</em> species, <em>Racomitrium lanuginosum</em> and pleurocarpous mosses at least 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: ericoid species and crowberry</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of ericoid species and crowberry (<em>Empetrum nigrum</em>) at least 15%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: dwarf shrub species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of dwarf shrubs less than 75%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. <em>Campylopus introflexus</em> was recorded within this habitat by Perrin et al. (2013) but did not form extensive carpets.</td>
</tr>
<tr>
<td>Vegetation composition: native trees and shrubs</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of scattered native trees and shrubs less than 20%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
</tbody>
</table>

Campylopus introflexus was recorded within this habitat by Perrin et al. (2013) but did not form extensive carpets.
<table>
<thead>
<tr>
<th>Vegetation composition: bracken</th>
<th>Percentage cover in local vicinity of a representative number of monitoring stops</th>
<th>Cover of bracken (<em>Pteridium aquilinum</em>) less than 10%</th>
<th>Based on Perrin et al. (2014). See the uplands supporting document for further details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetation composition: soft rush</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of soft rush (<em>Juncus effusus</em>) less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: <em>Sphagnum</em> condition</td>
<td>Condition at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 10% of the <em>Sphagnum</em> cover is crushed, broken and/or pulled up</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: signs of browsing</td>
<td>Percentage at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 33% collectively of the last complete growing season’s shoots of ericoids, crowberry (<em>Empetrum nigrum</em>) and bog-myrtle (<em>Myrica gale</em>) showing signs of browsing</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: burning</td>
<td>Occurrence in local vicinity of a representative number of 2m x 2m monitoring stops</td>
<td>No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning</td>
<td>Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: drainage</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
### Conservation Objectives for: Arroo Mountain SAC [001403]

**European dry heaths**

**To restore the favourable conservation condition of European dry heaths in Arroo Mountain SAC, which is defined by the following list of attributes and targets:**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area increasing, subject to natural processes</td>
<td>Arroo Mountain SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of dry heath stated by Perrin et al. (2013) is 363.4ha, covering 9.2% of the SAC. Perrin et al. (2013) report minor obvious losses of habitat of 0.01ha since 1995. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 4</td>
<td>Dry heath was recorded by Perrin et al. (2013) throughout the SAC, with the most extensive patches at Leckanarainey on the south-western slopes. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded four different dry heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of bryophyte or non-crustose lichen species present at each monitoring stop is at least three, excluding <em>Campylopus</em> and <em>Polytrichum</em> mosses</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: number of positive indicator species</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of positive indicator species present at each monitoring stop is at least two</td>
<td>Based on Perrin et al. (2014). The list of positive indicator species for this habitat, which is composed of dwarf shrubs, is presented in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: cover of positive indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of positive indicator species at least 50% for siliceous dry heath and 50-75% for calcareous dry heath</td>
<td>Based on Perrin et al. (2014). The list of positive indicator species for this habitat, which is composed of dwarf shrubs, is presented in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: dwarf shrub composition</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Proportion of dwarf shrub cover composed collectively of bog-myrtle (<em>Myrica gale</em>), creeping willow (<em>Salix repens</em>) and western gorse (<em>Ulex gallii</em>) is less than 50%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. <em>Campylopus introflexus</em> was recorded within this habitat by Perrin et al. (2013) but did not form extensive carpets. <em>Rhododendron ponticum</em> was recorded from this habitat at Leckanarainey.</td>
</tr>
<tr>
<td>Vegetation composition: native trees and shrubs</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of scattered native trees and shrubs less than 20%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: bracken</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of bracken (<em>Pteridium aquilinum</em>) less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>---------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vegetation composition: soft rush</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of soft rush (<em>Juncus effusus</em>) less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: senescent ling</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Senescent proportion of ling (<em>Calluna vulgaris</em>) cover less than 50%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: signs of browsing</td>
<td>Percentage at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 33% collectively of the last complete growing season’s shoots of ericoids showing signs of browsing</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: burning</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>No signs of burning in sensitive areas</td>
<td>Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: growth phases of ling</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Outside sensitive areas, all growth phases of ling (<em>Calluna vulgaris</em>) should occur throughout, with at least 10% of cover in the mature phase</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
Conservation Objectives for Arroo Mountain SAC [001403]

### 4060 Alpine and Boreal heaths

To maintain the favourable conservation condition of Alpine and Boreal heaths in Arroo Mountain SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Arroo Mountain SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of Alpine and Boreal heath stated by Perrin et al. (2013) is 117.0ha, covering 2.9% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 5</td>
<td>Alpine and boreal heath was recorded by Perrin et al. (2013) on the high ground through the central ridge of the SAC and was most abundant at the highest points. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded two different alpine and boreal heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of bryophyte or non-crustose lichen species present at each monitoring stop is at least three</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of positive indicator species at least 66%</td>
<td>Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: dwarf shrub species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of dwarf shrub species at least 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 10%</td>
<td>Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. No non-native species were recorded within this habitat by Perrin et al. (2013)</td>
</tr>
<tr>
<td>Vegetation structure: signs of grazing</td>
<td>Percentage at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 10% collectively of the live leaves of specific graminoids showing signs of grazing</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details including the list of specific graminoids</td>
</tr>
<tr>
<td>Vegetation structure: signs of browsing</td>
<td>Percentage at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 33% collectively of the last complete growing season’s shoots of ericoids and crowberry (Empetrum nigrum) showing signs of browsing</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: burning</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>No signs of burning within the habitat</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>

| 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 | Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details |
Conservation Objectives for: Arroo Mountain SAC [001403]

To restore the favourable conservation condition of Blanket bogs in Arroo Mountain SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area increasing, subject to natural processes</td>
<td>Arroo Mountain SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). Perrin et al. (2013) state that the current total area of blanket bog is 2174.9ha (54.8% of the SAC). This comprises 2096.3ha of active blanket bog area and 78.6ha of inactive blanket bog. Perrin et al. (2013) also report obvious losses of habitat since 1995 of approximately 1.83 ha. However, this is almost certainly an under-estimate, as chronic losses due to erosion since 1995 cannot be quantified (89.0ha were mapped as eroding blanket bog by Perrin et al. (2013). It should be noted that further restoration of blanket bog would be required in order to fulfil the targets for peat formation and hydrology presented below. A summary of the mapping methodology and a brief discussion of restoration potential are presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 6</td>
<td>Blanket bog was recorded by Perrin et al. (2013) extensively across the SAC. It was abundant along the lower flanks of the SAC, but was also frequent on gently sloping higher ground. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Ecosystem function: peat formation</td>
<td>Active blanket bog as a proportion of the total area of Annex I blanket bog</td>
<td>At least 99% of the total Annex I blanket bog area is active</td>
<td>From the areas given by Perrin et al. (2013) above, 96.4% of the Annex I blanket bog habitat is currently active. See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Ecosystem function: hydrology</td>
<td>Flow direction, water levels, occurrence of drains and erosion gullies</td>
<td>Natural hydrology unaffected by drains and erosion</td>
<td>Further details and a brief discussion of restoration potential is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded six different active blanket bog communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of positive indicator species at each monitoring stop is at least seven</td>
<td>Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of bryophytes or lichens, excluding Sphagnum fallax, at least 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: potential dominant species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of each of the potential dominant species less than 75%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details including the list of potentially dominant species.</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. Campylopus introflexus was recorded forming extensive carpets within this habitat by Perrin et al. (2013)</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Vegetation composition: native trees and scrub</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of scattered native trees and shrubs less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: Sphagnum condition</td>
<td>Condition at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 10% of the Sphagnum cover is crushed, broken and/or pulled up</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: signs of browsing</td>
<td>Percentage at a representative number of 2m x 2m monitoring stops</td>
<td>Last complete growing season's shoots of ericoids, crowberry (Empetrum nigrum) and bog-myrtle (Myrica gale) showing signs of browsing collectively less than 33%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: burning</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning</td>
<td>Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: drainage</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: erosion</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
Conservation Objectives for: Arroo Mountain SAC [001403]

7220 Petrifying springs with tufa formation (Cratoneurion)

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

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Square metres</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Within Arroo Mountain SAC, 26 polygons were recorded as having petrifying springs/spring complexes during the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013). The majority of these (21) were recorded as being less than 1% of the polygon in which they occurred. The overall area of habitat 7220* is given in Perrin et al. (2013) as 0.9ha. The approach to mapping conducted during the NSUH is detailed in Perrin et al. (2014). Note that the NSUH did not undertake a conservation status assessment of this habitat and thus it is not included in the uplands supporting document.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution. See map 7</td>
<td>This habitat has been recorded from 26 polygons within the SAC. Four of the polygons are predominantly wooded, with the Fossitt (2000) woodland types oak-ash-hazel woodland (WN2), scrub (WS1), mixed conifer woodland (WD3) and scattered trees and parkland (WD5) being associated with the habitat. The majority of the polygons where the habitat was recorded are more open with the Annex I habitats Wet heath (4010), Alkaline fens (7230), Blanket bog (7130*) and Calcareous scree (8120) being recorded with the springs. Other open polygons supported the non-Annex I habitats rich fen and flush (PF1), wet grassland (GS4), dry-humid acid grassland (GS3) and dry calcareous and neutral grassland (GS1). Lyons and Kelly (2013) recognise three main sub-types of spring: wooded springs, inland non-wooded springs and coastal springs. The springs in this SAC fall into the first two sub-types</td>
</tr>
<tr>
<td>Hydrological regime:</td>
<td>Metres; metres per second</td>
<td>Maintain appropriate hydrological regimes</td>
<td>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)</td>
</tr>
<tr>
<td>Water quality</td>
<td>Water chemistry measures</td>
<td>Maintain oligotrophic and calcareous conditions</td>
<td>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)</td>
</tr>
<tr>
<td>Vegetation composition:</td>
<td>Occurrence</td>
<td>Maintain typical species</td>
<td>The bryophytes <em>Palustriella commutata</em> (<em>Cratoneuron commutatum</em>) and <em>Cratoneuron filicinum</em> are diagnostic of petrifying springs (EC, 2013) and are found in this habitat in the SAC (Perrin et al., 2013). <em>Palustriella commutata</em> is diagnostic for the NSUH vegetation community SPG2, this being synonymous with 7220*. Other bryophyte species recorded within the SAC (Perrin et al., 2013), which are listed in Appendix 1 A-C of Lyons and Kelly (2013) as being indicative of petrifying springs, are: <em>Aneura pinguis</em>, <em>Bryum pseudotriquetrum</em>, <em>Campylium stellatum</em>, <em>Fissidens adianthoides</em>, <em>Hymenostylium recurvirostrum</em> var. <em>recurvirostrum</em>, <em>Orthothecium rufescens</em>, <em>Palustriella falcata</em>, <em>Pellia endiviifolia</em>, <em>Philontis calcarea</em> and <em>Preissia quadrata</em></td>
</tr>
</tbody>
</table>
**Conservation Objectives for: Arroo Mountain SAC [001403]**

**8120  Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)**

To restore the favourable conservation condition of Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii) in Arroo Mountain SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Arroo Mountain SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of calcareous scree in the SAC stated by Perrin et al. (2013) is 21.4ha. This covers 0.5% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes.</td>
<td>Calcareous scree was recorded by Perrin et al. (2013) on the steep slopes which occur in the north-eastern portion of the SAC. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator fern and Saxifraga species</td>
<td>Number of species in local vicinity of a representative number of 2m x 2m monitoring stops</td>
<td>Number of ferns and Saxifraga indicators at each monitoring stop at least one</td>
<td>Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Number of species in local vicinity of a representative number of monitoring stops</td>
<td>Number of positive indicator species at each monitoring stop at least three</td>
<td>Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: grass species and dwarf shrubs</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of dwarf shrubs and grasses, excluding blue moor-grass (Sesleria caerulea) collectively less than 20%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Proportion of vegetation composed of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Proportion of vegetation composed of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. No non-native species were recorded within this habitat by Perrin et al. (2013)</td>
</tr>
<tr>
<td>Vegetation composition: bracken, native trees and scrub</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Total cover of bracken (Pteridium aquilinum), native trees and scrub less than 25%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: grazing and browsing</td>
<td>Percentage at a representative number of 2m x 2m monitoring stops</td>
<td>Live leaves of forbs and shoots of dwarf shrubs showing signs of grazing or browsing collectively less than 50%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbance</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Ground disturbed by human and animal paths, scree running, vehicles less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Conservation Objectives for: Arroo Mountain SAC [001403]**

8210 Calcareaous rocky slopes with chasmophytic vegetation

To restore the favourable conservation condition of Calcareaous rocky slopes with chasmophytic vegetation in Arroo Mountain SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Arroo Mountain SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of calcareaous rocky slopes in the SAC stated by Perrin et al. (2013) is 6.6ha. This covers 0.2% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 9</td>
<td>Calcareaous rocky slopes were recorded by Perrin et al. (2013) on the steep slopes which occur in the north-eastern portion of the SAC and also at other locations near its periphery. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator fern and Saxifraga species</td>
<td>Number of species in local vicinity of a representative number of monitoring stops</td>
<td>Number of ferns and Saxifraga indicators at each monitoring stop at least one</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Number of species in local vicinity of a representative number of monitoring stops</td>
<td>Number of positive indicator species at each monitoring stop at least three</td>
<td>Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). Further details can be found in the uplands supporting document.</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Proportion of vegetation composed of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. <em>Epilobium brunnescens</em> was recorded within this habitat by Perrin et al. (2013)</td>
</tr>
<tr>
<td>Vegetation composition: bracken, native trees and scrub</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Total cover of bracken (<em>Pteridium aquilinum</em>), native trees and scrub less than 25%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: grazing and browsing</td>
<td>Percentage in local vicinity of a representative number of monitoring stops</td>
<td>Live leaves of forbs and shoots of dwarf shrubs showing signs of grazing or browsing collectively less than 50%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. <em>Saxifraga aizoides</em> and <em>Saxifraga oppositifolia</em>, listed as Rare by Curtis and McGough (1988) have been recorded from this habitat. Also <em>Seligeria triafria</em> agg. and <em>Timmia norvegica</em>, listed as Near Threatened and Vulnerable respectively in Lockhart et al. (2012), have been recorded from the habitat. These and any new records should be considered within this attribute. See the uplands supporting document for further details.</td>
</tr>
</tbody>
</table>
MAP 1: ARROO MOUNTAIN SAC CONSERVATION OBJECTIVES

SAC DESIGNATION

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

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.


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

Legend

Arroo Mountain SAC 001403

SITE CODE:
SAC 001403; version 3.01. Co. Leitrim

N

0

0.5

1

1.5

2

km

Map Version 1

Date: July 2016
MAP 3:
ARROO MOUNTAIN SAC
CONSERVATION OBJECTIVES
WET HEATH

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

SITE CODE:
SAC 001403; version 3.01. Co. Leitrim.

Legend

- Arroo Mountain SAC 001403
- OSI Discovery Series County Boundary

Cover of 4010 Northern Atlantic wet heaths with *Erica tetralix*

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

Distance Survey of Ireland Licence No EN 0059214. © Ordnance Survey of Ireland Government of Ireland.

Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.
MAP 4:
ARROO MOUNTAIN SAC
CONSERVATION OBJECTIVES
DRY HEATHS

Legend
- Arroo Mountain SAC 001403
- OSI Discovery Series County Boundary
- Cover of 4030 European dry heaths

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

Distance Survey of Ireland Licence No EN 0039214. © Distance Survey of Ireland Government of Ireland.

SITE CODE:
SAC 001403, version 3.01, Co. Leitrim.

Map to be read in conjunction with the NPWS Conservation Objectives Document.
MAP 5:
ARROO MOUNTAIN SAC
CONSERVATION OBJECTIVES
ALPINE AND BOREAL HEATHS

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

SITE CODE: SAC 001403; version 3.01. Co. Leitrim.

Legend

- Arroo Mountain SAC 001403
- OSI Discovery Series County Boundary

Cover of 4060 Alpine and Boreal heaths

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

MAP 6:
ARROO MOUNTAIN SAC
CONSERVATION OBJECTIVES
BLANKET Bogs (*if active bog)

Legend

- Arroo Mountain SAC 001403
- OSI Discovery Series County Boundary

Cover of 7130 Blanket bogs (* if active bog)

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

Distance Survey of Ireland Licence No EN 0039214. © Ordnance Survey of Ireland Government of Ireland

Níl sna teorainneacha ar na léarscáileanna ach nód garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0039214. © Suirbhéarachta Ordonáis na Rialtas na hÉireann.

LEGEND

Arroo Mountain SAC 001403
OSI Discovery Series County Boundary

Cover of 7130 Blanket bogs (* if active bog)

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

SITE CODE:
SAC 001403; version 3.0. Co. Leitrim.

MAP Version 1
Date: July 2016

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

Distance Survey of Ireland Licence No EN 0039214. © Ordnance Survey of Ireland Government of Ireland.

Níl sna teorainneacha ar na léarscáileanna ach nód garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0039214. © Suirbhéarachta Ordonáis na Rialtas na hÉireann.

SITE CODE:
SAC 001403; version 3.0. Co. Leitrim.

0 0.5 1 1.5 2 km
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

Distance Survey of Ireland Licence No EN 0039214. © Ordnance Survey of Ireland Government of Ireland.

Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.
MAP 8: ARROO MOUNTAIN SAC CONSERVATION OBJECTIVES CALCAREOUS SCREES


Legend
- Arroo Mountain SAC 001403
- OSI Discovery Series County Boundary

Cover of 8120 Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

Distance Survey of Ireland Licence No EN 0059214. © Distance Survey of Ireland Government of Ireland.

Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe 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: July 2016
MAP 9: ARROO MOUNTAIN SAC
CONSERVATION OBJECTIVES
CALCAREOUS ROCKY SLOPES

SITE CODE: SAC 001403, version 3.01, Co. Leitrim.

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

Legend

- Arroo Mountain SAC 001403
- OSI Discovery Series County Boundary

Cover of 8210 Calcareous rocky slopes with chasmophytic vegetation

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.


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

<table>
<thead>
<tr>
<th>Bird Code</th>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>A188</td>
<td>Kittiwake</td>
<td>Rissa tridactyla</td>
</tr>
</tbody>
</table>

For more information please go to: [www.npws.ie/protected-sites/conservation-management-planning](http://www.npws.ie/protected-sites/conservation-management-planning)
Citation: NPWS (2016) Conservation objectives for Aughris Head SPA [004133]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
Conservation objectives for Ballintemple and Ballygilgan SPA [004234]

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:

<table>
<thead>
<tr>
<th>Bird Code</th>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>A045</td>
<td>Barnacle Goose</td>
<td>Branta leucopsis</td>
</tr>
</tbody>
</table>

For more information please go to: [www.npws.ie/protected-sites/conservation-management-planning](http://www.npws.ie/protected-sites/conservation-management-planning)
Citation: NPWS (2016) Conservation objectives for Ballintemple and Ballygilgan SPA [004234].
Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000622</td>
<td>Ballysadare Bay SAC</td>
</tr>
<tr>
<td>1014</td>
<td>Narrow-mouthed whorl snail <em>Vertigo angustior</em></td>
</tr>
<tr>
<td>1130</td>
<td>Estuaries</td>
</tr>
<tr>
<td>1140</td>
<td>Mudflats and sandflats not covered by seawater at low tide</td>
</tr>
<tr>
<td>1365</td>
<td>Harbour seal <em>Phoca vitulina</em></td>
</tr>
<tr>
<td>2110</td>
<td>Embryonic shifting dunes</td>
</tr>
<tr>
<td>2120</td>
<td>Shifting dunes along the shoreline with <em>Ammophila arenaria</em> (white dunes)</td>
</tr>
<tr>
<td>2130</td>
<td>Fixed coastal dunes with herbaceous vegetation (grey dunes)*</td>
</tr>
<tr>
<td>2190</td>
<td>Humid dune slacks</td>
</tr>
</tbody>
</table>

Please note that this SAC overlaps with Ballysadare Bay SPA (004129) and adjoins Unshin River SAC (001898). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.
### NPWS Documents

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>1989 survey of breeding herds of common seal (<em>Phoca vitulina</em>) with reference to previous surveys</td>
<td>Harrington, R.</td>
<td>Unpublished report to Wildlife Service</td>
</tr>
<tr>
<td>2007</td>
<td>A Survey of Intertidal Mudflats and Sandflats in Ireland</td>
<td>Aquatic Services Unit</td>
<td>Unpublished report to NPWS</td>
</tr>
<tr>
<td>2011</td>
<td>Monitoring and condition assessment of populations of <em>Vertigo geyeri</em>, <em>Vertigo angustior</em> and <em>Vertigo mouliinsiana</em> in Ireland</td>
<td>Moorkens, E.A.; Killeen, I.J.</td>
<td>Irish Wildlife Manual No. 55</td>
</tr>
<tr>
<td>2011</td>
<td>Harbour seal pilot monitoring project, 2010</td>
<td>NPWS</td>
<td>Unpublished Report to NPWS</td>
</tr>
<tr>
<td>2012</td>
<td>Harbour seal pilot monitoring project, 2011</td>
<td>NPWS</td>
<td>Unpublished Report to NPWS</td>
</tr>
<tr>
<td>2013</td>
<td>Ballysadoare Bay SAC (site code 622) Conservation objectives supporting document- marine habitats and species V1</td>
<td>NPWS</td>
<td>Conservation objectives supporting document</td>
</tr>
</tbody>
</table>
Other References

Year : 1980
Title : An assessment of the status of the common seal (*Phoca vitulina vitulina*) 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 : 2011
Title : Subtidal benthic investigations Ballysadare Bay cSAC (site code IE000622) Co. Sligo
Author : Aquafact
Series : Unpublished report to the Marine Institute and NPWS

Year : 2011
Title : A survey of mudflats and sandflats in Ireland. An intertidal soft sediment survey of Ballysadare Bay
Author : Aquatic Services Unit
Series : Unpublished report to the Marine Institute and NPWS
<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>GIS Operations</th>
<th>Used For</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>EPA WFD transitional waterbody data</td>
<td>Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising</td>
<td>1130 (map 3)</td>
</tr>
<tr>
<td>2005</td>
<td>OSi Discovery series vector data</td>
<td>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</td>
<td>Marine community types base data (map 4)</td>
</tr>
<tr>
<td>Interpolated 2013</td>
<td>2007, 2010 intertidal surveys; 2010 subtidal survey</td>
<td>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</td>
<td>1140, Marine community types (maps 4 and 5)</td>
</tr>
<tr>
<td>2013</td>
<td>Sand Dune Monitoring Project 2011. Version 1</td>
<td>QIs selected; clipped to SAC boundary; overlapping regions with saltmarsh data investigated and resolved with expert opinion as necessary</td>
<td>2110, 2120, 2130, 2190 (map 6)</td>
</tr>
<tr>
<td>2013</td>
<td>NPWS rare and threatened species database</td>
<td>Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising</td>
<td>1014, 1365 (maps 7 and 8)</td>
</tr>
<tr>
<td>2005</td>
<td>OSi Discovery series vector data</td>
<td>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</td>
<td>1365 (map 8)</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Estuaries in Ballysadare Bay SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>The permanent habitat area is stable or increasing, subject to natural processes. See map 3</td>
<td>Habitat area was estimated as 1703ha using OSI data and the defined Transitional Water Body area under the Water Framework Directive</td>
</tr>
<tr>
<td>Community extent</td>
<td>Hectares</td>
<td>Maintain the extent of the <em>Zostera</em>-dominated community, subject to natural processes. See map 5</td>
<td>Based on intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2011). See marine supporting document for further information</td>
</tr>
<tr>
<td>Community structure:</td>
<td>Shoots/m²</td>
<td>Conserve the high quality of the <em>Zostera</em>-dominated community, subject to natural processes</td>
<td>Based on intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2011). See marine supporting document for further details</td>
</tr>
<tr>
<td>Zostera density</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community distribution</td>
<td>Hectares</td>
<td>Conserve the following community types in a natural condition: Intertidal sand with <em>Angulus tenuis</em> community complex; Muddy sand to sand with <em>Hediste diversicolor</em>, <em>Corophium volutator</em> and <em>Peringia ulvae</em> community complex; Fine sand with polychaetes community complex; Sand with bivalves, nematodes and crustaceans community complex; Intertidal reef community complex; Subtidal reef community complex. See map 5</td>
<td>Based on intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2011) and a subtidal survey in 2010 (Aquafact, 2011). See marine habitats supporting document for further information</td>
</tr>
</tbody>
</table>
Conservation Objectives for: Ballysadare Bay SAC [000622]

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 Ballysadare Bay SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>The permanent habitat area is stable or increasing, subject to natural processes. See map 4</td>
<td>Habitat area was estimated using OSi data as 1345ha</td>
</tr>
<tr>
<td>Community extent</td>
<td>Hectares</td>
<td>Maintain the extent of the Zostera-dominated community, subject to natural processes. See map 5</td>
<td>Based on intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2011). See marine supporting document for further information</td>
</tr>
<tr>
<td>Community structure: Zostera density</td>
<td>Shoots/m²</td>
<td>Conserve the high quality of the Zostera-dominated community, subject to natural processes</td>
<td>Based on intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2011). See marine supporting document for further information</td>
</tr>
<tr>
<td>Community distribution</td>
<td>Hectares</td>
<td>Conserve the following community types in a natural condition: Intertidal sand with Angulus tenuis community complex; Muddy sand to sand with Hediste diversicolor, Corophium volutator and Peringia ulvae community complex. See map 5</td>
<td>Based on intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2011). See marine supporting document for further information</td>
</tr>
</tbody>
</table>
Conservation Objectives for: Ballysadare Bay SAC [000622]

To maintain the favourable conservation condition of Embryonic shifting dunes in Ballysadare Bay SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Strandhill - 1.08ha. See map 6</td>
<td>Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Embryo dunes were surveyed and mapped at one sub-site, giving a total estimated area of 1.08ha. Habitat is very difficult to measure in view of its dynamic nature. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline or change in habitat distribution, subject to natural processes. See map 6 for known distribution</td>
<td>Based on data from Delaney et al. (2013). Embryo dunes are concentrated around the growing tip of Strandhill dunes. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: functionality and sediment supply</td>
<td>Presence/absence of physical barriers</td>
<td>Maintain the natural circulation of sediment and organic matter, without any physical obstructions</td>
<td>Based on data from Delaney et al. (2013). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Coastal protection works in the form of rock armour have been installed on the seaward edge of the carpark and golf course. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession</td>
<td>Based on data from Delaney et al. (2013). Transitional communities occur between a range of sand dune habitats and some saltmarsh habitats. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: plant health of foredune grasses</td>
<td>Percentage cover</td>
<td>More than 95% of sand couch (<em>Elytrigia juncea</em>) and/or lyme-grass (<em>Leymus arenarius</em>) should be healthy (i.e. green plant parts above ground and flowering heads present)</td>
<td>Based on data from Delaney et al. (2013). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover at a representative number of monitoring stops</td>
<td>Maintain the presence of species-poor communities with typical species: sand couch (<em>Elytrigia juncea</em>) and/or lyme-grass (<em>Leymus arenarius</em>)</td>
<td>Based on data from Delaney et al. (2013). Embryo dunes at Strandhill support a typical flora. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover</td>
<td>Negative indicator species (including non-native species) to represent less than 5% cover</td>
<td>Based on data from Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<em>Hippophae rhamnoides</em>) should be absent or effectively controlled. See coastal habitats supporting document for further details</td>
</tr>
</tbody>
</table>
To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in Ballysadare Bay SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes including erosion and succession. For sub-site mapped: Strandhill-5.47ha. See map 6</td>
<td>Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Marram dunes were surveyed and mapped at one sub-site, giving a total estimated area of 5.47ha. Habitat is very difficult to measure in view of its dynamic nature. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution</td>
<td>Based on data from Delaney et al. (2013). Mobile dunes occur the seaward side of the spit in the southern part of Strandhill and are particularly well developed at the growing tip. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: functionality and sediment supply</td>
<td>Presence/absence of physical barriers</td>
<td>Maintain the natural circulation of sediment and organic matter, without any physical obstructions</td>
<td>Based on data from Delaney et al. (2013). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (<em>Ammophila arenaria</em>) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. There are coastal protection works in place at Strandhill. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession</td>
<td>Based on data from Gaynor (2008) and Delaney et al. (2013). Transitional communities occur between a range of sand dune habitats and some saltmarsh habitats. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: plant health of dune grasses</td>
<td>Percentage cover</td>
<td>95% of marram grass (<em>Ammophila arenaria</em>) and/or lyme-grass (<em>Leymus arenarius</em>) should be healthy (i.e. green plant parts above ground and flowering heads present)</td>
<td>Based on data from Delaney et al. (2013). The mobile dune habitat at the tip of the spit is in good condition and is actively accreting. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover at a representative number of monitoring stops</td>
<td>Maintain the presence of species-poor communities dominated by marram grass (<em>Ammophila arenaria</em>) and/or lyme-grass (<em>Leymus arenarius</em>)</td>
<td>Based on data from Delaney et al. (2013). The mobile dunes at Strandhill support a characteristic dune flora. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover</td>
<td>Negative indicator species (including non-natives) to represent less than 5% cover</td>
<td>Based on data from Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<em>Hippophae rhamnoides</em>) should be absent or effectively controlled. See coastal habitats supporting document for further details</td>
</tr>
</tbody>
</table>
Conservation Objectives for : Ballysadare Bay SAC [000622]

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

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

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes including erosion and succession. For sub-site mapped: Strandhill - 56.07ha. See map 6</td>
<td>Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Fixed dunes were surveyed and mapped at one sub-site, giving a total estimated area of 56.07ha. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution</td>
<td>Based on data from Delaney et al. (2013). Fixed dune habitat covers an extensive area at Strandhill. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: functionality and sediment supply</td>
<td>Presence/ absence of physical barriers</td>
<td>Maintain the natural circulation of sediment and organic matter, without any physical obstructions</td>
<td>Based on data from Delaney et al. (2013). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. There are coastal protection works at Strandhill. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession</td>
<td>Based on data from Delaney et al. (2013). Transitional communities occur between a range of sand dune habitats and some saltmarsh habitats. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: bare ground</td>
<td>Percentage cover</td>
<td>Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes</td>
<td>Based on data from Gaynor (2008) and Delaney et al. (2013). There is a large blowout in Strandhill dunes known locally as Shelly Valley, which covers 5.4ha. Trampling has created tracks in the vicinity of this blowout. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: sward height</td>
<td>Centimetres</td>
<td>Maintain structural variation within sward</td>
<td>Based on data from Gaynor (2008) and Delaney et al. (2013). Grazing by cattle or sheep is absent. This has led to the reduction in species richness of the site as well as a potential problem of the spread of sycamore (Acer pseudoplatanus) and wild clematis (Clematis vitalba). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover at a representative number of monitoring stops</td>
<td>Maintain range of sub-communities with typical species listed in Delaney et al. (2013)</td>
<td>Based on data from Delaney et al. (2013). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species (including Hippophae rhamnoides)</td>
<td>Percentage cover</td>
<td>Negative indicator species (including non-natives) to represent less than 5% cover</td>
<td>Based on data from Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (Hippophae rhamnoides) should be absent or effectively controlled. At Strandhill, negative indicator species common ragwort (Senecio jacobaea) and creeping thistle (Cirsium arvense) occur occasionally. Sycamore (Acer pseudoplatanus) and wild clematis (Clematis vitalba) have also been noted from the fixed dunes. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: scrub/trees</td>
<td>Percentage cover</td>
<td>No more than 5% cover or under control</td>
<td>Based on data from Delaney et al. (2013). Creeping willow (Salix repens) is abundant within the fixed dunes at Strandhill. Sycamore (Acer pseudoplatanus) has also been noted. See coastal habitats supporting document for further details</td>
</tr>
</tbody>
</table>
### Conservation Objectives for: Ballysadare Bay SAC [000622]

#### 2190 Humid dune slacks

To restore the favourable conservation condition of Humid dune slacks in Ballysadare Bay SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes including erosion and succession. For sub-site mapped: Strandhill - 1.83ha. See map 6</td>
<td>Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Dune slacks were surveyed and mapped at one sub-site, giving a total estimated area of 1.83ha. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline or change in habitat distribution, subject to natural processes. See map 6 for known distribution</td>
<td>Based on data from Delaney et al. (2013). One large slack and one small slack have been recorded from the southern part of Strandhill dunes. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: functionality and sediment supply</td>
<td>Presence/absence of physical barriers</td>
<td>Maintain the natural circulation of sediment and organic matter, without any physical obstructions</td>
<td>Based on data from Delaney et al. (2013). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation, resulting in increased rates of erosion. There are coastal protection works at Strandhill. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: hydrological and flooding regime</td>
<td>Water table levels; groundwater fluctuations (metres)</td>
<td>Maintain natural hydrological regime</td>
<td>Based on data from Gaynor (2008) and Delaney et al. (2013). The slacks are showing some signs of drying out, which may be accelerated by human interference with the local hydrology. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession</td>
<td>Based on data from Gaynor (2008) and Delaney et al. (2013). Transitional communities occur between a range of sand dune habitats and some saltmarsh habitats. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: bare ground</td>
<td>Percentage cover</td>
<td>Bare ground should not exceed 5% of dune slack habitat, with the exception of pioneer slacks which can have up to 20% bare ground</td>
<td>Based on data from Gaynor (2008) and Delaney et al. (2013). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: vegetation height</td>
<td>Centimetres</td>
<td>Maintain structural variation within sward</td>
<td>Based on data from Gaynor (2008) and Delaney et al. (2013). The dunes at Strandhill are subject to low level grazing by rabbits (<em>Oryctolagus cuniculus</em>). Grazing by cattle or sheep is absent. This has led to the reduction in species richness of the site as well as a potential problem of the spread of sycamore (<em>Acer pseudoplatanus</em>) and wild clematis (<em>Clematis vitalba</em>). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover at a representative number of monitoring stops</td>
<td>Maintain range of sub-communities with typical species listed in Delaney et al. (2013)</td>
<td>Based on data from Gaynor (2008) and Delaney et al. (2013). At Strandhill, typical pioneer bryophyte species are frequent, and the locally important marsh helleborine (<em>Epipactis palustris</em>) also occurs. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: cover of <em>Salix repens</em></td>
<td>Percentage cover; centimetres</td>
<td>Maintain less than 40% cover of creeping willow (<em>Salix repens</em>)</td>
<td>Based on data from Delaney et al. (2013). Cover of creeping willow (<em>Salix repens</em>) needs to be controlled (e.g. through an appropriate grazing regime) to prevent the development of a coarse, rank vegetation cover. It is abundant within the fixed dunes at Strandhill but is notably absent from the dune slacks. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover</td>
<td>Negative indicator species (including non-natives) to represent less than 5% cover</td>
<td>Based on data from Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<em>Hippophae rhamnoides</em>) should be absent or effectively controlled. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vegetation composition: scrub/trees</td>
<td>Percentage cover</td>
<td>No more than 5% cover or under control</td>
<td>Based on data from Delaney et al. (2013). See coastal habitats supporting document for further details</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Narrow-mouthed Whorl Snail in Ballysadare Bay SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution: occupied sites</td>
<td>Number</td>
<td>No decline. There is one known location for this species in this SAC (which overlaps two 1km squares). See map 7</td>
<td>From Moorkens and Killeen (2011) (site code Va CAM20)</td>
</tr>
<tr>
<td>Presence on transect</td>
<td>Occurrence</td>
<td>Adult or sub-adult snails are present in all three of the habitat zones on the transect (minimum four samples)</td>
<td>Transect established as part of condition assessment monitoring at this site (Moorkens and Killeen, 2011). See habitat area target below for definition of optimal and suboptimal habitat</td>
</tr>
<tr>
<td>Presence</td>
<td>Occurrence</td>
<td>Adult or sub-adult snails are present in at least six other places at the site with a wide geographical spread (minimum of eight sites sampled)</td>
<td>From Moorkens and Killeen (2011)</td>
</tr>
<tr>
<td>Transect habitat quality</td>
<td>Metres</td>
<td>At least 50m of habitat along the transect is classed as optimal and the remainder as at least sub-optimal</td>
<td>From Moorkens and Killeen (2011). See habitat extent target below for definition of optimal and suboptimal habitat</td>
</tr>
<tr>
<td>Transect optimal wetness</td>
<td>Metres</td>
<td>Soils, at time of sampling, are damp (optimal wetness) and covered with a layer of humid thatch for at least 50m along the transect</td>
<td>From Moorkens and Killeen (2011)</td>
</tr>
<tr>
<td>Habitat extent</td>
<td>Hectares</td>
<td>At least 45ha of the site in at least optimal/sub-optimal condition. Optimal habitat is defined as fixed dune, species-rich grassland dominated by red fescue (<em>Festuca rubra</em>) and marram (<em>Ammophila arenaria</em>), with sparse oxeye daisy (<em>Leucanthemum vulgare</em>), dandelion (<em>Taraxacum</em> sp.), ribwort plantain (<em>Plantago lanceolata</em>) and other low growing herbs. Vegetation height 20-50cm. Habitat growing on damp, friable soil covered with a layer of humid, open structured thatch. Sub-optimal habitat is defined as above but either vegetation height is less than 10cm or above 50cm; or the soil is dry and sandy; or the thatch is wetter with a denser structure</td>
<td>From Moorkens and Killeen (2011). See also the conservation objective for fixed dunes (2130)</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Harbour Seal in Ballysadare Bay SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to suitable habitat</td>
<td>Number of artificial barriers</td>
<td>Species range within the site should not be restricted by artificial barriers to site use. See map 8</td>
<td>See marine supporting document for further details</td>
</tr>
<tr>
<td>Breeding behaviour</td>
<td>Breeding sites</td>
<td>Conserve the breeding sites in a natural condition. See map 8</td>
<td>Attribute and target based on background knowledge of Irish breeding populations, review of data summarised by Summers et al. (1980); Harrington (1990); Lyons (2004) and unpublished NPWS records. See marine supporting document for further details</td>
</tr>
<tr>
<td>Moulting behaviour</td>
<td>Moult haul-out sites</td>
<td>Conserve the moult haul-out sites in a natural condition. See map 8</td>
<td>Attribute and target based on background knowledge of Irish populations, review of data from Lyons (2004); Cronin et al. (2004); NPWS (2010); NPWS (2011); NPWS (2012) and unpublished NPWS records. See marine supporting document for further details</td>
</tr>
<tr>
<td>Resting behaviour</td>
<td>Resting haul-out sites</td>
<td>Conserve the resting haul-out sites in a natural condition. See map 8</td>
<td>Attribute and target based on background knowledge of Irish populations, review of data from Lyons (2004) and unpublished NPWS records. See marine supporting document for further details</td>
</tr>
<tr>
<td>Disturbance</td>
<td>Level of impact</td>
<td>Human activities should occur at levels that do not adversely affect the harbour seal population at the site</td>
<td>See marine supporting document for further details</td>
</tr>
</tbody>
</table>
Map to be read in conjunction with the NPIOS Conservation Objectives Document.

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 00622).

Nil anraoithreachta ar na leasúil/bhreise a chosadh gan gheall ar fhoireann eile. Faisleach ar fhoireann eile a d'fhreastal daimh ina cheastail ar gheall ar fhoireann eile. Miseann an éadan nuair a d'fhreastail Ordóinseachta. Ceadail an Éadan nuair a d'fhreastail Ordóinseachta (Ceadan Uimh. EN 00622)
Legend
- Ballysadare Bay SAC 000622
- Unshin River SAC 001898
- Ballysadare Bay SPA 004129
- OSi Discovery Series County Boundary

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

SITE CODE: SAC 000632; version 3,
SAC 001898; version 3.
SPA 004129; version 1.03. CO. SLIGO

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).

Nil erraoinreacha eir na leasaí/bheansa ach ní d'fhanadh an ghealladh féin tar éis phríomhshaisse na gníomhanna.

Ní ona leasúreacha eir na leasaí/bheansa ach ní d'fhanadh an ghealladh féin tar éis phríomhshaisse na gníomhanna.

Map Version 1
Date: Sept 2013
Map Version 1
Date: Sept 2013

MAP 4:

BALLYSADARE BAY SAC
CONSERVATION OBJECTIVES
TIDAL MUDFLATS AND SANDFLATS

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

SITE CODE:
SAC 000622; version 3. CO. SLIGO

Legend

Ballysadare Bay SAC 000622
1140 Mudflats and sandflats not covered by sea water at low tide
OSi Discovery Series County Boundary

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number DIN 0059212).

Nil eini bhréanachta a ne leosfáileann a chos ná ghearrthoimhneachta. Físhlútar ar thuilleann ó dús físhlú isteach na goinear chomhthóirleachta. Mac anearthadh d'fhásar na Contae le dearth énas (Ceadúnas Uimh. DIN 0059212)

Níl an ceidhreachas a leis an lóssú ar a chos ná ghearrthoimhneachta. Físhlútar ar thuilleann ó dús físhlú isteach na goinear chomhthóirleachta. Mac anearthadh d'fhásar na Contae le dearth énas (Ceadúnas Uimh. DIN 0059212)
MAP 5: BALLYSDARE BAY SAC
CONSERVATION OBJECTIVES
MARINE COMMUNITY TYPES

Legend
- Ballysadare Bay SAC 000622
- OSI Discovery Series County Boundary

Marine Community Types
- Fine sand with polychaetes community complex
- Intertidal reef community
- Intertidal sand with Angulus tenus community complex
- Muddy sand to sand with Hediste diversicolor, Corophium volutator and Peringia ulvae community complex
- Sand with bivalves, nematodes and crustaceans community complex
- Subtidal reef community
- Zostera-dominated community

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

SITE CODE: SAC 000622, version 3. CO. SLIGO

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).

Nil an tseirbhiseach ar na leabharleacain a chothait go ginearálta. Feidhm ar dhiaidh is difriúil é an t-athraíocht as go raibh na h-áiteanna i gceadáil.

Map Version 1
Date: Sept 2013
Map Version 1

Date: Sept 2013

MAP 6: BALLYSADARE BAY SAC CONSERVATION OBJECTIVES SAND DUNE HABITATS

SITE CODE: SAC 000622, version 3. CO. SLIGO

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212)

NÍ Lísna taitneach a ri na liosánlaítear ach ní féidir liom liost rí liosánlaítear. Fheidhleachadh na liosánlaítear i corpacha iarrachta. Mise n-aonair a bhfuil aithne ort air fein nó go ceart caoiniúiteach.

Legend

- Ballysadare Bay SAC 000622
- OSi Discovery Series County Boundary
- SDM: 133 Sand Dune Monitoring Project Site Codes

Sand Dune Habitats

Qualifying Interests

- 2110 Embryonic shifting dunes
- 2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes)
- 2130 "Fixed coastal dunes with herbaceous vegetation (‘grey dunes’)"
- 2190 Humid dune slacks

Non-Qualifying Interests

- 1220 Perennial vegetation of stony banks
- 2170 Dunes with Salix repens ssp. argentea (Salicion arenariae)
MAP 7:
BALLYSADARE BAY SAC
CONSERVATION OBJECTIVES
NARROW-MOUTHEd WHORL SNAIL

Legend
- Ballysadare Bay SAC 000622
- 1014 Narrow-Mouthed Whorl Snail - Vertigo angustior
- OSi Discovery Series County Boundary

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).

Nil eile leanbhreachtach ar na leasaí leannach ach ní mhaith liom scríobh a dhéanamh air an tóiríocht na gcúiseanna úrtha. Tá obair ar feadhanna agus ar feadhanna le haghaidh an am a dtugtar chomhthartala.

SITE CODE:
SAC 000622; version 3; CO. SLIGO

Scale: 1:50,000

Map Version 1
Date: Sept 2013

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

- Ballysadare Bay SAC 000622
- 1365 Harbour Seal - *Phoca vitulina* breeding sites
- 1365 Harbour Seal - *Phoca vitulina* moulting sites
- 1365 Harbour Seal - *Phoca vitulina* resting sites
- 1365 Harbour Seal - *Phoca vitulina* habitat
- OSI Discovery Series County Boundary

MAP 8: BALLYSADARE BAY SAC

CONSERVATION OBJECTIVES

HARBOUR SEAL

SITE CODE:

SAC 000622; version 3; CO. SLIGO

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


Series Editor: Rebecca Jeffrey

ISSN 2009-4086
The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

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

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

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

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

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

Notes/Guidelines:

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

* indicates a priority habitat under the Habitats Directive

<table>
<thead>
<tr>
<th>Code</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>004129</td>
<td>Ballysadare Bay SPA</td>
</tr>
<tr>
<td>A046</td>
<td>Brent Goose <em>Branta bernicla hrota</em></td>
</tr>
<tr>
<td>A141</td>
<td>Grey Plover <em>Pluvialis squatarola</em></td>
</tr>
<tr>
<td>A149</td>
<td>Dunlin <em>Calidris alpina alpina</em></td>
</tr>
<tr>
<td>A157</td>
<td>Bar-tailed Godwit <em>Limosa lapponica</em></td>
</tr>
<tr>
<td>A162</td>
<td>Redshank <em>Tringa totanus</em></td>
</tr>
<tr>
<td>A999</td>
<td>Wetlands</td>
</tr>
</tbody>
</table>

Please note that this SPA overlaps with Ballysadare Bay SAC (000622) and is adjacent to Drumcliff Bay SPA (004013) and Cummeen Strand SPA (004035). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.
To maintain the favourable conservation condition of Light-bellied Brent Goose in Ballysadare Bay SPA, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population trend</td>
<td>Percentage change</td>
<td>Long term population trend stable or increasing</td>
<td>Waterbird population trends are presented in part four of the conservation objectives supporting document</td>
</tr>
<tr>
<td>Distribution</td>
<td>Range, timing and intensity of use of areas</td>
<td>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</td>
<td>Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Grey Plover in Ballysadare Bay SPA, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population trend</td>
<td>Percentage change</td>
<td>Long term population trend stable or increasing</td>
<td>Population trends are presented in part four of the conservation objectives supporting document</td>
</tr>
<tr>
<td>Distribution</td>
<td>Range, timing and intensity of use of areas</td>
<td>No significant decrease in the range, timing and intensity of use of areas by grey plover, other than that occurring from natural patterns of variation</td>
<td>Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Dunlin in Ballysadare Bay SPA, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population trend</td>
<td>Percentage change</td>
<td>Long term population trend stable or increasing</td>
<td>Population trends are presented in part four of the conservation objectives supporting document</td>
</tr>
<tr>
<td>Distribution</td>
<td>Range, timing and intensity of use of areas</td>
<td>No significant decrease in the range, timing and intensity of use of areas by dunlin, other than that occurring from natural patterns of variation</td>
<td>Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Bar-tailed Godwit in Ballysadare Bay SPA, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population trend</td>
<td>Percentage change</td>
<td>Long term population trend stable or increasing</td>
<td>Population trends are presented in part four of the conservation objectives supporting document</td>
</tr>
<tr>
<td>Distribution</td>
<td>Range, timing and intensity of use of areas</td>
<td>No significant decrease in the range, timing and intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation</td>
<td>Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Redshank in Ballysadare Bay SPA, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population trend</td>
<td>Percentage change</td>
<td>Long term population trend</td>
<td>Population trends are presented in part four of the conservation objectives supporting document</td>
</tr>
<tr>
<td>Distribution</td>
<td>Range, timing and intensity of use areas</td>
<td>No significant decrease in the range, timing or intensity of use of areas by redshank, other than that occurring from natural patterns of variation</td>
<td>Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of the wetland habitat in Ballysadare Bay SPA as a resource for the regularly-occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2130 hectares, other than that occurring from natural patterns of variation</td>
<td>The wetland habitat area was estimated as 2130ha using OSI data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document</td>
</tr>
</tbody>
</table>
Map Version 1
Date: Oct 2013

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

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

Legend
- Ballysadare Bay SPA 004129
- Drumcliff Bay SPA 004013
- Cummeen Strand SPA 004035
- Ballysadare Bay SAC 000622
- OSI Discovery Series County Boundary

SITE CODE: SPA 004129; version 1.03
SPA 004013; version 2.02, SPA 004035; version 1.03,
SAC 000622; version 3, CO. SLIGO.

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 009012).

Nil aon leor leimseach ar an leisceáltaireach, ach i bhfothar sarbhathaithe. Fheidfear a theagmháilte a díreach ar thionchar nuair a gcuireann comhairle leasuithe. Mocsansbail d'athar na Sultbhearnaicheadh Ordóinis in chead don Rialtas (Ceadadas Uimh. EN 009012).
Conservation objectives for Ben Bulben, Gleniff and Glenade Complex SAC [000623]

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

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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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3260</td>
<td>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation</td>
</tr>
<tr>
<td>4010</td>
<td>Northern Atlantic wet heaths with Erica tetralix</td>
</tr>
<tr>
<td>4030</td>
<td>European dry heaths</td>
</tr>
<tr>
<td>4060</td>
<td>Alpine and Boreal heaths</td>
</tr>
<tr>
<td>5130</td>
<td>Juniperus communis formations on heaths or calcareous grasslands</td>
</tr>
<tr>
<td>6210</td>
<td>Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia) (* important orchid sites)*</td>
</tr>
</tbody>
</table>

For more information please go to: www.npws.ie/protected-sites/conservation-management-planning
Generic Conservation Objectives

For more information please go to: www.npws.ie/protected-sites/conservation-management-planning

15/08/2016

6230 Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)*

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

7140 Transition mires and quaking bogs

7220 Petrifying springs with tufa formation (Cratoneurion)*

7230 Alkaline fens

8110 Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)

8120 Calcareous and calcshist scree of the montane to alpine levels (Thlaspietea rotundifolii)

8210 Calcareous rocky slopes with chasmophytic vegetation

* denotes a priority habitat

<table>
<thead>
<tr>
<th>Code</th>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1013</td>
<td>Geyer’s Whorl Snail</td>
<td><em>Vertigo geyeri</em></td>
</tr>
<tr>
<td>1355</td>
<td>Otter</td>
<td><em>Lutra lutra</em></td>
</tr>
</tbody>
</table>

Citation: NPWS (2016) Conservation objectives for Ben Bulben, Gleniff and Glenade Complex SAC [000623]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
Citation:


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.

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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*

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>002032</td>
<td><strong>Boleybrack Mountain SAC</strong></td>
</tr>
<tr>
<td>3160</td>
<td>Natural dystrophic lakes and ponds</td>
</tr>
<tr>
<td>4010</td>
<td>Northern Atlantic wet heaths with <em>Erica tetralix</em></td>
</tr>
<tr>
<td>4030</td>
<td>European dry heaths</td>
</tr>
<tr>
<td>6410</td>
<td><em>Molinia</em> meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)</td>
</tr>
<tr>
<td>7130</td>
<td>Blanket bogs (* if active bog)</td>
</tr>
<tr>
<td>Year</td>
<td>Title</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>blanket bogs in counties Cavan, Leitrim and Roscommon</td>
</tr>
<tr>
<td></td>
<td>and Sligo</td>
</tr>
<tr>
<td>2012</td>
<td>Ireland Red List no. 8: Bryophytes</td>
</tr>
<tr>
<td>2013</td>
<td>Irish semi-natural grasslands survey 2007-2012</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and</td>
</tr>
<tr>
<td></td>
<td>Lough Owel</td>
</tr>
<tr>
<td>2013</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>The status of EU protected habitats and species in Ireland. Volume 3. Species assessments</td>
</tr>
<tr>
<td></td>
<td>habitats in Ireland, Version 2.0</td>
</tr>
<tr>
<td></td>
<td>specific conservation objectives and Article 17 reporting</td>
</tr>
<tr>
<td>2016</td>
<td>Boleybrack Mountain SAC (site code: 2032) Conservation objectives supporting document-</td>
</tr>
<tr>
<td></td>
<td>upland habitats V1</td>
</tr>
</tbody>
</table>
## Other References

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>Interpretation manual of European Union habitats- Eur 28</td>
<td>European Commission- DG Environment</td>
<td>European Commission</td>
</tr>
<tr>
<td>in prep.</td>
<td>Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes</td>
<td>Roden, C.; Murphy, P.</td>
<td>Unpublished report to NPWS</td>
</tr>
</tbody>
</table>
## Spatial data sources

<table>
<thead>
<tr>
<th>Year</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
<td>OSi 1:5000 IG vector dataset</td>
</tr>
<tr>
<td><strong>GIS Operations</strong></td>
<td>WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising</td>
</tr>
<tr>
<td><strong>Used For</strong></td>
<td>3160 (map 2)</td>
</tr>
</tbody>
</table>
### Conservation Objectives for: Boleybrack Mountain SAC [002032]

**3160**  
Natural dystrophic lakes and ponds

To maintain the favourable conservation condition of Natural dystrophic lakes and ponds in Boleybrack Mountain SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Natural dystrophic lakes and ponds (3160) are scattered throughout this SAC. There are c.10 lakes larger than 1ha in area and many smaller lakes and pools. Douglas et al. (1990) surveyed the blanket bog at Lackagh and Barleart. Near Lough Kip they noted that wet/quaking vegetation was restricted to lake and river edges. All lakes and pools are upland and, in line with Article 17 reporting (NPWS, 2013), have been mapped as potential 3160 (see map 2). Note: all 3160 pools may not be mapped in the 1:5,000 OSI data. Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes</td>
<td>As noted above, the habitat is widespread in the SAC (see map 2). All lakes have been mapped as potential 3160</td>
</tr>
<tr>
<td>Typical species</td>
<td>Occurrence</td>
<td>Typical species present, in good condition, and demonstrating typical abundances and distribution</td>
<td>For lists of typical plant and invertebrate species, see Article 17 habitat assessment for 3160 (NPWS, 2013) and O Connor (2015)</td>
</tr>
<tr>
<td>Vegetation composition: characteristic zonation</td>
<td>Occurrence</td>
<td>All characteristic zones should be present, correctly distributed and in good condition</td>
<td>The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.), however, significant further work is necessary to describe the characteristic zonation and other spatial patterns in the other four Annex I lake habitats. Spatial patterns are likely to be relatively simple in 3160 lakes and ponds, with limited zonation</td>
</tr>
<tr>
<td>Vegetation distribution: maximum depth</td>
<td>Metres</td>
<td>Maintain maximum depth of vegetation, subject to natural processes</td>
<td>The maximum depth of vegetation is likely to be specific to the lake shoreline in question. A specific target has not yet been set for this lake habitat type. Upland lakes and pools naturally have very clear water and, therefore, maximum depth is expected to be large</td>
</tr>
<tr>
<td>Hydrological regime: water level fluctuations</td>
<td>Metres</td>
<td>Maintain appropriate natural hydrological regime necessary to support the habitat</td>
<td>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 and pools 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. Owing to their size and the sensitivity of peatland, 3160 lakes and ponds can easily be damaged or destroyed by drainage</td>
</tr>
<tr>
<td>Lake substratum quality</td>
<td>Various</td>
<td>Maintain appropriate substratum type, extent and chemistry to support the vegetation</td>
<td>Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that habitat 3160 is associated with nutrient-poor peat and silt substrates</td>
</tr>
<tr>
<td>Water quality: transparency</td>
<td>Metres</td>
<td>Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency. Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A specific target has yet to be established for this Annex I lake habitat. Habitat 3160 is associated with very clear water. The OECD fixed boundary system set transparency targets for ultra-oligotrophic lakes of ≥12m annual mean Secchi disk depth, and ≥6m annual minimum Secchi disk depth.</td>
<td></td>
</tr>
<tr>
<td>Water quality: nutrients</td>
<td>µg/l P; mg/l N</td>
<td>Maintain 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 3160 lakes and ponds, annual average TP concentration should be ≤5µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009.</td>
<td></td>
</tr>
<tr>
<td>Water quality: phytoplankton biomass</td>
<td>µg/l Chlorophyll a</td>
<td>Maintain appropriate water quality to support the habitat, including high chlorophyll a status. Oligotrophic and WFD 'high' status targets apply to habitat 3160. The average growing season (March-October) chlorophyll a concentration must be &lt;5.8µg/l (The European Communities Environmental Objectives (Surface Waters) Regulations 2009). Where a lake has a chlorophyll a concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The OECD targets may be more appropriate for habitat 3160: annual average chlorophyll a concentration &lt;1µg/l and annual peak chlorophyll a concentration ≤2.5µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009.</td>
<td></td>
</tr>
<tr>
<td>Water quality: phytoplankton composition</td>
<td>EPA phytoplankton composition metric</td>
<td>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, habitat 3160 requires WFD high status.</td>
<td></td>
</tr>
<tr>
<td>Water quality: attached algal biomass</td>
<td>Algal cover and EPA phytobenthos metric</td>
<td>Maintain trace/ absent attached algal biomass (&lt;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 3160 lakes and ponds should, therefore, be trace/ absent (&lt;5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, habitat 3160 requires high phytobenthos status.</td>
<td></td>
</tr>
<tr>
<td>Water quality: macrophyte status</td>
<td>EPA macrophyte metric (The Free Index)</td>
<td>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 3160 lakes and ponds 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.</td>
<td></td>
</tr>
<tr>
<td>Parameter</td>
<td>Unit(s)</td>
<td>Description</td>
<td>Notes</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Acidification status</td>
<td>pH units; mg/l</td>
<td>Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes</td>
<td>Acidification can impact on species abundance and composition in soft water lake habitats. Although EC (2013) describes habitat 3160 as having pH 3-6, Drinan (2012) found mean pHs of 5.16 and 5.62 in upland and lowland 3160 lakes, respectively. The target for habitat 3160 is pH &gt;4.5 and &lt;9.0, in line with the surface water standards for soft waters (where water hardness is ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. The specific requirements of lake habitat 3160, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined.</td>
</tr>
<tr>
<td>Water colour</td>
<td>mg/l PtCo</td>
<td>Maintain appropriate water colour to support the habitat</td>
<td>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 &lt;30mg/l PtCo. Water colour can be very low (&lt;20mg/l PtCo or even &lt;10mg/l PtCo) in 3160 lakes and ponds, where the peatland in the lake's catchment is intact.</td>
</tr>
<tr>
<td>Dissolved organic carbon (DOC)</td>
<td>mg/l</td>
<td>Maintain appropriate organic carbon levels to support the habitat</td>
<td>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.</td>
</tr>
<tr>
<td>Turbidity</td>
<td>Nephelometric turbidity units/ mg/l SS/ other appropriate units</td>
<td>Maintain appropriate turbidity to support the habitat</td>
<td>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.</td>
</tr>
<tr>
<td>Fringing habitat: area</td>
<td>Hectares</td>
<td>Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3160</td>
<td>Most 3160 lake and pond shorelines intergrade with blanket bog, heath, flush, poor fen or heath habitats and these support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and can support wetland communities and species of conservation concern.</td>
</tr>
</tbody>
</table>
To restore the favourable conservation condition of Northern Atlantic wet heaths with *Erica tetralix* in Boleybrack Mountain SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Northern Atlantic wet heaths with <em>Erica tetralix</em> habitat has not been mapped in detail for Boleybrack Mountain SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 1,400ha. Further details on this and the following attributes can be found in the Boleybrack Mountain SAC conservation objectives supporting document for upland habitats.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes</td>
<td>Extensive areas of wet heath have been recorded within the SAC, and field notes from 1998 (NPWS internal files) indicate that the habitat is present towards the centre of the SAC and on the western slopes. Further information can be found within this source and the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>The diversity of wet heath communities within this SAC is unknown. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: cross-leaved heath</td>
<td>Occurrence within 20m of a representative number of 2m x 2m monitoring stops</td>
<td>Cross-leaved heath (<em>Erica tetralix</em>) present near each monitoring stop</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of positive indicator species at least 50%</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of <em>Cladonia</em> and <em>Sphagnum</em> species, <em>Racomitrium lanuginosum</em> and pleurocarpous mosses at least 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: ericoid species and crowberry</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of ericoid species and crowberry (<em>Empetrum nigrum</em>) at least 15%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: dwarf shrub species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of dwarf shrubs less than 75%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014), where the list of negative indicator species is also presented. See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. <em>Campylopus introflexus</em> was recorded within this habitat in Boleybrack Mountain SAC in 1998; information from 1998 field notes (NPWS internal files).</td>
</tr>
<tr>
<td>Vegetation composition: native trees and shrubs</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of scattered native trees and shrubs less than 20%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: bracken</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of bracken (<em>Pteridium aquilinum</em>) less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vegetation composition: soft rush</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of soft rush (<em>Juncus effusus</em>) less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: <em>Sphagnum</em> condition</td>
<td>Condition at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 10% of the <em>Sphagnum</em> cover is crushed, broken and/or pulled up</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: signs of browsing</td>
<td>Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 33% collectively of the last complete growing season’s shoots of ericoids, crowberry (<em>Empetrum nigrum</em>) and bog-myrtle (<em>Myrica gale</em>) showing signs of browsing</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: burning</td>
<td>Occurrence in local vicinity of a representative number of 2m x 2m monitoring stops</td>
<td>No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning</td>
<td>Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: drainage</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists, Curtis and McGough (1988) and Lockhart et al. (2012). See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
To restore the favourable conservation condition of European dry heaths in Boleybrack Mountain SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>European dry heaths have not been mapped in detail for Boleybrack Mountains SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 320ha. Further details on this and the following attributes can be found in the Boleybrack Mountain SAC conservation objectives supporting document for upland habitats</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes</td>
<td>Dry heath appears to be confined to the summits and steeper slopes within the SAC; information from the GIS files associated with NPWS (2013). Further information can be found within this source and the uplands supporting document</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities, subject to natural processes</td>
<td>The diversity of dry heath communities within this SAC is unknown. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)</td>
<td></td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of bryophyte or non-crustose lichen species present at each monitoring stop is at least three, excluding Campylopus and Polytrichum mosses</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: number of positive indicator species</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of positive indicator species present at each monitoring stop is at least two</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat, which is composed of dwarf shrubs, is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: cover of positive indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of positive indicator species at least 50% for siliceous dry heath and 50-75% for calcareous dry heath</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat, which is composed of dwarf shrubs, is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: dwarf shrub composition</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Proportion of dwarf shrub cover composed collectively of bog-myrtle (Myrica gale), creeping willow (Salix repens) and western gorse (Ulex gallii) is less than 50%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014) where the list of negative indicator species is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: native trees and shrubs</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of scattered native trees and shrubs less than 20%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: bracken</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of bracken (Pteridium aquilinum) less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation Composition: Soft Rush</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of soft rush (<em>Juncus effusus</em>) less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>----------------------------------</td>
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<td>-------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vegetation Structure: Senescent Ling</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Senescent proportion of ling (<em>Calluna vulgaris</em>) cover less than 50%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation Structure: Signs of Browsing</td>
<td>Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 33% collectively of the last complete growing season’s shoots of ericoids showing signs of browsing</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation Structure: Burning</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>No signs of burning in sensitive areas</td>
<td>Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation Structure: Growth Phases of Ling</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Outside sensitive areas, all growth phases of ling (<em>Calluna vulgaris</em>) should occur throughout, with at least 10% of cover in the mature phase</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical Structure: Disturbed Bare Ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of Local Distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat</td>
<td>This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists, Curtis and McGough (1988) and Lockhart et al. (2012). See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
Conservation Objectives for: Boleybrack Mountain SAC [002032]

To maintain the favourable conservation condition of *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) in Boleybrack Mountain SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td><em>Molinia</em> meadows have not been mapped for Boleybrack Mountain SAC and thus the total area of the qualifying habitat is unknown. It is noted as occurring in wet peaty areas at low elevations in the SAC (NPWS internal files)</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes</td>
<td>See note for area above</td>
</tr>
<tr>
<td>Vegetation composition: typical species</td>
<td>Number at a representative number of monitoring stops</td>
<td>At least seven positive indicator species present, including one &quot;high quality&quot; species as listed in O'Neill et al. (2013)</td>
<td>List of positive indicator species, including high quality species, identified by O'Neill et al. (2013). Note that purple moor-grass (<em>Molinia caerulea</em>) is a positive indicator species, but not necessarily an essential component of the habitat</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%</td>
<td>Attribute and target based on O'Neill et al. (2013)</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>Cover of non-native species not more than 1%</td>
<td>List of negative indicator species identified by O'Neill et al. (2013)</td>
</tr>
<tr>
<td>Vegetation composition: moss species</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>Hair mosses (<em>Polytrichum</em> spp.) not more than 25% cover</td>
<td>Attribute and target based on O'Neill et al. (2013)</td>
</tr>
<tr>
<td>Vegetation composition: woody species and bracken</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>Cover of woody species and bracken (<em>Pteridium aquilinum</em>) not more than 5% cover</td>
<td>Attribute and target based on O'Neill et al. (2013)</td>
</tr>
<tr>
<td>Vegetation structure: broadleaf herb: grass ratio</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>Broadleaf herb component of vegetation between 40% and 90%</td>
<td>Attribute and target based on O'Neill et al. (2013)</td>
</tr>
<tr>
<td>Vegetation structure: sward height</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>At least 30% of sward between 10 and 80cm tall</td>
<td>Attribute and target based on O'Neill et al. (2013)</td>
</tr>
<tr>
<td>Vegetation structure: litter</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>Litter cover not more than 25%</td>
<td>Attribute and target based on O'Neill et al. (2013)</td>
</tr>
<tr>
<td>Physical structure: bare ground</td>
<td>Percentage</td>
<td>Not more than 10% bare ground</td>
<td>Attribute and target based on O'Neill et al. (2010)</td>
</tr>
<tr>
<td>Physical structure: bare soil</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>Not more than 10% bare soil</td>
<td>Attribute and target based on O'Neill et al. (2013)</td>
</tr>
<tr>
<td>Physical structure: disturbance</td>
<td>Square metres</td>
<td>Area showing signs of serious grazing or other disturbance less than 20m²</td>
<td>Attribute and target based on O'Neill et al. (2013)</td>
</tr>
</tbody>
</table>
To restore the favourable conservation condition of Blanket bogs in Boleybrack Mountain SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Blanket bog has not been mapped in detail for Boleybrack Mountain SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 2,000ha. Further information can be found in Douglas et al. (1990).</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes</td>
<td>Extensive areas of blanket bog were recorded by Douglas et al. (1990), especially throughout the central areas of the SAC. Further information can be found within this source and the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Ecosystem function: peat formation</td>
<td>Active blanket bog as a proportion of the total area of Annex I blanket bog habitat</td>
<td>At least 99% of the total Annex I blanket bog area is active</td>
<td>See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Ecosystem function: hydrology</td>
<td>Flow direction, water levels, occurrence of drains and erosion gullies</td>
<td>Natural hydrology unaffected by drains and erosion</td>
<td>Further details and a brief discussion of restoration potential is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Douglas et al. (1990) recorded different active blanket bog communities within this SAC. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of positive indicator species at each monitoring stop is at least seven</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of bryophytes or lichens, excluding <em>Sphagnum fallax</em>, at least 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: potential dominant species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of each of the potential dominant species less than 75%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details, including the list of potentially dominant species.</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented. See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: native trees and scrub</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of scattered native trees and shrubs less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: <em>Sphagnum</em> condition</td>
<td>Condition at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 10% of the <em>Sphagnum</em> cover is crushed, broken and/or pulled up</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: signs of browsing</td>
<td>Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops</td>
<td>Last complete growing season's shoots of ericoids, crowberry (<em>Empetrum nigrum</em>) and bog-myrtle (<em>Myrica gale</em>) showing signs of browsing collectively less than 33%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vegetation structure: burning</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning</td>
<td>Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: drainage</td>
<td>Percentage area in local vicinity of a representative number of monitoring stops</td>
<td>Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: erosion</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists, Curtis and McGough (1988) and Lockhart et al. (2012). See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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Legend

- Boleybrack Mountain SAC 000584; version 3.01. CO. CAVAN, CO. LEITRIM.
- Potential 3160 Natural dystrophic lakes and ponds

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


Series Editor: Rebecca Jeffrey
ISSN 2009-4086
The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

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

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

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

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

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

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

*indicates a priority habitat under the Habitats Directive*

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000625</td>
<td>Bunduff Lough and Machair/Trawalua/Mullaghmore SAC</td>
</tr>
<tr>
<td>1140</td>
<td>Mudflats and sandflats not covered by seawater at low tide</td>
</tr>
<tr>
<td>1160</td>
<td>Large shallow inlets and bays</td>
</tr>
<tr>
<td>1170</td>
<td>Reefs</td>
</tr>
<tr>
<td>1395</td>
<td>Petalwort <em>Petalophyllum ralfsii</em></td>
</tr>
<tr>
<td>2120</td>
<td>Shifting dunes along the shoreline with <em>Ammophila arenaria</em> (white dunes)</td>
</tr>
<tr>
<td>2130</td>
<td>Fixed coastal dunes with herbaceous vegetation (grey dunes)*</td>
</tr>
<tr>
<td>21A0</td>
<td>Machairs (* in Ireland)</td>
</tr>
<tr>
<td>5130</td>
<td><em>Juniperus communis</em> formations on heaths or calcareous grasslands</td>
</tr>
<tr>
<td>6210</td>
<td>Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)</td>
</tr>
<tr>
<td>7230</td>
<td>Alkaline fens</td>
</tr>
</tbody>
</table>

Please note that this SAC adjoins Streedagh Point Dunes SAC (001680). 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

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>Biomar survey of Irish machair sites</td>
<td>Crawford, I.; Bleasdale, A.; Conaghan, J.</td>
<td>Irish Wildlife Manual No. 3</td>
</tr>
<tr>
<td>2015</td>
<td>Bunduff Lough and Machair/Trawalua/Mullaghmore SAC (site code: 625) Conservation objectives supporting document- coastal habitats V1</td>
<td></td>
<td>Conservation objectives supporting document</td>
</tr>
<tr>
<td>2015</td>
<td>Bunduff Lough and Machair/Trawalua/Mullaghmore SAC (site code: 625) Conservation objectives supporting document- marine habitats V1</td>
<td></td>
<td>Conservation objectives supporting document</td>
</tr>
</tbody>
</table>

## Other References

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>The BioMar biotope viewer: a guide to marine habitats, fauna and flora in Britain and Ireland</td>
<td>Picton, B.E.; Costello, M.J.</td>
<td>Environmental Science Unit, Trinity College Dublin</td>
</tr>
<tr>
<td>Year</td>
<td>Title</td>
<td>Author</td>
<td>Series</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>2008</td>
<td>The phytosociology and conservation value of Irish sand dunes</td>
<td>Gaynor, K.</td>
<td>Unpublished PhD thesis, National University of Ireland, Dublin</td>
</tr>
<tr>
<td>2012</td>
<td>Subtidal sediment and subtidal reef survey of Bunduff Lough and Machair/Trawalua/Mullaghmore SAC</td>
<td>MERC</td>
<td>Unpublished report to the Marine Institute and NPWS</td>
</tr>
<tr>
<td>2012</td>
<td>Intertidal benthic survey and intertidal reef survey of Bunduff Lough and Machair/Trawalua/Mullaghmore SAC</td>
<td>MERC</td>
<td>Unpublished report to the Marine Institute and NPWS</td>
</tr>
</tbody>
</table>
### Spatial data sources

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>GIS Operations</th>
<th>Used For</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpolated 2014</td>
<td>1994 BioMar survey; 2011 subtidal survey; 2012 intertidal survey</td>
<td>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</td>
<td>1140, 1170, marine community types (maps 3, 5 and 6)</td>
</tr>
<tr>
<td>2005</td>
<td>OSi Discovery series vector data</td>
<td>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</td>
<td>1160 (map 4)</td>
</tr>
<tr>
<td>2005</td>
<td>OSi Discovery series vector data</td>
<td>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</td>
<td>Marine community types base data (map 6)</td>
</tr>
<tr>
<td>2009</td>
<td>Coastal Monitoring Project 2004-2006. Version 1</td>
<td>QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used</td>
<td>2120, 2130, 21A0 (map 7)</td>
</tr>
<tr>
<td>2012</td>
<td>The conservation status of juniper formations in Ireland</td>
<td>Juniper formations polygons clipped to SAC boundary</td>
<td>5130 (map 8)</td>
</tr>
<tr>
<td>2015</td>
<td>NPWS rare and threatened species database</td>
<td>Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising</td>
<td>1395 (map 8)</td>
</tr>
</tbody>
</table>
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 Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>The permanent habitat area is stable or increasing, subject to natural</td>
<td>Habitat area was estimated as 144ha using OSI data</td>
</tr>
<tr>
<td>Community distribution</td>
<td>Hectares</td>
<td>Conserve the following community type in a natural condition: Fine to</td>
<td>Based on an intertidal survey undertaken in 2012 (MERC, 2012). See marine supporting document for further information</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Large shallow inlets and bays in Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>The permanent habitat area is stable or increasing, subject to natural processes. See map 4</td>
<td>Habitat area was estimated as 3,782ha using OSI data and the Transitional Water Body area as defined under the Water Framework Directive</td>
</tr>
<tr>
<td>Community distribution</td>
<td>Hectares</td>
<td>Conserve the following community types in a natural condition: Fine to very fine sand community complex; Intertidal reef community complex; Laminaria-dominated community complex. See map 6</td>
<td>Based on a 1994 BioMar survey (Picton and Costello, 1997), 2011 subtidal survey (MERC, 2012) and 2012 intertidal survey (MERC, 2012) and InfoMar data. See marine supporting document for further details</td>
</tr>
</tbody>
</table>
Reefs

To maintain the favourable conservation condition of Reefs in Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>The permanent habitat area is stable or increasing, subject to natural processes. See map 5</td>
<td>Habitat area estimated as 1,203ha from a 1994 BioMar survey (Picton and Costello, 1997), 2011 subtidal survey (MERC, 2012) and 2012 intertidal survey (MERC, 2012) and InfoMar data</td>
</tr>
<tr>
<td>Distribution</td>
<td>Occurrence</td>
<td>The distribution of reefs remains stable, subject to natural processes. See map 5 for mapped distribution</td>
<td>Based on information from a 1994 BioMar survey (Picton and Costello, 1997), 2011 subtidal survey (MERC, 2012) and 2012 intertidal survey (MERC, 2012) and InfoMar data</td>
</tr>
<tr>
<td>Community structure</td>
<td>Biological composition</td>
<td>Conserve the following community types in a natural condition: Intertidal reef community complex; <em>Laminaria</em>-dominated community complex. See map 6</td>
<td>Reef mapping based on information from a 1994 BioMar survey (Picton and Costello, 1997), 2011 subtidal survey (MERC, 2012) and 2012 intertidal survey (MERC, 2012) and InfoMar data. See marine supporting document for further details</td>
</tr>
</tbody>
</table>
To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Bunduff - 5.10ha; Trawalua - 5.03ha. See map 7</td>
<td>Based on data from the Coastal Monitoring Project (CMP) (Ryle et al. 2009). Habitat was mapped at two sub-sites to give a total estimated area of 10.13ha. Habitat is very difficult to measure in view of its dynamic nature. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, or change in habitat distribution, subject to natural processes. See map 7 for known distribution</td>
<td>Based on data from Ryle et al. (2009). This habitat accounts for approximately 4% of the sand dune habitat at Trawalua and 5% at Bunduff. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: functionality and sediment supply</td>
<td>Presence/ absence of physical barriers</td>
<td>Maintain the natural circulation of sediment and organic matter, without any physical obstructions</td>
<td>Based on data from Ryle et al. (2009). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (<em>Ammophila arenaria</em>) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. At Bunduff, the mobile dunes are affected by natural erosion, which has been compounded by recreational pressure. A dune management project was implemented at this site and involved the erection sand trap fences (chestnut paling) at the front of the mobile dunes in one area. At Trawalua, the mobile dunes are mainly intact, however in some areas the habitat is eroded. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession</td>
<td>Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: plant health of dune grasses</td>
<td>Percentage cover</td>
<td>More than 95% of marram grass (<em>Ammophila arenaria</em>) and/or lyme-grass (<em>Leymus arenarius</em>) should be healthy (i.e. green plant parts above ground and flowering heads present)</td>
<td>Based on data from Ryle et al. (2009). The CMP noted unhealthy marram grass (<em>Ammophila arenaria</em>) patches in eroding mobile dunes at Trawalua. At Bunduff this species had lost condition in places where the natural erosion was compounded by trampling pressure. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover at a representative number of monitoring stops</td>
<td>Maintain the presence of species-poor communities dominated by marram grass (<em>Ammophila arenaria</em>) and/or lyme-grass (<em>Leymus arenarius</em>)</td>
<td>Based on data from Ryle et al. (2009). Both sub-sites support a typical species complement for mobile dunes. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover</td>
<td>Negative indicator species (including non-natives) to represent less than 5% cover</td>
<td>Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<em>Hippophae rhamnoides</em>) should be absent or effectively controlled. Creeping thistle (<em>Cirsium arvense</em>) was recorded in mobile dune at Bunduff. See coastal habitats supporting document for further details</td>
</tr>
</tbody>
</table>
### Fixed coastal dunes with herbaceous vegetation (grey dunes)

To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Trawalua - 75.18ha; Bunduff - 36.66ha; Mullaghmore - 68.48ha. See map 7</td>
<td>Based on data from Coastal Monitoring Project (CMP) (Ryle et al. 2009). Habitat was surveyed and mapped at two sub-sites and data for the Mullaghmore sub-site was derived from aerial photos (2000) and internal NPWS files to give a total estimated area of 180.32ha. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, or change in habitat distribution, subject to natural processes. See map 7 for known distribution</td>
<td>Based on data from Ryle et al. (2009). Fixed dune habitat is well represented at all sub-sites, with large areas at Trawalua, Mullaghmore and a smaller area at Bunduff. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: functionality and sediment supply</td>
<td>Presence/absence of physical barriers</td>
<td>Maintain the natural circulation of sediment and organic matter, without any physical obstructions</td>
<td>Based on data from Ryle et al. (2009). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. At Bunduff, there are some coastal protection measures in the form of sand-trap fencing and marram grass (<em>Ammophila arenaria</em>) planting as part of a dune management project. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession</td>
<td>Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: bare ground</td>
<td>Percentage cover</td>
<td>Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes</td>
<td>Based on data from Gaynor (2008) and Ryle et al. (2009). At Trawalua, there are a significant number of tracks throughout the fixed dune habitat. The fixed dunes at Bunduff are naturally eroded in some areas particularly on the seaward side. Some small blowouts at the southwestern part of the site were revegetating at the time of the CMP survey. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: sward height</td>
<td>Centimetres</td>
<td>Maintain structural variation within sward</td>
<td>Based on data from Gaynor (2008) and Ryle et al. (2009). All of the sub-sites are grazed to varying extents. At Bunduff the main land use is light to moderate grazing by sheep, cattle and horses. At Trawalua, the fixed dune habitat is lightly grazed and even undergrazed in places. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover at a representative number of monitoring stops</td>
<td>Maintain range of sub-communities with typical species listed in Ryle et al. (2009)</td>
<td>Based on data from Gaynor (2008) and Ryle et al. (2009). The fixed dunes at Trawalua support a typical complement of species. At Bunduff, the CMP noted an abundance of orchids (bee orchid (<em>Ophrys apifera</em>) and frog orchid (<em>Coeloglossum viride</em>) in the fixed dunes. The parasitic species dodder (<em>Cuscuta epithymum</em>) was also abundant at the time of survey. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species (including <em>Hippophae rhamnoides</em>)</td>
<td>Percentage cover</td>
<td>Negative indicator species (including non-natives) to represent less than 5% cover</td>
<td>Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<em>Hippophae rhamnoides</em>) has never been recorded from this SAC and should remain absent. At Bunduff, ragwort (<em>Senecio jacobaea</em>), creeping thistle (<em>Cirsium arvense</em>), perennial rye-grass (<em>Lolium perenne</em>) and bramble (<em>Rubus fruticosus</em>) were recorded by the CMP in fixed dune habitat. At Trawalua, ragwort (<em>Senecio jacobaea</em>), perennial rye-grass (<em>Lolium perenne</em>) and nettle (<em>Urtica dioica</em>) were recorded in fixed dunes. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vegetation composition: scrub/trees</td>
<td>Percentage cover</td>
<td>No more than 5% cover or under control</td>
<td>Based on data from Ryle et al. (2009). At Bunduff, burnet rose (<em>Rosa pimpinellifolia</em>) and low-growing juniper (<em>Juniperus communis</em>) was recorded in the fixed dune. See coastal habitats supporting document for further details</td>
</tr>
</tbody>
</table>
Conservation Objectives for: Bunduff Lough and Machair/Trawalua/Mullaghmore SAC

To maintain the favourable conservation condition of Machairs in Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Bunduff - 48.82ha; Trawalua - 33.39ha; Mullaghmore - 4.18ha. See map 7</td>
<td>Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Habitat was surveyed and mapped at two sub-sites and data for the Mullaghmore sub-site was derived from aerial photos (2000) and internal NPWS files to give a total estimated area of 86.38ha. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes. See map 7 for known distribution</td>
<td>Based on data from Ryle et al. (2009). Both Bunduff and Trawalua have extensive areas of machair that mostly occur in the flat areas between fixed dune ridges and areas of alkaline marsh/fen. At Bunduff, machair accounts for approximately 50% of the total sand dune habitat. At Trawalua, machair accounts for approximately 30% of the total sand dune resource. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Physical structure: functionality and sediment supply</td>
<td>Presence/ absence of physical barriers</td>
<td>Maintain the natural circulation of sediment and organic matter, without any physical obstructions</td>
<td>Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Physical structure: hydrological and flooding regime</td>
<td>Water table levels; groundwater fluctuations</td>
<td>Maintain natural hydrological regime</td>
<td>Based on data from Ryle et al. (2009), Crawford et al. (1996) and Gaynor (2006). See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession</td>
<td>Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: bare ground</td>
<td>Percentage cover</td>
<td>Bare ground should not exceed 10% of machair habitat, subject to natural processes</td>
<td>Based on data from Ryle et al. (2009). At Trawalua there are a significant numbers of tracks through the machair habitat. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: sward height</td>
<td>Centimeters</td>
<td>Maintain structural variation within sward</td>
<td>Based on data from Gaynor (2006, 2008) and Ryle et al. (2009). All of the sub-sites are grazed to varying extents. At Bunduff, the main land use is light to moderate grazing by sheep, cattle and horses. Rabbits (Oryctolagus cuniculus) also graze the machair at this site. At Trawalua, the machair habitat is grazed by cattle, sheep and horses and the sward is kept low. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover at a representative number of monitoring stops</td>
<td>Maintain range of sub-communities with typical species listed in Ryle et al. (2009)</td>
<td>Based on data from Crawford et al (1996), Gaynor (2006) and Ryle et al. (2009). Notable species include the Annex II liverwort species petalwort (<em>Petalophyllum ralfsii</em>), which has been recorded at Bunduff. The areas of wet machair/alkaline fen are very species-rich, often containing 40-50 plant species in an area of 4m². See coastal habitats supporting document for further details as well as the conservation objectives for Alkaline fens (7230) and <em>Petalophyllum ralfsii</em> (1395).</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover</td>
<td>Negative indicator species (including non-natives) to represent less than 5% cover</td>
<td>Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. At Bunduff, the CMP recorded ragwort (<em>Senecio jacobaea</em>). This species was also recorded at Trawalua, along with perennial rye-grass (<em>Lolium perenne</em>). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>----------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vegetation composition: scrub/trees</td>
<td>Percentage cover</td>
<td>No more than 5% cover or under control</td>
<td>Based on data from Ryle et al. (2009). At Bunduff, gorse (<em>Ulex europaeus</em>) was recorded in the machair as were heath species such as ling (<em>Calluna vulgaris</em>). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: bryophytes</td>
<td>Percentage cover</td>
<td>Should always be at least an occasional component of the vegetation</td>
<td>Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
</tbody>
</table>
**Conservation Objectives for: Bunduff Lough and Machair/Trawalua/Mullaghmore SAC**

**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 Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Extent of this habitat within the SAC is unknown. Cooper et al. (2012), O'Neill et al. (2013) and NPWS internal files record the habitat at the eastern end of the SAC; however, there may be other formations present. See map 8 for location of sub-site (SO14) surveyed and mapped by Cooper et al. (2012). Juniper plants have been recorded elsewhere, but at least some populations will not be large enough to be classified as formations.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes</td>
<td>See notes for area above</td>
</tr>
<tr>
<td>Juniper population size</td>
<td>Number per formation</td>
<td>At least 50 plants per formation</td>
<td>To classify as a juniper formation, at least 50 plants should be present (Cooper et al., 2012)</td>
</tr>
<tr>
<td>Vegetation composition: typical species</td>
<td>Number per formation</td>
<td>At least 50% of the listed positive indicator species for the relevant vegetation group present</td>
<td>Cooper et al. (2012) lists positive indicator species for five vegetation groups. The formation described by Cooper et al. (2012) falls into vegetation group 4 (<em>Calluna vulgaris/ Erica cinerea</em> group). See Cooper et al. (2012) for positive indicator species</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Occurrence per formation</td>
<td>Negative indicator species, particularly non-native invasive species, absent or under control</td>
<td>Negative indicator species listed by Cooper et al. (2012)</td>
</tr>
<tr>
<td>Vegetation structure: cone-bearing plants</td>
<td>Percentage per formation</td>
<td>At least 10% of juniper plants are bearing cones</td>
<td>Attribute and target based on Cooper et al. (2012)</td>
</tr>
<tr>
<td>Vegetation structure: seedling recruitment</td>
<td>Percentage per formation</td>
<td>At least 10% of juniper plants are seedlings</td>
<td>Attribute and target based on Cooper et al. (2012)</td>
</tr>
<tr>
<td>Vegetation structure: dead juniper</td>
<td>Percentage per formation</td>
<td>Mean percentage of each juniper plant dead less than 10%</td>
<td>Attribute and target based on Cooper et al. (2012)</td>
</tr>
</tbody>
</table>
### Conservation Objectives for: Bunduff Lough and Machair/Trawalua/Mullaghmore SAC

**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 Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Extent of this habitat within the SAC is unknown. It generally occurs in rather small fragmented areas in mosaic with other habitats such as dune and heath habitats (NPWS internal files; Ryle et al. (2009); O’Neill et al. (2013))</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes</td>
<td>See note for area above</td>
</tr>
<tr>
<td>Vegetation composition: typical species</td>
<td>Number at a representative number of monitoring stops</td>
<td>At least seven positive indicator species present, including two “high quality” species</td>
<td>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</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%</td>
<td>List of negative indicator species identified by O’Neill et al. (2013)</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>Cover of non-native species not more than 1%</td>
<td>Attribute and target based on O’Neill et al. (2013)</td>
</tr>
<tr>
<td>Vegetation composition: woody species and bracken (<em>Pteridium aquilinum</em>)</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>Cover of woody species (except certain listed species) and bracken (<em>Pteridium aquilinum</em>) not more than 5% cover</td>
<td>Woody species that can occur above 5% cover includes juniper (<em>Juniperus communis</em>). However, cover of this species above 25% may indicate transition to another Annex I habitat: <em>Juniperus communis</em> formations (5130). Attribute and target based on O’Neill et al. (2013)</td>
</tr>
<tr>
<td>Vegetation structure: broadleaf herb: grass ratio</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>Broadleaf herb component of vegetation between 40 and 90%</td>
<td>Attribute and target based on O’Neill et al. (2013)</td>
</tr>
<tr>
<td>Vegetation structure: sward height</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>At least 30% of sward between 5cm and 40cm tall</td>
<td>Attribute and target based on O’Neill et al. (2013)</td>
</tr>
<tr>
<td>Vegetation structure: litter</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>Litter cover not more than 25%</td>
<td>Attribute and target based on O’Neill et al. (2013)</td>
</tr>
<tr>
<td>Physical structure: bare soil</td>
<td>Percentage at a representative number of monitoring stops</td>
<td>Not more than 10% bare soil</td>
<td>Attribute and target based on O’Neill et al. (2013)</td>
</tr>
<tr>
<td>Physical structure: disturbance</td>
<td>Square metres</td>
<td>Area showing signs of serious grazing or other disturbance less than 20m²</td>
<td>Attribute and target based on O’Neill et al. (2013)</td>
</tr>
</tbody>
</table>
Conservation Objectives for: Bunduff Lough and Machair/Trawalua/Mullaghmore SAC

### Alkaline fens

To maintain the favourable conservation condition of Alkaline fens in Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Extent of this habitat within the SAC is unknown. It occurs in complex mosaic with other habitats, including Annex I habitats such as Machairs (21A0) (Ryle et al., 2009; O’Neill et al., 2013, NPWS internal files)</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes</td>
<td>See note for area above. The main area of fen within the SAC occurs immediately to the west and north of Bunduff Lough (NPWS internal files)</td>
</tr>
<tr>
<td>Hydrological regime</td>
<td>Metres</td>
<td>Appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat</td>
<td>Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat</td>
</tr>
<tr>
<td>Peat formation</td>
<td>Flood duration</td>
<td>Active peat formation, where appropriate</td>
<td>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.)</td>
</tr>
<tr>
<td>Water quality: nutrients</td>
<td>Water chemistry</td>
<td>Appropriate water quality to support the natural structure and functioning of the habitat</td>
<td>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</td>
</tr>
<tr>
<td>Vegetation composition: typical species</td>
<td>Percentage cover</td>
<td>Maintain vegetation cover of typical species including brown mosses and vascular plants</td>
<td>Mosses listed for fen at this SAC include Campylium stellatum, Scorpidium revolvens, Ctenidium molluscum, Calliergonella cuspidata and Philonotis fontana. Common vascular plant species include water horsetail (Equisetum fluviatile), jointed rush (Juncus articulatus), devil’s-bit scabious (Succisa pratensis), marsh pennywort (Hydrocotyle vulgaris), ragged-robin (Lychnis flos-cuculi), creeping bent (Agrostis stolonifera), grass of parnassus (Parnassia palustris), bog pimpernel (Anagallis tenella), long-stalked yellow sedge (Carex lepidocarpa), black sedge (C. nigra), flea sedge (C. pulicaris) and dioecious sedge (C. dioica). Orchid species are also frequent with common twayblade (Listera ovata), common spotted orchid (Dactylorhiza fuchsii) and marsh helleborine (Epipactis palustris) (NPWS internal files)</td>
</tr>
<tr>
<td>Vegetation composition: trees and shrubs</td>
<td>Percentage cover in local vicinity</td>
<td>Cover of scattered native trees and shrubs less than 10%</td>
<td>Scrub and trees will tend to invade if fen conditions become drier. NPWS internal files report scattered multi-stemmed trees over much of the habitat. Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at a representative number of monitoring stops and in local vicinity</td>
<td>Cover of disturbed bare ground less than 10%. Where tufa is present, disturbed bare ground less than 1%</td>
<td>While grazing may be appropriate in this habitat, excessive area of disturbed bare ground may develop due to unsuitable grazing regimes. Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)</td>
</tr>
<tr>
<td>Physical structure: drainage</td>
<td>Percentage cover in local vicinity</td>
<td>Areas showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%</td>
<td>Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Petalwort in Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution of populations</td>
<td>Number and geographical spread of populations</td>
<td>No decline. See map 8 for recorded location</td>
<td>The population at Bunduff occurs on a track at edge of dune slack in slightly blown-out area. Data from NPWS surveys and Campbell (2013)</td>
</tr>
<tr>
<td>Population size</td>
<td>Number of individuals</td>
<td>No decline. The population is estimated to be c.210 thalli</td>
<td>Counts of thalli: from mean of number of thalli in three 1 x 1m plots, from three counts between early April 2009 and April 2011: 4.67 thalli per m² in 45m² = c.210 thalli (Campbell, 2013)</td>
</tr>
<tr>
<td>Area of suitable habitat</td>
<td>Hectares</td>
<td>No decline. Area of suitable habitat at Bunduff estimated to be c.0.0045ha</td>
<td>Main area of occupancy, recorded along the track, measured by GPS, is c.55m² (Campbell, 2013). Only about 80% of this area is actually suitable habitat for Petalophyllum ralfsii i.e. c.44m². Two outlying records (0.25m² each) from Bunduff were also reported by Lockhart in 1998 and Hodgetts in 2003 giving a total of c.45m² of suitable habitat</td>
</tr>
<tr>
<td>Hydrological conditions: soil moisture</td>
<td>Occurrence of damp soil conditions</td>
<td>Maintain hydrological conditions so that substrate is kept moist and damp throughout the year, but not subject to prolonged inundation by flooding in winter</td>
<td>Petalophyllum ralfsii grows in damp sand. Based on Campbell (2013).</td>
</tr>
<tr>
<td>Vegetation: open structure</td>
<td>Height and percentage cover of vegetation</td>
<td>Maintain open, low vegetation, with a high percentage cover of bryophytes (small acrocarps and liverwort turf) and bare ground</td>
<td>Petalophyllum ralfsii grows in compacted, sandy ground, maintained by rabbit (Oryctolagus cuniculus) and cattle grazing and some occasional vehicle use. Campbell (2013) recorded a mean height of vegetation of 2.9cm, with bryophyte cover c.51-90% and bare ground c.2-10% (based on three 1 x 1m plots measured between 2009 and 2011)</td>
</tr>
</tbody>
</table>
MAP 1:
BUNDUFF LOUGH AND MACHAIR / TRAWALUA / MULLAGHMORE SAC
CONSERVATION OBJECTIVES

SAC DESIGNATION

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

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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Legend

Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625
MAP 2:
BUNDUFF LOUGH AND MACHAIR / TRAWALUA / MULLAGHMORE SAC
CONSERVATION OBJECTIVES
ADJOINING DESIGNATIONS

Site Code:
SAC 000625; version 3.01.
SAC 001680; version 3. CO. SLIGO / CO. LEITRIM

Legend
- Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625
- Streedagh Point Dunes SAC 001680
- OSI Discovery Series County Boundary

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Casódóirí Uilthi EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

An Rúinne
Fidhleachtaí, Oideachas agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

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

Map Version 1
Date: Feb 2015
Map Version 1
Date: Feb 2015

MAP 3:
BUNDUFF LOUGH AND MACAIR /
TRAWALUA / MULLAGHMORE SAC
CONSERVATION OBJECTIVES
TIDAL MUDFLATS AND SANDFLATS

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

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

Legend

Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625
1140 Mudflats and sandflats not covered by sea water at low tide
OSI Discovery Series County Boundary

SITE CODE:
SAC 000625; version 3.01. CO. SLIGO / CO. LEITRIM

Map Version 1
Date: Feb 2015
MAP 4: BUNDUFF LOUGH AND MACHAIR / TRAWALUA / MULLAGHMORE SAC CONSERVATION OBJECTIVES
LARGE SHALLOW INLETS AND BAY

Legend

- Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625
- 1160 Large shallow inlets and bays
- OSI Discovery Series County Boundary

Map to be read in conjunction with the NPWS Conservation Objectives Document.
MAP 5:
BUNDUFF LOUGH AND MACHAIR / TRAWALUA / MULLAGHMORE SAC
CONSERVATION OBJECTIVES
REEFS

Legend
- Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625
- 1170 Reefs
- OSI Discovery Series County Boundary

Site code: SAC 000625; version 3.01. CO. SLIGO / CO. LEITRIM

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

Map Version 1
Date: Feb 2015

Map to be read in conjunction with the NPWS Conservation Objectives Document.
MAP 7:
BUNDUFF LOUGH AND MACHAIR / TRAWALUA / MULLAGHMORE SAC
CONSERVATION OBJECTIVES
SAND DUNE HABITATS

Legend
- Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625
- OSI Discovery Series County Boundary
- CMP: 138 Coastal Monitoring Project Site Codes

Sand Dune Habitats

Qualifying Interests
- 2120 Shifting dunes along the shoreline with Ammophila arenaria ('white dunes')
- 2130 *Fixed coastal dunes with herbaceous vegetation ('grey dunes')
- 21A0 Machairs (*in Ireland)

Non Qualifying Interests
- 1210 Annual vegetation of drift lines
- 2110 Embryonic shifting dunes
- 2190 Humid dune slacks

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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

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

Map Version 1
Date: Feb 2015
MAP 8: BUNDUFF LOUGH AND MACHAIR / TRAWALUA / MULLAGHMORE SAC CONSERVATION OBJECTIVES
JUNIPER FORMATIONS & PETALWORT

SITE CODE: SAC 000625; version 3.01. CO. SLIGO / CO. LEITRIM

Legend

- Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625
- 1395 Petalwort - Petalophyllum ralfsii
- 5130 Juniperus communis formations on heaths or calcareous grasslands

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7140</td>
<td>Transition mires and quaking bogs</td>
</tr>
</tbody>
</table>

* denotes a priority habitat
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*

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000584</td>
<td>Cuilcagh - Anierin Uplands SAC</td>
</tr>
<tr>
<td>1393</td>
<td>Slender Green Feather-moss <em>Drepanoclados vernicosus</em></td>
</tr>
<tr>
<td>3110</td>
<td>Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)</td>
</tr>
<tr>
<td>3160</td>
<td>Natural dystrophic lakes and ponds</td>
</tr>
<tr>
<td>4010</td>
<td>Northern Atlantic wet heaths with <em>Erica tetralix</em></td>
</tr>
<tr>
<td>4030</td>
<td>European dry heaths</td>
</tr>
<tr>
<td>4060</td>
<td>Alpine and Boreal heaths</td>
</tr>
<tr>
<td>6230</td>
<td>Species-rich <em>Nardus</em> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)*</td>
</tr>
<tr>
<td>7130</td>
<td>Blanket bogs (* if active bog)</td>
</tr>
<tr>
<td>7140</td>
<td>Transition mires and quaking bogs</td>
</tr>
<tr>
<td>7220</td>
<td>Petrifying springs with tufa formation (<em>Cratoneurion)</em></td>
</tr>
<tr>
<td>8110</td>
<td>Siliceous scree of the montane to snow levels (<em>Androsacetalia alpinae and Galeopsietalia ladani)</em></td>
</tr>
<tr>
<td>8220</td>
<td>Siliceous rocky slopes with chasmophytic vegetation</td>
</tr>
</tbody>
</table>
## NPWS Documents

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>Irish Red List No. 1 - Water beetles</td>
<td>Foster, G.N.; Nelson, B.H.; O'Connor, Á.</td>
<td>Ireland Red List No. 1</td>
</tr>
<tr>
<td>2013</td>
<td>A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel</td>
<td>Roden, C.; Murphy, P.</td>
<td>Irish Wildlife Manual No. 70</td>
</tr>
<tr>
<td>2013</td>
<td>The status of EU protected habitats and species in Ireland. Volume 3. Species assessments</td>
<td>NPWS</td>
<td>Conservation assessments</td>
</tr>
</tbody>
</table>
Other References

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

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

Year : 1997
Title : The distribution of aquatic Coleoptera in Northern Ireland. Part 1: Families Haliplidae, Hygobiidae, Noteridae, Dytiscidae and Gyrinidae
Author : Nelson, B., Foster, G., Weyl, R.; Anderson, R.

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 : 2000
Title : A guide to habitats in Ireland
Author : Fossitt, J.A.
Series : The Heritage Council, Kilkenny

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 : 2006
Author : Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coron, R.
Series : EPA, Wexford

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 : 2008
Title : Agabus melanarius Aubé, 1937 (Coleoptera: Dytiscidae) a water beetle new to Ireland
Author : Nelson, B.
Series : The Coleopterist, 17: 151-153
<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>Interpretation manual of European Union habitats- Eur 28</td>
<td>European Commission- DG Environment</td>
<td>European Commission</td>
</tr>
<tr>
<td></td>
<td>Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes</td>
<td>Roden, C.; Murphy, P.</td>
<td>Unpublished report to NPWS</td>
</tr>
<tr>
<td>Year</td>
<td>Title</td>
<td>GIS Operations</td>
<td>Used For</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>2008</td>
<td>OSi 1:5000 IG vector dataset</td>
<td>WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitats and to resolve any issues arising</td>
<td>3110, 3160 (map 2)</td>
</tr>
<tr>
<td>2013</td>
<td>National Survey of Upland Habitats</td>
<td>Habitat dataset for site clipped to SAC boundary. Relevant QI selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising</td>
<td>4010, 4030, 4060, 6230, 7130, 7140, 7220, 8110, 8220 (maps 3 to 11)</td>
</tr>
<tr>
<td>2016</td>
<td>NPWS rare and threatened species database</td>
<td>Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising</td>
<td>1393 (map 12)</td>
</tr>
</tbody>
</table>
### Conservation Objectives for: Cuilcagh - Anierin Uplands SAC [000584]

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

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

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Lake habitat 3110 is considered to occur in the larger lakes in Cuilcagh - Anierin Uplands SAC, such as Loughs Nambrack, Derrynananta, Munter Eolus and Knockgorm. Its exact distribution in the SAC is unknown however, as no specific information on the lake vegetation is currently available. Lake habitat 3110 is likely to co-occur with habitat 3160 in most/all lakes. In line with Article 17 reporting (NPWS, 2013), all lakes larger than 1ha have been mapped as ‘potential 3110’ (see map 2). Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes</td>
<td>As noted above, the exact distribution of lake habitat 3110 in the SAC is not known. In map 2, all lakes larger than 1ha (based on 1:5,000 data) have been mapped as potential 3110. All lakes are upland, at altitudes of higher than 350m</td>
</tr>
<tr>
<td>Typical species</td>
<td>Occurrence</td>
<td>Typical species present, in good condition, and demonstrating typical abundances and distribution</td>
<td>For lists of typical plant species, see the Article 17 habitat assessment for 3110 (NPWS, 2013) and the lake habitats supporting document (O Connor, 1997). A number of rare and threatened water beetle and water bug species have been recorded on the Fermanagh side of Cuilcagh (Nelson et al., 1997), but the lakes and ponds in this SAC have not been surveyed</td>
</tr>
<tr>
<td>Vegetation composition:</td>
<td>Occurrence</td>
<td>All characteristic zones should be present, correctly distributed and in good condition</td>
<td>The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.), however, significant further work is necessary to describe the characteristic zonation and other spatial patterns in the other four Annex I lake habitats</td>
</tr>
<tr>
<td>characteristic zonation</td>
<td>Metres</td>
<td>Maintain maximum depth of vegetation, subject to natural processes</td>
<td>The maximum depth of vegetation is likely to be specific to the lake shoreline in question. An indicative target has not yet been set for this lake habitat type. Water clarity is expected to be high in upland 3110 lakes, resulting in a large maximum depth of vegetation</td>
</tr>
<tr>
<td>Vegetation distribution:</td>
<td>Metres</td>
<td>Maintain appropriate natural hydrological regime necessary to support the habitat</td>
<td>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</td>
</tr>
<tr>
<td>Hydrological regime:</td>
<td>Metres</td>
<td>Maintain appropriate natural hydrological regime necessary to support the habitat</td>
<td></td>
</tr>
<tr>
<td>Lake substratum quality</td>
<td>Various</td>
<td>Maintain appropriate substratum type, extent and chemistry to support the vegetation</td>
<td>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 3110 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.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Water quality: transparency</td>
<td>Metres</td>
<td>Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency</td>
<td>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 specific target has yet to be established for this Annex I lake habitat. Habitat 3110 is associated with very clear water, particularly upland examples. 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. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m.</td>
</tr>
<tr>
<td>Water quality: nutrients</td>
<td>µg/l P; mg/l N</td>
<td>Maintain the concentration of nutrients in the water column at sufficiently low levels to support the habitat and its typical species</td>
<td>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 TP concentration should be ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009.</td>
</tr>
<tr>
<td>Water quality: phytoplankton biomass</td>
<td>µg/l Chlorophyll a</td>
<td>Maintain appropriate water quality to support the habitat, including high chlorophyll a status</td>
<td>Oligotrophic and WFD 'high' status targets apply to lake habitat 3110. Where a lake has a chlorophyll a 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 a concentration must be &lt;5.8µg/l. The annual average chlorophyll a concentration should be &lt;2.5µg/l and the annual peak chlorophyll a concentration should be ≤8.0µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009.</td>
</tr>
<tr>
<td>Water quality: phytoplankton composition</td>
<td>EPA phytoplankton composition metric</td>
<td>Maintain appropriate water quality to support the habitat, including high phytoplankton composition status</td>
<td>The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, habitat 3110 requires WFD high status.</td>
</tr>
<tr>
<td>Water quality: attached algal biomass</td>
<td>Algal cover and EPA phytobenthos metric</td>
<td>Maintain trace/ absent attached algal biomass (&lt;5% cover) and high phytobenthos status</td>
<td>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 (&lt;5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, habitat 3110 requires high phytobenthos status.</td>
</tr>
<tr>
<td>Water quality: macrophyte status</td>
<td>EPA macrophyte metric (The Free Index)</td>
<td>Maintain high macrophyte status</td>
<td>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.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Unit(s)</td>
<td>Description</td>
<td>Notes</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------</td>
<td>------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Acidification status</td>
<td>pH units; mg/l</td>
<td>Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes</td>
<td>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 Sphagnum mosses and Juncus bulbosus (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 &lt;5.5 pH units. Maximum pH should be &lt;9.0 pH units, in line with the surface water standards established for soft waters (where water hardness is ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009.</td>
</tr>
<tr>
<td>Water colour</td>
<td>mg/l PtCo</td>
<td>Maintain appropriate water colour to support the habitat</td>
<td>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 &lt;50mg/l PtCo. Water colour can be very low (&lt;20mg/l PtCo or even &lt;10mg/l PtCo) in lake habitat 3110, where the peatland in the lake's catchment is intact.</td>
</tr>
<tr>
<td>Dissolved organic carbon (DOC)</td>
<td>mg/l</td>
<td>Maintain appropriate organic carbon levels to support the habitat</td>
<td>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.</td>
</tr>
<tr>
<td>Turbidity</td>
<td>Nephelometric turbidity units/ mg/l SS/ other appropriate units</td>
<td>Maintain appropriate turbidity to support the habitat</td>
<td>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.</td>
</tr>
<tr>
<td>Fringing habitat: area</td>
<td>Hectares</td>
<td>Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3110</td>
<td>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. In this SAC, active blanket bog and heath communities dominate lake shorelines. Transition mire, fen, flush and grassland may also occur. 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.</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Natural dystrophic lakes and ponds in Cuilcagh - Anierin Uplands SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Natural dystrophic lakes and ponds (3160) are scattered throughout the peatland in the SAC. The habitat likely co-occurs with lake habitat 3110 in the larger lakes. Douglas et al. (1990) found blanket bog of very high scientific importance with extensive 3160 pools south of Lough Cratty. Perrin et al. (2013) recorded fire damage in this area. Douglas et al. (1990) also recorded 3160 pools at Levenatalla and tear pools on the border with NI. All lakes and pools are upland and, in line with Article 17 reporting (NPWS, 2013), have been mapped as potential 3160 (see map 2). Note: not all 3160 pools are mapped in the 1:5,000 OSi data. Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes</td>
<td>As noted above, the habitat is widespread and of high conservation value in the SAC (see map 2). All lakes have been mapped as potential 3160. See Douglas et al. (1990) and Perrin et al. (2013)</td>
</tr>
<tr>
<td>Typical species</td>
<td>Occurrence</td>
<td>Typical species present, in good condition, and demonstrating typical abundances and distribution</td>
<td>For lists of typical plant and invertebrate species, see Article 17 habitat assessment for lake habitat 3160 (NPWS, 2013) and O Connor (2015). A number of rare and threatened water beetle and water bug species has been recorded in 3160 pools and lakes on the Fermanagh side of Cuilcagh, but this SAC has not been surveyed. Beetles included the Endangered Hydroporus longicornis, and Near Threatened Dytiscus lapponicus, Boreonectes (Stictotarsus) multilineatus (= Potamonectes griseostriatus) and Agabus arcticus (see Nelson, 2008; Nelson et al., 1997; Foster et al., 2009). Bugs included Callicorixa wollastoni and Glaenocorisa propinqua</td>
</tr>
<tr>
<td>Vegetation composition:</td>
<td>Occurrence</td>
<td>All characteristic zones should be present, correctly distributed and in good condition</td>
<td>The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.), however, significant further work is necessary to describe the characteristic zonation and other spatial patterns in the other four Annex I lake habitats. Spatial patterns are likely to be relatively simple in 3160 lakes and ponds, with limited zonation</td>
</tr>
<tr>
<td>characteristic zonation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetation distribution:</td>
<td>Metres</td>
<td>Maintain maximum depth of vegetation, subject to natural processes</td>
<td>The maximum depth of vegetation is likely to be specific to the lake shoreline in question. An indicative target has not yet been set for this lake habitat type. Upland lakes and pools naturally have very clear water and, therefore, maximum depth is expected to be large</td>
</tr>
<tr>
<td>maximum depth</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 and pools 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. Owing to their size and the sensitivity of peatland, 3160 lakes and pools can easily be damaged or destroyed by drainage.

Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that habitat 3160 is associated with nutrient-poor peat and silt substrates.

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 specific target has yet to be established for this Annex I lake habitat. Habitat 3160 is associated with very clear water. The OECD fixed boundary system set transparency targets for ultra-oligotrophic lakes of ≥12m annual mean Secchi disk depth, and ≥6m annual minimum Secchi disk depth.

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 3160 lakes and pools, annual average TP concentration should be ≤5µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009.

Oligotrophic and WFD 'high' status targets apply to lake habitat 3160. The average growing season (March-October) chlorophyll a concentration must be <5.8µg/l (The European Communities Environmental Objectives (Surface Waters) Regulations 2009). Where a lake has a chlorophyll a concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The OECD targets may be more appropriate for habitat 3160: annual average chlorophyll a concentration <1µg/l and annual peak chlorophyll a concentration ≤2.5µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009.

The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, lake habitat 3160 requires WFD high status.

Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in 3160 lakes and ponds 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 3160 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 3160 lakes and pools is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of $\geq 0.90$, 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. Although EC (2013) describes habitat 3160 as having pH 3-6, Drinan (2012) found mean pHs of 5.16 and 5.62 in upland and lowland 3160 lakes, respectively. The target for habitat 3160 is pH $>4.5$ and $<9.0$, in line with the surface water standards for soft waters (where water hardness is $\leq 100$mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. The specific requirements of habitat 3160, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined.

### Water colour

**mg/l PtCo**

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 $<50$mg/l PtCo. Water colour can be very low ($<20$mg/l PtCo or even $<10$mg/l PtCo) in 3160 lakes and pools where the peatland in the lake's catchment is intact.

### Dissolved organic carbon (DOC)

**mg/l**

Maintain appropriate organic carbon levels to support the habitat

Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.

### Turbidity

**Nephelometric turbidity units/ mg/l SS/ other appropriate units**

Maintain appropriate turbidity to support the habitat

Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. 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

**Hectares**

Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3160

Most 3160 lake and pool shorelines intergrade with active blanket bog, heath, flush or fen habitats and these support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and can support wetland communities and species of conservation concern.
To restore the favourable conservation condition of Northern Atlantic wet heaths with *Erica tetralix* in Cuilcagh - Anierin Uplands SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area increasing, subject to natural processes</td>
<td>Cuilcagh - Anierin Uplands SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013 and Perrin et al., 2014). Northern Atlantic wet heaths with <em>Erica tetralix</em> was mapped in detail for this SAC (Perrin et al., 2013) and the total current area of the qualifying habitat stated is 80.8ha, covering 0.8% of the SAC. Perrin et al. (2013) report obvious losses of habitat since 1995 of approximately 0.06ha. A summary of the mapping methodology, a brief discussion of restoration potential and further details on this and the following attributes can be found in the Cuilcagh - Anierin Uplands SAC conservation objectives supporting document for upland habitats.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 3</td>
<td>Small areas of wet heath were recorded by Perrin et al. (2013) throughout this SAC. Patches occur near the summit of Benbrack and in the vicinity of Alteen. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded four different wet heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: cross-leaved heath</td>
<td>Occurrence within 20m of a representative number of 2m x 2m monitoring stops</td>
<td>Cross-leaved heath (<em>Erica tetralix</em>) present near each monitoring stop</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of positive indicator species at least 50%</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of <em>Cladonia</em> and <em>Sphagnum</em> species, <em>Racomitrium lanuginosum</em> and pleurocarpous mosses at least 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: ericoid species and crowberry</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of ericoid species and crowberry (<em>Empetrum nigrum</em>) at least 15%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: dwarf shrub species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of dwarf shrubs less than 75%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014), where the list of negative indicator species is also presented. See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. The non-native moss <em>Campylopus introflexus</em> was recorded within this habitat by Perrin et al. (2013) with evidence that severe burning was facilitating the colonisation of this species.</td>
</tr>
<tr>
<td>Vegetation composition: native trees and shrubs</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of scattered native trees and shrubs less than 20%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: bracken</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of bracken (<em>Pteridium aquilinum</em>) less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: soft rush</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of soft rush (<em>Juncus effusus</em>) less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: Sphagnum condition</td>
<td>Condition at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 10% of the <em>Sphagnum</em> cover is crushed, broken and/or pulled up</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: signs of browsing</td>
<td>Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 33% collectively of the last complete growing season’s shoots of <em>ericoids</em>, crowberry (<em>Empetrum nigrum</em>) and bog-myrtle (<em>Myrica gale</em>) showing signs of browsing</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: burning</td>
<td>Occurrence in local vicinity of a representative number of 2m x 2m monitoring stops</td>
<td>No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning</td>
<td>Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: drainage</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
**Conservation Objectives for: Cuilcagh - Anierin Uplands SAC [000584]**

4030  
**European dry heaths**

To restore the favourable conservation condition of European dry heaths in Cuilcagh - Anierin Uplands SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area increasing, subject to natural processes</td>
<td>Cuilcagh - Anierin Uplands SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013 and Perrin et al., 2014). European dry heaths habitat was mapped in detail for this SAC (Perrin et al., 2013) and the total current area of the qualifying habitat stated is 770.5ha, covering 7.9% of the SAC. Perrin et al. (2013) report obvious losses of habitat since 1995 of approximately 0.25ha. A summary of the mapping methodology, a brief discussion of restoration potential and further details on this and the following attributes are presented in the Cuilcagh - Anierin Uplands SAC conservation objectives supporting document for upland habitats.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 4.</td>
<td>Dry heath was recorded by Perrin et al. (2013) throughout the SAC, including the western slopes of Slieve Anierin, the ridge between Slieve Anierin and Bencroy, north of the Playbank summit and on the slopes around Benbrack and Cuilcagh. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded four different dry heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of bryophyte or non-crustose lichen species present at each monitoring stop is at least three, excluding Campylopus and Polytrichum mosses</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: number of positive indicator species</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of positive indicator species present at each monitoring stop is at least two</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat, which is composed of dwarf shrubs, is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: cover of positive indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of positive indicator species at least 50% for siliceous dry heath and 50-75% for calcareous dry heath</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat, which is composed of dwarf shrubs, is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: dwarf shrub composition</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Proportion of dwarf shrub cover composed collectively of bog-myrtle (<em>Myrica gale</em>), creeping willow (<em>Salix repens</em>) and western gorse (<em>Ulex gallii</em>) is less than 50%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014), where the list of negative indicator species is also presented. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
### 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%

Based on Perrin et al. (2014), where the list of negative indicator species is also presented. See the uplands supporting document for further details. The non-native moss *Campylopus introflexus* was recorded within this habitat by Perrin et al. (2013), but did not form extensive carpets.

### 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 20%

Based on Perrin et al. (2014). See the uplands supporting document for further details.

### Vegetation composition: bracken
- Percentage cover in local vicinity of a representative number of monitoring stops
- Cover of bracken (*Pteridium aquilinum*) less than 10%

Based on Perrin et al. (2014). See the uplands supporting document for further details.

### Vegetation composition: soft rush
- Percentage cover in local vicinity of a representative number of monitoring stops
- Cover of soft rush (*Juncus effusus*) less than 10%

Based on Perrin et al. (2014). See the uplands supporting document for further details.

### Vegetation structure: senescent ling
- Percentage cover at a representative number of 2m x 2m monitoring stops
- Senescent proportion of ling (*Calluna vulgaris*) cover less than 50%

Based on Perrin et al. (2014). See the uplands supporting document for further details.

### Vegetation structure: signs of browsing
- Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops
- Less than 33% collectively of the last complete growing season’s shoots of ericoids showing signs of browsing

Based on Perrin et al. (2014). See the uplands supporting document for further details.

### Vegetation structure: burning
- Occurrence in local vicinity of a representative number of monitoring stops
- No signs of burning in sensitive areas

Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details.

### Vegetation structure: growth phases of ling
- Percentage cover in local vicinity of a representative number of monitoring stops
- Outside sensitive areas, all growth phases of ling (*Calluna vulgaris*) should occur throughout, with at least 10% of cover in the mature phase

Based on Perrin et al. (2014). See the uplands supporting document for further details.

### 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%

Based on Perrin et al. (2014). See the uplands supporting document for further details.

### 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 and no decline in status of hepatic mats associated with this habitat

Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details.
To restore the favourable conservation condition of Alpine and Boreal heaths in Cuilcagh - Anierin Uplands SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Cuilcagh - Anierin Uplands SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013 and Perrin et al., 2014). The total current area of Alpine and Boreal heath in the SAC stated by Perrin et al. (2013) is 92.5ha, covering 1.0% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology and further details on this and the following attributes can be found in the Cuilcagh - Anierin Uplands SAC conservation objectives supporting document for upland habitats.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 5</td>
<td>Alpine and Boreal heath was recorded by Perrin et al. (2014) on the high ground across the SAC. A large expanse was recorded on the summit ridge of Cuilcagh. It also notably occurred on the summit of the Playbank, with scattered patches across the summit area of Benbrack. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded four different Alpine and Boreal heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of bryophyte or non-crustose lichen species present at each monitoring stop is at least three</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of positive indicator species at least 66%</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: dwarf shrub species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of dwarf shrub species at least 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 10%</td>
<td>Based on Perrin et al. (2014), where the list of negative indicator species is presented. See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. The non-native moss Campylopus introflexus was recorded within this habitat by Perrin et al. (2013), but did not form extensive carpets.</td>
</tr>
<tr>
<td>Vegetation structure: signs of grazing</td>
<td>Percentage of leaves browsed at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 10% collectively of the live leaves of specific graminoids showing signs of grazing</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details, including the list of specific graminoids.</td>
</tr>
<tr>
<td>Vegetation structure: signs of browsing</td>
<td>Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 33% collectively of the last complete growing season's shoots of ericoids and crowberry (<em>Empetrum nigrum</em>) showing signs of browsing</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vegetation structure: burning</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>No signs of burning within the habitat</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should considered within this attribute. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
To restore the favourable conservation condition of **Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)** in Cuilcagh - Anierin Uplands SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Cuilcagh - Anierin Uplands SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013 and Perrin et al., 2014). Species-rich <em>Nardus</em> grassland* was mapped in detail for this SAC and the total current area stated by Perrin et al. (2013) is 1.4ha, covering 0.01% of the SAC. Perrin et al. (2013) report no obvious losses of habitat since 1995. A summary of the mapping methodology and further details on this and the following attributes can be found in the Cuilcagh - Anierin Uplands SAC conservation objectives supporting document for upland habitats.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 6</td>
<td>Species-rich <em>Nardus</em> grassland* was recorded by Perrin et al. (2013) in the north-east of the SAC on the slopes around Cuilcagh. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded two different species-rich <em>Nardus</em> grassland* communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of positive indicator species present at each monitoring stop is at least seven</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: high quality indicator species</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>At least two high quality species for base-rich examples of the habitat and at least one for base-poor examples of the habitat</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: species richness</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Species richness at each monitoring stop at least 25</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than or equal to 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. <em>Epilobium brunnescens</em> was recorded within this habitat by Perrin et al. (2013), with a relatively high cover score of 15% within the single monitoring stop</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of negative indicator species individually less than or equal to 10% and collectively less than or equal to 20%</td>
<td>Based on Perrin et al. (2014), where the list of negative indicator species is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: <em>Sphagnum</em> cover</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of <em>Sphagnum</em> species less than or equal to 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: Polytrichum cover</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of <em>Polytrichum</em> species less than or equal to 25%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vegetation composition: scrub, bracken and heath cover</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of scrub, bracken (<em>Pteridium aquilinum</em>) and heath collectively less than or equal to 5%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: forb to graminoid ratio</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Forb component of forb:graminoid ratio is 20-90%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: sward height</td>
<td>Sward height at a representative number of 2m x 2m monitoring stops</td>
<td>Proportion of the sward between 5cm and 50cm tall is at least 25%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: litter cover</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of litter less than or equal to 20%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than or equal to 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: grazing or disturbance</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Area of the habitat showing signs of serious grazing or disturbance less than 20m²</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
To restore the favourable conservation condition of Blanket bogs in Cuilcagh - Anierin Uplands SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area increasing, subject to natural processes</td>
<td>Cuilcagh - Anierin Uplands SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013 and Perrin et al., 2014). Perrin et al. (2013) state that the current total area of blanket bog is 5,934.8ha (61.1% of the SAC). This comprises 5861.1ha of active blanket bog and 73.7ha of inactive blanket bog. Perrin et al. (2013) also report obvious losses of habitat since 1995 of approximately 5.1ha. However, this is almost certainly an under-estimate, as chronic losses due to erosion since 1995 cannot be quantified (78.5ha were mapped as eroding blanket bog by Perrin et al. (2013)). It should be noted that further restoration of blanket bog would be required in order to fulfil the targets for peat formation and hydrology presented below. A summary of the mapping methodology and a brief discussion of restoration potential are presented in the Cuilcagh - Anierin Uplands SAC conservation objectives supporting document for upland habitats.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 7</td>
<td>Extensive areas of blanket bogs were recorded by Perrin et al. (2013) throughout this SAC. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Ecosystem function: peat formation</td>
<td>Active blanket bog as a proportion of the total area of Annex I blanket bog habitat</td>
<td>At least 99% of the total Annex I blanket bog area is active</td>
<td>From the habitat areas given by Perrin et al. (2013) above, 98.8% of the Annex I blanket bog habitat is currently actively peat-forming. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Ecosystem function: hydrology</td>
<td>Flow direction, water levels, occurrence of drains and erosion gullies</td>
<td>Natural hydrology unaffected by drains and erosion</td>
<td>Further details and a brief discussion of restoration potential is presented in the uplands supporting document</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded five different active blanket bog communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of positive indicator species at each monitoring stop is at least seven</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of bryophytes or lichens, excluding Sphagnum fallax, at least 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: potential dominant species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of each of the potential dominant species less than 75%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. The non-native species <em>Campylopus introflexus</em> was recorded within 33.3% of blanket bogs monitoring stops recorded by Perrin et al. (2013), but its cover was not sufficiently high to cause any of these stops to fail</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vegetation composition: native trees and scrub</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of scattered native trees and shrubs less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: Sphagnum condition</td>
<td>Condition at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 10% of the Sphagnum cover is crushed, broken and/or pulled up</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: signs of browsing</td>
<td>Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops</td>
<td>Last complete growing season's shoots of ericoids, crowberry (<em>Empetrum nigrum</em>) and bog-myrtle (<em>Myrica gale</em>) showing signs of browsing collectively less than 33%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: burning</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning</td>
<td>Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: drainage</td>
<td>Percentage area in local vicinity of a representative number of monitoring stops</td>
<td>Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: erosion</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
### Conservation Objectives for: Cuilcagh - Anierin Uplands SAC [000584]

#### Transition mires and quaking bogs

To maintain the favourable conservation condition of Transition mires and quaking bogs in Cuilcagh - Anierin Uplands SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Cuilcagh - Anierin Uplands SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013 and Perrin et al., 2014). The total current area of transition mires and quaking bogs in the SAC stated by Perrin et al. (2013) is 17.4ha. This covers 0.2% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology and further details on this and the following attributes can be found in the Cuilcagh - Anierin Uplands SAC conservation objectives supporting document for upland habitats.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 8</td>
<td>Transition mire was recorded by Perrin et al. (2013) scattered across the SAC, most notably on the western slopes of Slieve Anierin, along the undulating summit of the ridge of the Playbank and on flatter areas of ground to the south-east of the plateau east of Commas. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded three different transition mire communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: number of positive indicator species</td>
<td>Number at a representative number of 2m x 2m monitoring stops</td>
<td>Number of positive indicator species at least three for in-filling pools and flushes and at least six for fens</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: number of core positive indicator species</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>At least one core positive indicator species present</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: cover of positive indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of positive indicator species is at least 25%</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. No non-native species were recorded within this habitat by Perrin et al. (2013)</td>
</tr>
<tr>
<td>Vegetation structure: height</td>
<td>Percentage at a representative number of 2m x 2m monitoring stops</td>
<td>Proportion of live leaves and/or flowering shoots of vascular plants that are more than 15cm above the ground surface should be at least 50%</td>
<td>Based on Perrin et al. (2014). This attribute is only applicable to fen and flush examples, not to in-filling pool examples. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Physical structure: disturbed bare ground</th>
<th>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</th>
<th>Cover of disturbed bare ground less than 10%</th>
<th>Based on Perrin et al. (2014). See the uplands supporting document for further details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical structure: drainage</td>
<td>Percentage area in local vicinity of a representative number of monitoring stops</td>
<td>Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
## Conservation Objectives for: Cuilcagh - Anierin Uplands SAC [000584]

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

To restore the favourable conservation condition of Petrifying springs with tufa formation (Cratoneurion)* in Cuilcagh - Anierin Uplands SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Square metres</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Within Cuilcagh - Anierin Uplands SAC, eight polygons were recorded as having petrifying springs during the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013). The polygons were recorded mainly around the Cuilcagh massif. The overall area of habitat 7220* is given in Perrin et al. (2013) as 0.1ha. The approach to mapping conducted during the NSUH is detailed in Perrin et al. (2014). Note that the NSUH did not undertake a conservation status assessment of this habitat and thus it is not included in the uplands supporting document</td>
</tr>
</tbody>
</table>

| Habitat distribution | Occurrence | No decline from current distribution, subject to natural processes. See map 9 | This habitat has been recorded from eight polygons within the SAC. Four of the polygons are predominantly covered with the Fossitt (2000) habitat poor fen and flush (PF2), three of the polygons predominantly contain the Annex I habitat Blanket bog (7130*) and the majority of the final polygon supports the Fossitt (2000) habitat wet grassland (GSG). Lyons and Kelly (2013) recognise three main sub-types of spring: wooded springs, inland non-wooded springs and coastal springs. The springs in this SAC fall into the second sub-type, within which springs on steep sites are recognised as a distinct sub-group |

| 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 (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 bryophytes *Palustriella commutata* (*Cratoneuron commutatum*) and *Cratoneuron filicinum* are diagnostic of petrifying springs (EC, 2013) and are found in this habitat in the SAC (Perrin et al., 2013). *Palustriella commutata* is diagnostic for identifying the NSUH vegetation community SPG2i, this being synonymous with 7220*. Other bryophyte species recorded within the SAC (Perrin et al., 2013), which are listed in Appendix 1 A-C of Lyons and Kelly (2013) as being indicative of petrifying springs are: *Aneura pinguis*, *Bryum pseudotriquetrum*, *Campylium stellatum*, *Fissidens adianthoides*, *Hymenostylium recurvirostrum* var. *recurvirostrum*, *Jungermannia atrovirens*, *Palustriella falcata*, *Pellia endiviifolia*, *Philontis calcarea* and *Pohlia wahlenbergii* |
Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)

To restore the favourable conservation condition of Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) in Cuilcagh - Anierin Uplands SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Cuilcagh - Anierin Uplands SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013 and Perrin et al., 2014). The total current area of siliceous scree in the SAC stated by Perrin et al. (2013) is 8.5ha. This covers 0.1% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology and further details on this and the following attributes can be found in the Cuilcagh - Anierin Uplands SAC conservation objectives supporting document for upland habitats</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 10</td>
<td></td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of bryophytes and non-crustose lichen species at least 5%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Proportion of vegetation composed of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014), where the list of negative indicator species is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Proportion of vegetation composed of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. The cover of the non-native species <em>Campylopus introflexus</em> in one of four siliceous scree monitoring stops recorded by Perrin et al. (2013) was sufficiently high enough to cause it to fail</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Number of species in local vicinity of a representative number of monitoring stops</td>
<td>Number of positive indicator species present in vicinity of each monitoring stop in block scree is at least one</td>
<td>Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014) and is the same as for 8220 Siliceous rocky slopes. Further details can be found in the uplands supporting document</td>
</tr>
<tr>
<td>Vegetation composition: grass species and dwarf shrubs</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Total cover of grass species and dwarf shrubs less than 20%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: bracken, native trees and scrub</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Total cover of bracken (<em>Pteridium aquilinum</em>), native trees and scrub less than 25%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: grazing and browsing</td>
<td>Percentage of leaves/shoots grazed/browsed at a representative number of 2m x 2m monitoring stops</td>
<td>Live leaves of forbs and shoots of dwarf shrubs showing signs of grazing or browsing collectively less than 50%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbance</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Ground disturbed by human and animal paths, scree running, vehicles less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details.
To maintain the favourable conservation condition of Siliceous rocky slopes with chasmophytic vegetation in Cuilcagh - Anierin Uplands SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Cuilcagh - Anierin Uplands SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013 and Perrin et al., 2014). Siliceous rocky slopes was mapped in detail for this SAC and the total current area stated by Perrin et al. (2013) is 10.9ha, covering 0.1% of the SAC. Perrin et al. (2013) report no obvious losses of habitat since 1995. A summary of the mapping methodology and further details on this and the following attributes can be found in the Cuilcagh - Anierin Uplands SAC conservation objectives supporting document for upland habitats.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 11</td>
<td>Small areas of siliceous rocky slopes were recorded by Perrin et al. (2013) throughout this SAC, with some of the most extensive areas found on the slopes of Slieve Anierin. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Number of species at a representative number of monitoring stops</td>
<td>Number of positive indicator species present in vicinity of each monitoring stop is at least one</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Proportion of vegetation composed of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. No non-native species were recorded within this habitat by Perrin et al. (2013).</td>
</tr>
<tr>
<td>Vegetation composition: bracken, native trees and scrub</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Total cover of bracken (Pteridium aquilinum), native trees and scrub less than 25%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: grazing and browsing</td>
<td>Percentage of leaves/shoots grazed/browsed in local vicinity of a representative number of monitoring stops</td>
<td>Live leaves of forbs and shoots of dwarf shrubs showing signs of grazing or browsing collectively less than 50%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details.</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Slender Green Feather-moss (*Drepanocladus vernicosus*) in Cuilcagh - Anierin Uplands SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution of populations</td>
<td>Number and geographical spread of populations</td>
<td>No decline of known population at Commas. See map 12</td>
<td>(Please note that <em>Drepanocladus vernicosus</em> was reclassified as <em>Hamatocaulis vernicosus</em> by Hedenäs (1989)). The known population of <em>Hamatocaulis vernicosus</em> in Cuilcagh - Anierin Uplands SAC is at Commas, where it occurs in a springhead at the top of a rich flush, east of the summit of Cuilcagh (Perrin et al., 2013). See also Campbell et al. (2015)</td>
</tr>
<tr>
<td>Population size</td>
<td>Number of individuals</td>
<td>No decline. The population at Commas is estimated to be c.100 shoots</td>
<td></td>
</tr>
<tr>
<td>Area of suitable habitat</td>
<td>Hectares</td>
<td>No decline. Area of suitable habitat at Commas is estimated at c.0.0002ha</td>
<td>The population at Commas is estimated to occur over an area of c.2m² (0.0002ha). See Campbell et al. (2015) for further details</td>
</tr>
<tr>
<td>Hydrological conditions: water</td>
<td>Metres</td>
<td>Maintain suitable hydrological conditions</td>
<td><em>Hamatocaulis vernicosus</em> 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, such as the Commas population; and wet lowland sedge meadows, where plants can be inundated in winter, but may be subject to some desiccation in the summer. Based on Campbell (2013) and Campbell et al. (2015)</td>
</tr>
<tr>
<td>table level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetation: sward structure and</td>
<td>Height and percentage cover of vegetation</td>
<td>Maintain open structure with a high percentage cover of bryophytes</td>
<td><em>Hamatocaulis vernicosus</em> grows in moss-dominated, open communities, generally with a low cover of trees, shrubs and grasses, maintained at some sites by low grazing intensity (usually by sheep), such as at the Commas population. The moss <em>Calliergonella cuspidata</em>, a species often associated with high nutrient conditions, is usually present, but with low cover and never dominant. Rory Hodd (pers. comm., 2012) recorded that grazing pressure was not having any real impact at the Commas, although there were signs of some bare soil and minor erosion on the sides of the small valley in which the flush occurred</td>
</tr>
<tr>
<td>density</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MAP 1: CUICLAGH - ANIERIN UPLANDS SAC CONSERVATION OBJECTIVES
SAC DESIGNATION

SITE CODE:
SAC 000584; version 3.01; CO. CAVAN, CO. LEITRIM.

Legend

[Boundary lines]

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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

Legend

Cuiclagh-Anierin Uplands SAC 000584

Map to be read in conjunction with the NPWS Conservation Objectives Document.
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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Nil na teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis Rialtas na hÉireann

Legend

- **Cuilcagh Anierin Uplands SAC 000584**

- **Indicative Lake Habitats**
  - Potential 3110 / Potential 3160 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae) / Natural dystrophic lakes and ponds
  - Potential 3160 Natural dystrophic lakes and ponds

Map to be read in conjunction with the NPI C Conservation Objectives Document.
MAP 3: CUILCAGH - ANIERIN UPLANDS SAC CONSERVATION OBJECTIVES
WET HEATH

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

Legend

Culicagh-Anierin Uplands SAC 000584
Cover of 4010 Northern Atlantic wet heath with Erica tetralix

SITE CODE:
SAC 000584; version 3.01. CO. CAVAN, CO. LEITRIM.

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis Rialtas na hÉireann

Map Version 1
Date: July 2016
MAP 4: CUILCAGH - ANIERIN UPLANDS SAC CONSERVATION OBJECTIVES DRY HEATHS

SITE CODE:
SAC 000584; version 3.01. CO. CAVAN, CO. LEITRIM.

Legend
- CUILCAGH - ANIERIN UPLANDS SAC 000584

Cover of 4030 European dry heaths

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

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

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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Níl sna teorainneacha ar na léarscáileanna ach nod garshúiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis Rialtas na hÉireann

Map Version 1
Date: July 2016
MAP 5:
CUILCAGH - ANIERIN UPLANDS SAC
CONSERVATION OBJECTIVES
ALPINE AND BOREAL HEATHS

Legend

Cover of 4060 Alpine and Boreal heaths

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

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na nRialtas na hÉireann

SITE CODE:
SAC 000584; version 3.01. CO. CAVAN, CO. LEITRIM.

Map Version 1
Date: July 2016
MAP 6: CUICLAGH - ANIERIN UPLANDS SAC CONSERVATION OBJECTIVES SPECIES RICH NARDUS GRASSLAND* Map to be read in conjunction with the NPIWS Conservation Objectives Document.

SITE CODE: SAC 000584; version 3.01. CO. CAVAN, CO. LEITRIM.

Legend

- Cuilcagh - Anierin Uplands SAC 000584

Cover of 6230 Species-rich Nardus grasslands on siliceous substrates in mountain areas (and submountain areas in continental Europe)

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis Rialtas na hÉireann
MAP 7:
CUILCAGH - ANIERIN UPLANDS SAC
CONSERVATION OBJECTIVES
BLANKET BOGS (* IF ACTIVE BOG)

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

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SITE CODE:
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Legend

0% - 100% Blanket bogs (* if active bog)
CONSERVATION OBJECTIVES

TRANSITION MIRES

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

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Legend

Cuilcagh - Anierin Uplands SAC 000584

Cover of 7140 Transition mires and quaking bogs

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

MAP 8: CUILCAGH - ANIERIN UPLANDS SAC CONSERVATION OBJECTIVES TRANSITION MIRES

SITE CODE: SAC 000584; version 3.01. CO. CAVAN, CO. LEITRIM.
MAP 9: 
CUILCAGH - ANIERIN UPLANDS SAC
CONSERVATION OBJECTIVES
PETRIFYING SPRINGS

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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Legend

Cuilcagh-Anierin Uplands SAC 000584
Cover of 7220 *Petrifying springs with tufa formation (Cratoneurion)

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>Gray</td>
</tr>
<tr>
<td>0.1% - 20%</td>
<td>Yellow</td>
</tr>
<tr>
<td>20.1% - 40%</td>
<td>Orange</td>
</tr>
<tr>
<td>40.1% - 60%</td>
<td>Red</td>
</tr>
<tr>
<td>60.1% - 80%</td>
<td>Dark Brown</td>
</tr>
<tr>
<td>80.1% - 100%</td>
<td>Black</td>
</tr>
</tbody>
</table>

SITE CODE: SAC 000584; version 3.01. CO. CAVAN, CO. LEITRIM.

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

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MAP 10: 
CUILCAHG - ANIERIN UPLANDS SAC 
CONSERVATION OBJECTIVES
SILICEOUS SCREE

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

Legend:
- Cuilcagh-Anierin Uplands SAC 000584

Cover of 8110 Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 0.1%</td>
<td>Gray</td>
</tr>
<tr>
<td>0.1% - 20%</td>
<td>Yellow</td>
</tr>
<tr>
<td>20.1% - 40%</td>
<td>Orange</td>
</tr>
<tr>
<td>40.1% - 60%</td>
<td>Red</td>
</tr>
<tr>
<td>60.1% - 80%</td>
<td>Brown</td>
</tr>
<tr>
<td>80.1% - 100%</td>
<td>Pink</td>
</tr>
</tbody>
</table>

SITE CODE: SAC 000584; version 3.01. CO. CAVAN, CO. LEITRIM.

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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Map Version 1
Date: July 2016
MAP 11: CUILCAGH - ANIERIN UPLANDS SAC
CONSERVATION OBJECTIVES
SILICEOUS ROCKY SLOPES

Legend

- Culcagh-Anierin Uplands SAC 000584

8220 Cover Siliceous rocky slopes with chasmophytic vegetation

Legend:

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

SAC 000584: version 3.01. CO. CAVAN, CO. LEITRIM.
MAP 12: CUICLAGH - ANIERIN UPLANDS SAC CONSERVATION OBJECTIVES
SLENDER GREEN FEATHER-MOSS

Legend
- Cuilcagh Anierin Uplands SAC 000584
- 1393 Slender Green Feather Moss - Drepanocladus vernicosus

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

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis Rialtas na hÉireann
Conservation Objectives Series

Cummeen Strand SPA 004035

An Roinn
Ealaíon, Oidhreacht agus Gaeltacht

Department of
Arts, Heritage and the Gaeltacht
Citation:

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>004035</td>
<td>Cummeen Strand SPA</td>
</tr>
<tr>
<td>A046</td>
<td>Brent Goose <em>Branta bernicla hrota</em></td>
</tr>
<tr>
<td>A130</td>
<td>Oystercatcher <em>Haematopus ostralegus</em></td>
</tr>
<tr>
<td>A162</td>
<td>Redshank <em>Tringa totanus</em></td>
</tr>
<tr>
<td>A999</td>
<td>Wetlands</td>
</tr>
</tbody>
</table>

Please note that this SPA overlaps with Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (000627) and is adjacent to Drumcliff Bay SPA (004013) and Ballysadare Bay SPA (004129). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.
To maintain the favourable conservation condition of Light-bellied Brent Goose in Cummeen Strand SPA, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population trend</td>
<td>Percentage change</td>
<td>Long term population trend stable or increasing</td>
<td>Waterbird population trends are presented in part four of the conservation objectives supporting document</td>
</tr>
<tr>
<td>Distribution</td>
<td>Range, timing and intensity of use of areas</td>
<td>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</td>
<td>Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Oystercatcher in Cummeen Strand SPA, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population trend</td>
<td>Percentage change</td>
<td>Long term population trend stable or increasing</td>
<td>Population trends are presented in part four of the conservation objectives supporting document</td>
</tr>
<tr>
<td>Distribution</td>
<td>Range, timing and intensity of use of areas</td>
<td>No significant decrease in the range, timing and intensity of use of areas by oystercatcher, other than that occurring from natural patterns of variation</td>
<td>Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part four of the conservation objectives supporting document</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Redshank in Cummeen Strand SPA, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population trend</td>
<td>Percentage change</td>
<td>Long term population trend stable or increasing</td>
<td>Population trends are presented in part four of the conservation objectives supporting document</td>
</tr>
<tr>
<td>Distribution</td>
<td>Range, timing and intensity of use of areas</td>
<td>No significant decrease in the range, timing and intensity of use of areas by redshank, other than that occurring from natural patterns of variation</td>
<td>Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of wetland habitat in Cummeen Strand SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>The permanent area occupied by the wetland habitat should be stable and not significantly less than 1732 hectares, other than that occurring from natural patterns of variation</td>
<td>The wetland habitat area was estimated as 1732ha using OSI data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document</td>
</tr>
</tbody>
</table>
Legend

- Cummeen Strand SPA 004035
- Drumcliff Bay SPA 004013
- Ballysadare Bay SPA 004129
- Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC 000627
- OSI Discovery Series County Boundaries

Site Code: SPA 004035; version 1.03
SPA 004013; version 2.02, SPA 004129; version 1.03,
SAC 000627; version 3

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).

Nil aon karadhanna e ar na laiseachtaí is é á thionchar mhinic gréasaithe. Thosfar an fheithreithse a d'fhanann ar thionchar na gairid chumhachtai. Músafraíl d'aithníte na Stiúrthóireachta Oirthiúil is ceart ar Rialtas (Ceadaíon Uimh. EN 0059212)

Map Version 1
Date: June 2013
Map to be read in conjunction with the NPFV Conservation Objectives Document.
Conservation Objectives Series

Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC 000627
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.
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000627</td>
<td>Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC</td>
</tr>
<tr>
<td>1014</td>
<td>Marsh Snail <em>Vertigo angustior</em></td>
</tr>
<tr>
<td>1095</td>
<td>Sea Lamprey <em>Petromyzon marinus</em></td>
</tr>
<tr>
<td>1099</td>
<td>River Lamprey <em>Lampetra fluviatilis</em></td>
</tr>
<tr>
<td>1130</td>
<td>Estuaries</td>
</tr>
<tr>
<td>1140</td>
<td>Mudflats and sandflats not covered by seawater at low tide</td>
</tr>
<tr>
<td>1365</td>
<td>Harbour seal <em>Phoca vitulina</em></td>
</tr>
<tr>
<td>2110</td>
<td>Embryonic shifting dunes</td>
</tr>
<tr>
<td>2120</td>
<td>Shifting dunes along the shoreline with <em>Ammophila arenaria</em> (white dunes)</td>
</tr>
<tr>
<td>2130</td>
<td>Fixed coastal dunes with herbaceous vegetation (grey dunes)*</td>
</tr>
<tr>
<td>5130</td>
<td><em>Juniperus communis</em> formations on heaths or calcareous grasslands</td>
</tr>
<tr>
<td>7220</td>
<td>Petrifying springs with tufa formation (Cratoneurion)*</td>
</tr>
</tbody>
</table>

Please note that this SAC overlaps with Drumcliff Bay SPA (004013), Cummeen Strand SPA (004035), Ardboline Island and Horse Island SPA (004135) and Ballintemple and Ballygilgan SPA (004234). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping sites as appropriate.
## NPWS Documents

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>1989 survey of breeding herds of common seal (<em>Phoca vitulina</em>) with reference to previous surveys</td>
<td>Harrington, R.</td>
<td>Unpublished report to Wildlife Service</td>
</tr>
<tr>
<td>2007</td>
<td>A Survey of Intertidal Mudflats and Sandflats in Ireland</td>
<td>Aquatic Services Unit</td>
<td>Unpublished report to NPWS</td>
</tr>
<tr>
<td>2011</td>
<td>Monitoring and condition assessment of populations of <em>Vertigo geyeri</em>, <em>Vertigo angustior</em> and <em>Vertigo moulinsiana</em> in Ireland</td>
<td>Moorkens, E.A.; Killeen, I.J.</td>
<td>Irish Wildlife Manual No. 55</td>
</tr>
<tr>
<td>2013</td>
<td>Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (site code 627) Conservation objectives supporting document- coastal habitats V1</td>
<td>NPWS</td>
<td>Conservation objectives supporting document</td>
</tr>
<tr>
<td>2013</td>
<td>Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (site code 627) Conservation objectives supporting document- marine habitats and species V1</td>
<td>NPWS</td>
<td>Conservation objectives supporting document</td>
</tr>
<tr>
<td>Year</td>
<td>Title</td>
<td>Author</td>
<td>Series</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>1980</td>
<td>An assessment of the status of the common seal (<em>Phoca vitulina vitulina</em>) in Ireland</td>
<td>Summers, C.F.; Warner, P.J.; Nairn, R.G.W.; Curry, M.G.; Flynn, J.</td>
<td>Biological Conservation 17: 115-123</td>
</tr>
<tr>
<td>2008</td>
<td>The phytosociology and conservation value of Irish sand dunes</td>
<td>Gaynor, K.</td>
<td>Unpublished PhD thesis, National University of Ireland, Dublin</td>
</tr>
<tr>
<td>2011</td>
<td>Subtidal benthic investigations: Cummeen Strand/Drumcliff Bay cSAC (site code IE000627) Co. Sligo</td>
<td>Aquafact</td>
<td>Unpublished report to the Marine Institute and NPWS</td>
</tr>
<tr>
<td>2012</td>
<td>A survey of mudflats and sandflats in Ireland</td>
<td>Aquatic Services Unit</td>
<td>Unpublished report to the Marine Institute and NPWS</td>
</tr>
</tbody>
</table>
### Spatial data sources

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>GIS Operations</th>
<th>Used For</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>EPA WFD transitional waterbody data</td>
<td>Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising</td>
<td>1130 (map 3)</td>
</tr>
<tr>
<td>Interpolated 2013</td>
<td>Intertidal surveys, 2007 and 2010; subtidal survey, 2010</td>
<td>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</td>
<td>1140, marine community types (maps 4 and 5)</td>
</tr>
<tr>
<td>2005</td>
<td>OSi Discovery series vector data</td>
<td>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</td>
<td>Marine community types base data (map 5)</td>
</tr>
<tr>
<td>2009</td>
<td>Coastal Monitoring Project 2004-2006. Version 1</td>
<td>QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used</td>
<td>2110, 2120, 2130 (map 6)</td>
</tr>
<tr>
<td>2012</td>
<td>The conservation status of juniper formations in Ireland</td>
<td>Juniper survey centroids clipped to SAC boundary</td>
<td>5130 (map 7)</td>
</tr>
<tr>
<td>2013</td>
<td>NPWS rare and threatened species database</td>
<td>Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising</td>
<td>1014, 1365 (maps 7 and 8)</td>
</tr>
<tr>
<td>2005</td>
<td>OSi Discovery series vector data</td>
<td>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</td>
<td>1365 (map 8)</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Estuaries in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>The permanent habitat area is stable or increasing, subject to natural processes. See map 3</td>
<td>Habitat area was estimated as 1258ha using OSI data and the defined Transitional Water Body area under the Water Framework Directive</td>
</tr>
<tr>
<td>Community structure: Zostera density</td>
<td>Shoots/m²</td>
<td>Conserve the high quality of the Zostera-dominated community, subject to natural processes</td>
<td>Estimated during intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2012). See marine supporting document for further details</td>
</tr>
<tr>
<td>Community structure: Mytilus edulis density</td>
<td>Individuals/m²</td>
<td>Conserve the high quality of the Mytilidae-dominated community complex, subject to natural processes</td>
<td>Estimated during intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2012) and subtidal survey in 2010 (Aquafact, 2011). See marine supporting document for further details</td>
</tr>
<tr>
<td>Community distribution</td>
<td>Hectares</td>
<td>Conserve the following community types in a natural condition: Intertidal fine sand with <em>Peringia ulvae</em> and <em>Pygospio elegans</em> community complex; Estuarine mixed sediment to sandy mud with <em>Hediste diversicolor</em> and oligochaetes community complex; Fine sand with <em>Angulus</em> spp. and <em>Nephtys</em> spp. community complex; Sand to mixed sediment with amphipods community; Intertidal reef community. See map 5</td>
<td>Based on intertidal and subtidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2012; Aquafact, 2011) and an intertidal walkover undertaken in 2013. See marine supporting document for further information</td>
</tr>
</tbody>
</table>
Conservation Objectives for: Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC [000627]

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 Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>The permanent habitat area is stable or increasing, subject to natural processes. See map 4</td>
<td>Habitat area was estimated using OSI data as 2288ha</td>
</tr>
<tr>
<td>Community structure: Zostera density</td>
<td>Shoots/m²</td>
<td>Conserve the high quality of the Zostera-dominated community, subject to natural processes</td>
<td>Estimated during intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2012). See marine supporting document for further details</td>
</tr>
<tr>
<td>Community structure: Mytilus edulis density</td>
<td>Individuals/m²</td>
<td>Conserve the high quality of the Mytilidae-dominated community complex, subject to natural processes</td>
<td>Estimated during intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2012). See marine supporting document for further details</td>
</tr>
<tr>
<td>Community distribution</td>
<td>Hectares</td>
<td>Conserve the following community types in a natural condition: Intertidal fine sand with <em>Peringia ulvae</em> and <em>Pygospio elegans</em> community complex; Estuarine mixed sediment to sandy mud with <em>Hediste diversicolor</em> and oligochaetes community complex; Fine sand with crustaceans and <em>Scololepis (Scololepis squamata)</em> community complex; Fine sand with <em>Angulus</em> spp. and <em>Nephtys</em> spp. community complex. See map 5</td>
<td>Based on intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2012). See marine supporting document for further information</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Embryonic shifting dunes in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Coney Island - 0.67ha, Rosses Point - 32.27ha, Strandhill - 0.18ha, Yellow Strand - 0.83ha. See map 6</td>
<td>Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Habitat is very difficult to measure in view of its dynamic nature. It was recorded at four sub-sites, giving an estimated total area of 33.95ha. NB further unsurveyed areas maybe present within this SAC. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes. See map 6 for known distribution</td>
<td>Based on data from Ryle et al. (2009). Additional dune habitats noted to occur at Lissadell Strand and on Maquin's Island. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: functionalty and sediment supply</td>
<td>Presence/absence of physical barriers</td>
<td>Maintain the natural circulation of sediment and organic matter, without any physical obstructions</td>
<td>Based on data from Ryle et al. (2009). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. There are coastal protection works at both Strandhill and Rosses Point. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession</td>
<td>Based on data from Ryle et al. (2009). At Rosses Point, saltmarsh habitats occur in association with sand dune habitats. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: plant health of foredune grasses</td>
<td>Percentage cover</td>
<td>More than 95% of sand couch (Elytrigia juncea) and/or lyme-grass (Leymus arenarius) should be healthy (i.e. green plant parts above ground and flowering heads present)</td>
<td>Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover</td>
<td>Maintain the presence of species-poor communities with typical species: sand couch (Elytrigia juncea) and/or lyme-grass (Leymus arenarius)</td>
<td>Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover</td>
<td>Negative indicator species (including non-native species) to represent less than 5% cover</td>
<td>Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (Hippophae rhamnoides) should be absent or effectively controlled. This species has not been recorded from this SAC. See coastal habitats supporting document for further details</td>
</tr>
</tbody>
</table>
Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* (‘white dunes’) in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Coney Island - 0.46ha, Rosses Point - 0.17ha, Strandhill - 0.10ha, Yellow Strand - 0.47ha. See map 6</td>
<td>Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Habitat is very difficult to measure in view of its dynamic nature. It was recorded at four sub-sites, giving an estimated total area of 1.20ha. NB further unsurveyed areas maybe present within this SAC. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution</td>
<td>Based on data from Ryle et al. (2009). Additional dune habitats noted to occur at Lissadell Strand and on Maquin’s Island. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: functionality and sediment supply</td>
<td>Presence/absence of physical barriers</td>
<td>Maintain the natural circulation of sediment and organic matter, without any physical obstructions</td>
<td>Based on data from Ryle et al. (2009). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (<em>Ammophila arenaria</em>) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. There are hard coastal protection works at both Strandhill and Rosses Point. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession</td>
<td>Based on data from Gaynor (2008) and Ryle et al. (2009). At Rosses Point, saltmarsh habitats occur in association with sand dune habitats. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: plant health of dune grasses</td>
<td>Percentage cover</td>
<td>95% of marram grass (<em>Ammophila arenaria</em>) and/or lyme-grass (<em>Leymus arenarius</em>) should be healthy (i.e. green plant parts above ground and flowering heads present)</td>
<td>Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover at a representative number of monitoring stops</td>
<td>Maintain the presence of species-poor communities dominated by marram grass (<em>Ammophila arenaria</em>) and/or lyme-grass (<em>Leymus arenarius</em>)</td>
<td>Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover</td>
<td>Negative indicator species (including non-natives) to represent less than 5% cover</td>
<td>Based on data from Ryle et al. (2009). Negative indicators include non-native species; species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<em>Hippophae rhamnoides</em>) should be absent or effectively controlled. This species has not been recorded from this SAC. See coastal habitats supporting document for further details</td>
</tr>
</tbody>
</table>
To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation (‘grey dunes’) in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Coney Island - 15.06ha; Rosses Point - 21.89ha; Strandhill - 40.14ha; Yellow Strand - 19.16ha. See map 6</td>
<td>Based on data from Coastal Monitoring Project (CMP) (Ryle et al., 2009). Habitat was recorded at four sub-sites, giving an estimated total area of 96.26ha. NB further unsurveyed areas maybe present within this SAC. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution</td>
<td>Based on data from Ryle et al. (2009). Additional dune habitats noted to occur at Lissadell Strand and on Maquin’s Island. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: functionality and sediment supply</td>
<td>Presence/ absence of physical barriers</td>
<td>Maintain the natural circulation of sediment and organic matter, without any physical obstructions</td>
<td>Based on data from Ryle et al. (2009). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. There are coastal protection works at both Strandhill and Rosses Point. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession</td>
<td>Based on data from Gaynor (2008) and Ryle et al. (2009). At Rosses Point, saltmarsh habitats occur in association with sand dune habitats. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: bare ground</td>
<td>Percentage cover</td>
<td>Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes</td>
<td>Based on data from Gaynor (2008) and Ryle et al. (2009). At both Yellow Strand and Coney Island, overgrazing and rabbit burrowing have contributed to creating large areas of bare sand. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: sward height</td>
<td>Centimetres</td>
<td>Maintain structural variation within sward</td>
<td>Based on data from Gaynor (2008) and Ryle et al. (2009). Vegetation is quite rank in places at Strandhill and Rosses Point due to undergrazing, while at Coney Island and Yellow Strand, overgrazing is an issue. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover at a representative sample of monitoring stops</td>
<td>Maintain range of sub-communities with typical species listed in Ryle et al. (2009)</td>
<td>Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species (including Hippophae rhamnoides)</td>
<td>Percentage cover</td>
<td>Negative indicator species (including non-natives) to represent less than 5% cover</td>
<td>Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (Hippophae rhamnoides) should be absent or effectively controlled. This species has not been recorded from this SAC. The main negative indicators recorded are creeping thistle (Cirsium arvense), spear thistle (C. vulgare), ragwort (Senecio jacobaea) and perennial rye grass (Lolium perenne) (Ryle et al., 2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: scrub/trees</td>
<td>Percentage cover</td>
<td>Based on data from Ryle et al. (2009). At Strandhill, pine trees planted at low density occur within the fixed dune habitat. Isolated individual sycamore (<em>Acer pseudoplatanus</em>) trees are present in the northern part of the fixed dunes at Rosses Point. See coastal habitats supporting document for further details.</td>
<td></td>
</tr>
</tbody>
</table>
To restore the favourable conservation condition of *Juniperus communis* formations on heaths or calcareous grasslands in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formation area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Four areas of juniper vegetation were identified within the SAC (three at Rosses Point and one at Knocklane: SO01, SO04, SO08, SO16) by a national juniper survey (Cooper et al., 2012), although not all are classified as formations (see below). NB Further unsurveyed areas maybe present within the SAC.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline. Known locations shown on map 7</td>
<td>Map shows sites identified in Cooper et al. (2012)- SO01, SO04, SO08, SO16. NB Further unsurveyed areas maybe present within the SAC.</td>
</tr>
<tr>
<td>Juniper population size</td>
<td>Number</td>
<td>At least 50 plants per population</td>
<td>To classify as a juniper formation, at least 50 plants should be present (Cooper et al., 2012). Further work is required to confirm which sites, identified by Cooper et al. (2012) at Rosses Point, should be classified as formations. These three sites probably form a single breeding population (J. Cross, pers. comm.). The Knocklane population (SO04) is not currently classified as a formation (Cooper et al., 2012).</td>
</tr>
<tr>
<td>Formation structure: cover and height</td>
<td>Percentage and metres</td>
<td>Well-developed structure with an open to closed cover of juniper up to or exceeding 0.45m in height with associated species</td>
<td>The populations in the SAC are composed mainly of low-growing (0.2-0.7m high) plants of sub-species <em>nana</em> (Cooper et al., 2012).</td>
</tr>
<tr>
<td>Formation structure: community diversity and extent</td>
<td>Hectares</td>
<td>Appropriate community diversity and extent</td>
<td>See Cooper et al. (2012) for further details.</td>
</tr>
<tr>
<td>Formation structure: cone-bearing plants</td>
<td>Percentage</td>
<td>At least 10% of plants bearing cones</td>
<td>Target based on Cooper et al. (2012). 55% of the SO01 population was bearing cones at time of survey (Cooper et al., 2012).</td>
</tr>
<tr>
<td>Formation structure: seedling recruitment</td>
<td>Percentage</td>
<td>At least 10% of juniper plants within the formation are seedlings</td>
<td>Target based on Cooper et al. (2012). 21% of the SO01 population were seedlings according to Cooper et al. (2012).</td>
</tr>
<tr>
<td>Formation structure: amount of each plant dead</td>
<td>Mean percentage</td>
<td>Mean percentage of each juniper plant dead not more than 10%</td>
<td>Target based on Cooper et al. (2012).</td>
</tr>
<tr>
<td>Vegetation composition: typical species</td>
<td>Occurrence</td>
<td>A variety of typical native species with a minimum of 10 species present (excluding negative indicator species)</td>
<td>According to Cooper et al. (2012), juniper stands within the SAC fall into either vegetation group 4 (<em>Calluna vulgaris-Erica cinerea</em> group) or 5 (<em>Galium verum-Pilosella officinarum</em> group). See Cooper et al. (2012) for typical species.</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Occurrence</td>
<td>Negative indicator species, particularly non-native invasive species, absent or under control</td>
<td>Non-native cotoneaster (<em>Cotoneaster integrifolius</em>) was recorded at Rosses Point by Cooper et al. (2012).</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Petrifying springs with tufa formation (*Cratoneurion*) in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Square metres</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>The area of this habitat at Ballincar is recorded as 150m² along c.200m of cliff (internal NPWS files). NB further areas of the habitat may occur within this SAC</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline. See map 7 for recorded location</td>
<td>This habitat occurs along a seepage line in low (generally less than 10m in height) clay sea cliffs near Ballincar (internal NPWS files). Lyons and Kelly (2013) recognise three main subtypes of spring. This site falls into the coastal springs subtype (the other two being woodland springs and inland non-wooded springs) NB further areas of the habitat may occur within this SAC</td>
</tr>
<tr>
<td>Hydrological regime: height of water table; water flow</td>
<td>Metres; metres per second</td>
<td>Maintain appropriate hydrological regimes</td>
<td>The hydrological regime is currently unknown at this site. Petrifying springs rely on permanent irrigation, usually from upwelling groundwater sources or seepage sources. This site appears to be fed from water seeping through clay sea cliffs (internal NPWS files)</td>
</tr>
<tr>
<td>Water quality</td>
<td>Water chemistry measures</td>
<td>Maintain oligotrophic and calcareous conditions</td>
<td>Water chemistry is currently unknown for this site. Characteristically, petrifying spring water has high values for pH, alkalinity and dissolved calcium and is oligotrophic (Lyons and Kelly, 2013)</td>
</tr>
<tr>
<td>Vegetation composition: typical species</td>
<td>Occurrence</td>
<td>Maintain typical species</td>
<td>The bryophytes <em>Palustriella commutata</em> (<em>Cratoneurion commutatum</em>) and <em>Eucladium verticillatum</em> are diagnostic of this habitat (EC, 2007). Both are found at the location described above (internal NPWS files). Other bryophyte species listed here are <em>Didymodon lophaceus</em> and <em>Trichostomium crampilum</em> (internal NPWS files)</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Narrow-mouthed Whorl Snail in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution: occupied sites</td>
<td>Number</td>
<td>No decline. There is one known location for this species in this SAC (which overlaps two 1km squares). See map 7</td>
<td>From Moorkens and Killeen (2011) (site code VaCAM21)</td>
</tr>
<tr>
<td>Presence on transect</td>
<td>Occurrence</td>
<td>Adult or sub-adult snails are present in four of the grassland zones on the transect where optimal or sub-optimal habitat occurs (minimum 5 samples)</td>
<td>Transect established as part of condition assessment monitoring at this site (Moorkens and Killeen, 2011). See habitat extent target below for definition of optimal and sub-optimal habitat</td>
</tr>
<tr>
<td>Presence</td>
<td>Occurrence</td>
<td>Adult or sub-adult snails are present in at least 6 other places at the site with a wide geographical spread (minimum of 8 sites or 75% of sites sampled)</td>
<td>From Moorkens and Killeen (2011)</td>
</tr>
<tr>
<td>Transect habitat quality</td>
<td>Metres</td>
<td>At least 75m of habitat along the transect is classed as optimal and 150m of habitat along the transect is classed as sub-optimal or optimal</td>
<td>From Moorkens and Killeen (2011). See habitat extent target below for definition of optimal and sub-optimal habitat</td>
</tr>
<tr>
<td>Transect optimal wetness</td>
<td>Metres</td>
<td>Soils, at time of sampling, are damp (optimal wetness) and covered with a layer of humid thatch for more than 130m along the transect</td>
<td>From Moorkens and Killeen (2011)</td>
</tr>
<tr>
<td>Habitat extent</td>
<td>Hectares</td>
<td>12-15ha of the site optimal and a further 11-14ha sub-optimal. Optimal habitat is defined as fixed dune, species-rich grassland dominated by red fescue (<em>Festuca rubra</em>), with sparse marram grass (<em>Ammophila arenaria</em>), lady's bedstraw (<em>Galium verum</em>), eyebright (<em>Euphrasia sp.</em>), mouse-ear-hawkweed (<em>Pilosella officinarum</em>) and other low growing herbs. Vegetation height 10-30cm. Habitat growing on damp, friable soil covered with a layer of humid, open structured thatch. Sub-optimal habitat is defined as for optimal but either vegetation height is less than 10cm or between 30 and 50cm; or the vegetation contains mounds of moss or willow (<em>Salix spp.</em>) scrub; or the soil is dry and sandy; or the thatch is wetter with a denser structure</td>
<td>From Moorkens and Killeen (2011)</td>
</tr>
</tbody>
</table>
### Conservation Objectives for: Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC [000627]

#### 1095 Sea Lamprey *Petromyzon marinus*

To restore the favourable conservation condition of Sea Lamprey in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution: extent of anadromy</td>
<td>% of estuary accessible</td>
<td>No barriers for migratory life stages of lamprey moving from freshwater to marine habitats and vice versa</td>
<td>This SAC only covers marine/estuarine habitat and it is not anticipated that it contains suitable spawning or nursery habitat. Migrating adult lamprey pass through the site en route to/from the Garavogue River, which flows out of Lough Gill. Lough Gill SAC (site code: 976), which is adjacent to this SAC, encompasses the freshwater elements of sea lamprey habitat. Potential barriers for migrating lamprey include anthropogenic physical barriers and chemical barriers e.g. oxygen depletion or discharge of noxious pollutants.</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of River Lamprey in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution: extent of anadromy</td>
<td>% of estuary accessible</td>
<td>No barriers for migratory life stages of lamprey moving from freshwater to marine habitats and vice versa</td>
<td>This SAC only covers marine/estuarine habitat and it is not anticipated that it contains suitable spawning or nursery habitat. Migrating adult lamprey pass through the site en route to/from the Garavogue River, which flows out of Lough Gill. Lough Gill SAC (site code: 1976), which is adjacent to this SAC, encompasses the freshwater elements of river lamprey habitat. Potential barriers for migrating lamprey include anthropogenic physical barriers and chemical barriers e.g. oxygen depletion or discharge of noxious pollutants</td>
</tr>
</tbody>
</table>
**Conservation Objectives for: Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC [000627]**

**1365 Harbour seal *Phoca vitulina***

To maintain the favourable conservation condition of Harbour Seal in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to suitable habitat</td>
<td>Number of artificial barriers</td>
<td>Species range within the site should not be restricted by artificial barriers to site use. See map 8</td>
<td>See marine supporting document for further details</td>
</tr>
<tr>
<td>Breeding behaviour</td>
<td>Breeding sites</td>
<td>Conserve the breeding sites in a natural condition. See map 8</td>
<td>Attribute and target based on background knowledge of Irish breeding populations, review of data summarised by Summers et al. (1980), Warner (1983), Harrington (1990), Lyons (2004), and unpublished NPWS records. See marine supporting document for further details</td>
</tr>
<tr>
<td>Moulting behaviour</td>
<td>Moult haul-out sites</td>
<td>Conserve the moult haul-out sites in a natural condition. See map 8</td>
<td>Attribute and target based on background knowledge of Irish populations, review of data from Lyons (2004), Cronin et al. (2004), and unpublished NPWS records. See marine supporting document for further details</td>
</tr>
<tr>
<td>Resting behaviour</td>
<td>Resting haul-out sites</td>
<td>Conserve the resting haul-out sites in a natural condition</td>
<td>Attribute and target based on background knowledge of Irish populations, review of data from Lyons (2004) and unpublished NPWS records. See marine supporting document for further details</td>
</tr>
<tr>
<td>Disturbance</td>
<td>Level of impact</td>
<td>Human activities should occur at levels that do not adversely affect the harbour seal population at the site</td>
<td>See marine supporting document for further details</td>
</tr>
</tbody>
</table>
MAP 2: CUMMEEN STRAND / DRUMCLIFF BAY (SLIGO BAY) SAC

CONSERVATION OBJECTIVES
ADJOINING / OVERLAPPING DESIGNATIONS

Legend

- Cummeen Strand / Drumcliff Bay (Sligo Bay) SAC 000627
- Drumcliff Bay SPA 004013
- Cummeen Strand SPA 004035
- Ardboine Island and Horse Island SPA 004135
- Ballintemple and Ballygilgan SPA 004234
- OSI Discovery Series County Boundaries

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).

Map Version 1
Date: Aug 2013
MAP 3:
CUMMEEN STRAND / DRUMCLIFF BAY
(SLIGO BAY) SAC
CONSERVATION OBJECTIVES
ESTUARIES

The map is to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SAC 000627, version 3
County Sligo

Legend

SAC 000627
1130 Estuaries
OSI Discovery Series County Boundaries

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0038212).

Nil ach seanrathacht ar na linniúil/leas daonra in aghaidh na n-áthasóirí. Féadfaidh aithnítear na dteorainní ar son na garánta.

Copyright © An Taoiseach 2023
Map Version 1
Date: Aug 2013
Legend

- SAC 000627
- 1140 Mudflats and sandflats not covered by sea water at low tide
- OSI Discovery Series County Boundaries

MAP 4: CUMMEEN STRAND / DRUMCLIFF BAY (SLIGO BAY) SAC
CONSERVATION OBJECTIVES
TIDAL MUDFLATS AND SANDFLATS

SITE CODE: SAC 000627; version 3
County Sligo

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).

The Níl sna tae oinneach a ach níoghamhán go ginearálta. Faileadh ortbhreithiúil a díreachach an t-aonáras na gránnta chontráththa. Maíonn an t-áitiúil ná na Stáitíochtaí Oirthéinis sa chlúradh (Céadúin Uimh. EN 0059212).

Map Version 1
Date: Aug 2013

Map to be read in conjunction with the NPWS Conservation Objectives Document.
MAP 5: CUMMEEN STRAND / DRUMCLIFF BAY (SLIGO BAY) SAC CONSERVATION OBJECTIVES MARINE COMMUNITY TYPES

Legend

- SAC 000627
- OSI Discovery Series County Boundaries

Marine Community Types

- Estuarine mixed sediment to sandy mud with Hediste diversicolor and oligochaetes community complex
- Fine sand with Angulus spp. and Nephtys spp. community complex
- Fine sand with crustacea and Scolelepis (Scolelepis) squamata community complex
- Intertidal fine sand with Peringia ulvae and Pygospio elegans community complex
- Intertidal reef community
- Mytilidae-dominated community complex
- Sand to mixed sediment with amphipods community
- Subtidal reef community
- Zostera-dominated community

SITE CODE: SAC 000627; version 3 County Sligo

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0009212).

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**Map Version 1**

**Date:** Aug 2013

**MAP 6:**

CUMMEEN STRAND / DRUMCLIFF BAY (SLIGO BAY) SAC

**CONSERVATION OBJECTIVES**

**SAND DUNE HABITATS**

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

---

**Legend**

- **SAC 000627**
- OSi Discovery Series County Boundaries
- CMP: 135 Coastal Monitoring Project Site Codes

**Sand Dune Habitats**

**Qualifying Interests**

- 2110 Embryonic shifting dunes
- 2120 Shifting dunes along the shoreline with Ammophila arenaria (‘white dunes’)
- 2130* Fixed coastal dunes with herbaceous vegetation (‘grey dunes’)

**Non-Qualifying Interests**

- 1210 Annual vegetation of drift lines
- 1220 Perennial vegetation of stony banks
- 2170 Dunes with Salix repens ssp. argentea (Salicion arenariae)

---

**SITE CODE: SAC 000627; version 3**

County Sligo

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).

Nil aon taispeánacht ar na leasaí leis an chuid gréasáin iarracht a dhéanamh. An taispeánacht seo is de bagaimh agus is idirnáisiúnta i gceist nuair a dhéanann an Rialtas (Rinneadh ar an Rialtas, taispeánacht EN 0059212).

---

MAP 6: CUMMEEN STRAND / DRUMCLIFF BAY (SLIGO BAY) SAC CONSERVATION OBJECTIVES SAND DUNE HABITATS

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

---

**CMP: 135**

**CMP: 134**

**CMP: 133**

---

**N**:
CUMMEEN STRAND / DRUMCLIFF BAY
(SLIGO BAY) SAC
CONSERVATION OBJECTIVES
NARROW-MOUTED WHORL SNAIL, PETRIFYING SPRINGS & JUNIPER FORMATIONS

Legend

- SAC 000627
- 5130 Juniperus communis formations on heaths or calcareous grasslands Survey Sites
- 7220 *Petrifying springs with tufa formation (Cratoneuron)
- 1014 Narrow-Mouethed Whorl Snail - Vertigo angustior

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

The map was produced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).

Nil eoraí lir theas ar na leacán/bheoach an ndúchtaíanna, féach ar thionchar eile in eolaíocht na gaearr contaiste. Múscas na hAontósaí is é Mhuineadh um Ráidh (Comhairle Umh. EN 0059212).

SITE CODE: SAC 000627; version 3
County Sligo
MAP 8: CUMMEEN STRAND / DRUMCLIFF BAY (SLIGO BAY) SAC CONSERVATION OBJECTIVES
HARBOUR SEAL

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

SITE CODE: SAC 000627; version 3
County Sligo

Legend
- SAC 000627
- 1365 Harbour Seal - Phoca vitulina Breeding Sites
- 1365 Harbour Seal - Phoca vitulina Resting Sites
- 1365 Harbour Seal - Phoca vitulina Habitat
- OSI Discovery Series County Boundaries

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 005312).

Nil aon leasú ná aon leasú an chomhcheartachta a d'éirí ann. B'fhéidir go bhfuil an cheannarann de-bhallaí an-aimseartha agus an-ghnóthaí ag an-aimseartha a d'fhéadfadh a chomhlíonadh. Maireann an tAthar na hOidhreacht na hÉireann air an iarrthóir sin agus ainmhithe 'Enniscrone Pleasantland' i mBéal na hAbbáis, Sligo.
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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3180</td>
<td>Turloughs*</td>
</tr>
<tr>
<td></td>
<td>* denotes a priority habitat</td>
</tr>
</tbody>
</table>

For more information please go to: [www.npws.ie/protected-sites/conservation-management-planning](http://www.npws.ie/protected-sites/conservation-management-planning)
Citation: NPWS (2016) Conservation objectives for Doocastle Turlough SAC [000492]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
Conservation Objectives Series

Drumcliff Bay SPA 004013

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>004013</td>
<td>Drumcliff Bay SPA</td>
</tr>
<tr>
<td>A144</td>
<td>Sanderling <em>Calidris alba</em></td>
</tr>
<tr>
<td>A157</td>
<td>Bar-tailed Godwit <em>Limosa lapponica</em></td>
</tr>
<tr>
<td>A999</td>
<td>Wetlands</td>
</tr>
</tbody>
</table>

Please note that this SPA overlaps with Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (000627) and is adjacent to Cummeen Strand SPA (004035), Ballysadare Bay SPA (004129) and Ballintemple and Ballygilgan SPA (004234). 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 : 2013
Title : Drumcliff Bay SPA (site code 4013) Conservation objectives supporting document V1
Author : NPWS
Series : Conservation objectives supporting document
**Conservation Objectives for : Drumcliff Bay SPA [004013]**

**A144  Sanderling *Calidris alba***

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

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population trend</td>
<td>Percentage change</td>
<td>Long term population trend stable or increasing</td>
<td>Waterbird population trends are presented in part four of the conservation objectives supporting document</td>
</tr>
<tr>
<td>Distribution</td>
<td>Range, timing and intensity of use of areas</td>
<td>No significant decrease in the range, timing or intensity of use of areas by sanderling, other than that occurring from natural patterns of variation</td>
<td>Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Bar-tailed Godwit in Drumcliff Bay SPA, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population trend</td>
<td>Percentage change</td>
<td>Long term population trend stable or increasing</td>
<td>Population trends are presented in part four of the conservation objectives supporting document</td>
</tr>
<tr>
<td>Distribution</td>
<td>Range, timing and intensity of use of areas</td>
<td>No significant decrease in the range, timing and intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation</td>
<td>Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of wetland habitat in Drumcliff Bay SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1843 hectares, other than that occurring from natural patterns of variation</td>
<td>The wetland habitat area was estimated as 1843ha using OSI data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document</td>
</tr>
</tbody>
</table>
MAP 1: DRUMCLIFF BAY SPA
CONSERVATION OBJECTIVES
SPA DESIGNATION

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

Flughany Bog SAC 000497

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

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.
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000497</td>
<td>Flughany Bog SAC</td>
</tr>
<tr>
<td>7110</td>
<td>Active raised bogs*</td>
</tr>
<tr>
<td>7120</td>
<td>Degraded raised bogs still capable of natural regeneration</td>
</tr>
<tr>
<td>7150</td>
<td>Depressions on peat substrates of the Rhynchosporion</td>
</tr>
</tbody>
</table>
### NPWS Documents

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>National raised bog SAC management plan</td>
<td>Department of Arts, Heritage and the Gaeltacht</td>
<td>Draft for consultation. 15 January 2014</td>
</tr>
<tr>
<td>2016</td>
<td>Flughany Bog SAC (site code: 497) Conservation objectives supporting document- raised bog habitats V1</td>
<td>NPWS</td>
<td>Conservation objectives supporting document</td>
</tr>
</tbody>
</table>

### Other References

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
</table>
## Spatial data sources

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong>:</td>
<td>Scientific Basis for Raised Bog Conservation in Ireland</td>
</tr>
<tr>
<td><strong>GIS Operations</strong>:</td>
<td>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 potential</td>
</tr>
<tr>
<td><strong>Used For</strong>:</td>
<td>7110; digital elevation model; drainage patterns (maps 2 and 4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong>:</td>
<td>Raised Bog Monitoring and Assessment Survey 2013</td>
</tr>
<tr>
<td><strong>GIS Operations</strong>:</td>
<td>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</td>
</tr>
<tr>
<td><strong>Used For</strong>:</td>
<td>7110 ecotopes (map 3)</td>
</tr>
</tbody>
</table>
To restore the favourable conservation condition of Active raised bogs in Flughany Bog SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Restore area of active raised bog to 23.6ha, subject to natural processes</td>
<td>Active Raised Bog (ARB) habitat was mapped at 11.4ha by Fernandez et al. (2014). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 13.1ha. See map 2. However, it is estimated that only 9.2ha is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 20.6ha. Eco-hydrological assessments of the cutover estimates that an additional 3.0ha of bog forming habitats could be restored. The long term target for ARB is therefore 23.6ha. See raised bog supporting document for further details on this and following attributes</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>Restore the distribution and variability of active raised bog across the SAC. See map 3 for distribution in 2012</td>
<td>ARB habitat at Flughany Bog is central and sub-central ecotopes and active flush. ARB currently occurs most abundantly on the south-eastern part of Flughany Bog. DRB occurs on both 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)</td>
</tr>
<tr>
<td>High bog area</td>
<td>Hectares</td>
<td>No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 2</td>
<td>The area of high bog within Flughany Bog SAC in 2012 (latest figure available) was 143.7ha (DAHG 2014)</td>
</tr>
<tr>
<td>Hydrological regime: water levels</td>
<td>Centimetres</td>
<td>Restore appropriate water levels throughout the site</td>
<td>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. Open water is often characteristic of soak systems</td>
</tr>
<tr>
<td>Hydrological regime: flow patterns</td>
<td>Flow direction; slope</td>
<td>Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 4 for current situation</td>
<td>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</td>
</tr>
<tr>
<td>Transitional areas between high bog and adjacent mineral soils (including cutover areas)</td>
<td>Hectares; distribution</td>
<td>Restore adequate transitional areas to support/protect active raised bog and the services it provides</td>
<td>No natural marginal habitats exist around the margins of the bog. Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)</td>
</tr>
<tr>
<td>Vegetation quality: central ecotope, active flush, soaks, bog woodland</td>
<td>Hectares</td>
<td>Restore 11.8ha of central ecotope/active flush/soaks/bog woodland as appropriate</td>
<td>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 23.6ha (see area target above)</td>
</tr>
<tr>
<td>Vegetation quality: microtopographical features</td>
<td>Hectares</td>
<td>Restore adequate cover of high quality microtopographical features</td>
<td>High quality microtopography (hummocks, hollows and pools) is well developed in the southern part of Flughany Bog</td>
</tr>
<tr>
<td>Vegetation quality: bog moss (Sphagnum) species</td>
<td>Percentage cover</td>
<td>Restore adequate cover of bog moss (Sphagnum) species to ensure peat-forming capacity</td>
<td>Sphagnum cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as Sphagnum austini are particularly good peat formers. Sphagnum cover and distribution also varies naturally across a site</td>
</tr>
<tr>
<td>Typical ARB species: flora</td>
<td>Occurrence</td>
<td>Restore, where appropriate, typical active raised bog flora</td>
<td>Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat’s subtypes or geographical range</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------</td>
<td>-----------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Typical ARB species: fauna</td>
<td>Occurrence</td>
<td>Restore, where appropriate, typical active raised bog fauna</td>
<td>Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat’s subtypes or geographical range</td>
</tr>
<tr>
<td>Elements of local distinctiveness</td>
<td>Occurrence</td>
<td>Maintain features of local distinctiveness, subject to natural processes</td>
<td>Flughany Bog is noted for the presence of a number of flush systems and associated swallow-holes</td>
</tr>
<tr>
<td>Negative physical indicators</td>
<td>Percentage cover</td>
<td>Negative physical features absent or insignificant</td>
<td>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</td>
</tr>
<tr>
<td>Vegetation composition: native negative indicator species</td>
<td>Percentage cover</td>
<td>Native negative indicator species at insignificant levels</td>
<td>Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (<em>Narthecium ossifragum</em>), deergrass (<em>Trichophorum germanicum</em>) and harestail cotton-grass (<em>Eriophorum vaginatum</em>) forming tussocks; abundant magellanic bog-moss (<em>Sphagnum magellanicum</em>) in pools previously dominated by <em>Sphagnum</em> species typical of very wet conditions (e.g. feathery bog-moss (<em>S. cuspidatum</em>)); and indicators of frequent burning events such as abundant <em>Cladonia floerkeana</em> and high cover of carnation sedge (<em>Carex panicea</em>) (particularly in true midlands raised bogs)</td>
</tr>
<tr>
<td>Vegetation composition: non-native invasive species</td>
<td>Percentage cover</td>
<td>Non-native invasive species at insignificant levels and not more than 1% cover</td>
<td>Most common non-native invasive species include lodgepole pine (<em>Pinus contorta</em>), rhododendron (<em>Rhododendron ponticum</em>), and pitcherplant (<em>Sarracenia purpurea</em>)</td>
</tr>
<tr>
<td>Air quality: nitrogen deposition</td>
<td>kg N/ha/year</td>
<td>Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr</td>
<td>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 Flughany Bog suggests that the current level is approximately 8.2kg N/ha/yr (Henry and Aherne, 2014)</td>
</tr>
<tr>
<td>Water quality</td>
<td>Hydrochemical measures</td>
<td>Water quality on the high bog and in transitional areas close to natural reference conditions</td>
<td>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 areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater, and run-off from surrounding mineral lands)</td>
</tr>
</tbody>
</table>
Conservation Objectives for : Flughany Bog SAC [000497]

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 Flughany Bog SAC.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 Jan 2016</td>
<td>Version 1</td>
<td>Page 9 of 10</td>
<td></td>
</tr>
</tbody>
</table>
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 Flughany Bog SAC.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
</table>
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.


Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach 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.
MAP 3:
FLUGHANY BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
ECOTOPES

Legend
- Flughany Bog SAC 000497
- High Bog Boundary
- OSI Discovery Series County Boundary

ActiveRaisedBogsEcotopes
- Central ecotope
- Soaks / active flush
- Sub-central ecotope

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

SITE CODE:
SAC 000497; version 3.01. Co. Mayo / Sligo

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.


Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach 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.

Map Version 1
Date: Jan 2016
Legend

- Flughany Bog SAC 000497
- OSI Discovery Series County Boundary
- High Bog Boundary
- Drainage Patterns
- Contours

Elevation

- 89.83 m
- 72.67 m

MAP 4:
FLUGHANY BOG SAC
CONSERVATION OBJECTIVES
RAISED BOG
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS

SITE CODE:
SAC 000497; version 3.01. Co. Mayo / Sligo

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

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. The map is compiled from official data. The Ordnance Survey of Ireland and the Government of Ireland do not accept any liability in connection with this product.


Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaíochta.

Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na Rialtas na hÉireann.
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- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

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

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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>3150</td>
<td>Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation</td>
<td><em>Austropotamobius pallipes</em></td>
</tr>
</tbody>
</table>

* denotes a priority habitat

<table>
<thead>
<tr>
<th>Code</th>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1092</td>
<td>White-clawed Crayfish</td>
<td><em>Austropotamobius pallipes</em></td>
</tr>
<tr>
<td>1833</td>
<td>Slender Naiad</td>
<td><em>Najas flexilis</em></td>
</tr>
</tbody>
</table>

For more information please go to: [www.npws.ie/protected-sites/conservation-management-planning](http://www.npws.ie/protected-sites/conservation-management-planning)
The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

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- the 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:

<table>
<thead>
<tr>
<th>Bird Code</th>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>A018</td>
<td>Shag</td>
<td><em>Phalacrocorax aristotelis</em></td>
</tr>
<tr>
<td>A045</td>
<td>Barnacle Goose</td>
<td><em>Branta leucopsis</em></td>
</tr>
<tr>
<td>A184</td>
<td>Herring Gull</td>
<td><em>Larus argentatus</em></td>
</tr>
<tr>
<td>A194</td>
<td>Arctic Tern</td>
<td><em>Sterna paradisaea</em></td>
</tr>
</tbody>
</table>
**Citation:** NPWS (2016) Conservation objectives for Inishmurray SPA [004068]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
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

<table>
<thead>
<tr>
<th>Code</th>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1421</td>
<td>Killarney Fern</td>
<td><em>Trichomanes speciosum</em></td>
</tr>
</tbody>
</table>
Citation: NPWS (2016) Conservation objectives for Knockalongy and Knockachree Cliffs SAC [001669].
Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
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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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3140</td>
<td>Hard oligo-mesotrophic waters with benthic vegetation of <em>Chara</em> spp.</td>
</tr>
</tbody>
</table>

* denotes a priority habitat

For more information please go to: [www.npws.ie/protected-sites/conservation-management-planning](http://www.npws.ie/protected-sites/conservation-management-planning)
Citation: NPWS (2016) Conservation objectives for Lough Arrow SAC [001673]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
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The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

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- the conservation status of its typical species is favourable.

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- 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:

<table>
<thead>
<tr>
<th>Bird Code</th>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>A004</td>
<td>Little Grebe</td>
<td><em>Tachybaptus ruficollis</em></td>
</tr>
<tr>
<td>A061</td>
<td>Tufted Duck</td>
<td><em>Aythya fuligula</em></td>
</tr>
</tbody>
</table>

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 Arrow SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

Conservation Objectives Series

Ox Mountains Bogs SAC 002006

An Roinn Ealaion, Oidhreachta,
Gnóthai Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage,
Regional, Rural and Gaeltacht Affairs

Series Editor: Rebecca Jeffrey
ISSN 2009-4086
The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

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

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

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

Favourable conservation status of a habitat is achieved when:
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The favourable conservation status of a species is achieved when:
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- 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

<table>
<thead>
<tr>
<th>Site Code</th>
<th>Site Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>002006</td>
<td>Ox Mountains Bogs SAC</td>
<td></td>
</tr>
<tr>
<td>1013</td>
<td>Geyer’s Whorl Snail <em>Vertigo geyeri</em></td>
<td></td>
</tr>
<tr>
<td>1528</td>
<td>Marsh Saxifrage <em>Saxifraga hirculus</em></td>
<td></td>
</tr>
<tr>
<td>3110</td>
<td>Oligotrophic waters containing very few minerals of sandy plains (<em>Littorelletalia uniflorae</em>)</td>
<td></td>
</tr>
<tr>
<td>3160</td>
<td>Natural dystrophic lakes and ponds</td>
<td></td>
</tr>
<tr>
<td>4010</td>
<td>Northern Atlantic wet heaths with <em>Erica tetralix</em></td>
<td></td>
</tr>
<tr>
<td>4030</td>
<td>European dry heaths</td>
<td></td>
</tr>
<tr>
<td>7130</td>
<td>Blanket bogs (* if active bog*)</td>
<td></td>
</tr>
<tr>
<td>7140</td>
<td>Transition mires and quaking bogs</td>
<td></td>
</tr>
<tr>
<td>7150</td>
<td>Depressions on peat substrates of the Rhynchosporion</td>
<td></td>
</tr>
</tbody>
</table>

Please note that this SAC adjoins River Moy SAC (002298). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjacent site as appropriate.
### NPWS Documents

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>A survey to locate blanket bogs of scientific interest in County Kerry and County Sligo</td>
<td>Douglas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A.</td>
<td>Unpublished report to NPWS</td>
</tr>
<tr>
<td>2011</td>
<td>Monitoring and condition assessment of populations of <em>Vertigo geyeri</em>, <em>Vertigo angustior</em> and <em>Vertigo moulinisiana</em> in Ireland</td>
<td>Moorkens, E.; Killeen, I.</td>
<td>Irish Wildlife Manual No. 55</td>
</tr>
<tr>
<td>2013</td>
<td>A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel</td>
<td>Roden, C.; Murphy, P.</td>
<td>Irish Wildlife Manual No. 70</td>
</tr>
<tr>
<td>2013</td>
<td>The status of EU protected habitats and species in Ireland. Volume 3. Species assessments</td>
<td>NPWS</td>
<td>Conservation assessments</td>
</tr>
<tr>
<td>Year</td>
<td>Title</td>
<td>Author</td>
<td>Series</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2002</td>
<td>Deterioration of Atlantic soft water macrophyte communities by acidification, eutrophication and alkalisation</td>
<td>Arts, G.H.P.</td>
<td>Aquatic Botany, 73: 373-393</td>
</tr>
<tr>
<td>2013</td>
<td>Interpretation manual of European Union habitats- Eur 28</td>
<td>European Commission- DG Environment</td>
<td>European Commission</td>
</tr>
<tr>
<td>Year</td>
<td>2014</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>New vice-county record for Marsh Saxifrage (<em>Saxifraga hirculus</em>) in Sligo (H28)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Author</td>
<td>Muldoon, C.; Hodd, R.; Lockhart, N.; Douglas, C.; Roche, J.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Series</td>
<td>Irish Naturalists’ Journal, 33 (2): 130-131</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>in prep.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Author</td>
<td>Roden, C.; Murphy, P.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Series</td>
<td>Unpublished report to NPWS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>Title</td>
<td>GIS Operations</td>
<td>Used For</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>2008</td>
<td>OSi 1:5000 IG vector dataset</td>
<td>WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising</td>
<td>3110, 3160 (map 3)</td>
</tr>
<tr>
<td>2013</td>
<td>National Survey of Upland Habitats</td>
<td>Habitat dataset for site clipped to SAC boundary. Relevant QI selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising</td>
<td>4010, 4030, 7130, 7140, 7150 (maps 4-8)</td>
</tr>
<tr>
<td>2016</td>
<td>NPWS rare and threatened species database</td>
<td>Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising</td>
<td>1013 (map 9)</td>
</tr>
</tbody>
</table>
### Conservation Objectives for: Ox Mountains Bogs SAC [002006]

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

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

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural</td>
<td>Lake habitat 3110 occurs in Lough Easky. It may also be present in other lakes in the SAC, where it is likely to co-occur with habitat 3160, however the exact distribution of habitat 3110 in the SAC is unknown. In line with Article 17 reporting (NPWS, 2013), all lakes larger than 1ha have been mapped as ‘potential 3110’ (see map 3). Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/ zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes</td>
<td>As noted above, the exact distribution of habitat 3110 in the SAC is not known. In map 3, all lakes larger than 1ha (based on 1:5,000 data) have been mapped as potential 3110</td>
</tr>
<tr>
<td>Typical species</td>
<td>Occurrence</td>
<td>Typical species present, in good condition, and</td>
<td>For lists of typical plant species, see Article 17 habitat assessment for 3110 (NPWS, 2013) and the lake habitats supporting document (O Connor, 2015)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>demonstrating typical abundances and distribution</td>
<td></td>
</tr>
<tr>
<td>Vegetation composition:</td>
<td>Occurrence</td>
<td>All characteristic zones should be present,</td>
<td>The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.), however, significant further work is necessary to describe the characteristic zonation and other spatial patterns in the remaining four Annex I lake habitats</td>
</tr>
<tr>
<td>characteristic zonation</td>
<td></td>
<td>correctly distributed and in good condition</td>
<td></td>
</tr>
<tr>
<td>Vegetation distribution:</td>
<td>Metres</td>
<td>Maintain maximum depth of vegetation, subject to</td>
<td>The maximum depth of vegetation is likely to be specific to the lake shoreline in question. An indicative target has not yet been set for this lake habitat type. Indicative targets will be developed for the other lake habitats with time</td>
</tr>
<tr>
<td>maximum depth</td>
<td></td>
<td>natural processes</td>
<td></td>
</tr>
<tr>
<td>Hydrological regime:</td>
<td>Metres</td>
<td>Maintain appropriate natural hydrological regime</td>
<td>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</td>
</tr>
<tr>
<td>water level fluctuations</td>
<td></td>
<td>necessary to support the habitat</td>
<td></td>
</tr>
<tr>
<td>Lake substratum quality</td>
<td>Various</td>
<td>Maintain appropriate substratum type, extent</td>
<td>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 lake habitat 3110 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</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and chemistry to support the vegetation</td>
<td></td>
</tr>
</tbody>
</table>
Water quality: 

transparency

Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency. Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A specific target has yet to be established for this Annex I lake habitat. Habitat 3110 is associated with very clear water. 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. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m.

Water quality: 
nutrients

μg/l P; mg/l N

Maintain 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 TP concentration should be ≤10μg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009.

Water quality: 
phytoplankton biomass

μg/l Chlorophyll a

Maintain appropriate water quality to support the habitat, including high chlorophyll a status. Oligotrophic and WFD 'high' status targets apply to the lake habitat 3110. Where a lake has a chlorophyll a 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 a concentration must be <5.8μg/l. The annual average chlorophyll a concentration should be <2.5μg/l and the annual peak chlorophyll a concentration should be ≤8.0μg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009.

Water quality: 
phytoplankton composition

EPA phytoplankton composition metric

Maintain appropriate water quality to support the habitat, including high phytoplankton composition status. The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, habitat 3110 requires WFD high status.

Water quality: 
attached algal biomass

Algal cover and EPA phytobenthos metric

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, 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.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit/Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acidification status</td>
<td>pH units; mg/l</td>
<td>Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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 Sphagnum mosses and Juncus bulbosus (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 &lt;5.5 pH units. Maximum pH should be &lt;9.0 pH units, in line with the surface water standards established for soft waters (where water hardness is ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009.</td>
</tr>
<tr>
<td>Water colour</td>
<td>mg/l PtCo</td>
<td>Maintain appropriate water colour to support the habitat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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 &lt;50mg/l PtCo. Water colour can be very low (&lt;20mg/l PtCo or even &lt;10mg/l PtCo) in lake habitat 3110, where the peatland in the lake’s catchment is intact.</td>
</tr>
<tr>
<td>Dissolved organic carbon (DOC)</td>
<td>mg/l</td>
<td>Maintain appropriate organic carbon levels to support the habitat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Turbidity</td>
<td>Nephelometric turbidity units/ mg/l SS/ other appropriate units</td>
<td>Maintain appropriate turbidity to support the habitat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Fringing habitat: area</td>
<td>Hectares</td>
<td>Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3110</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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. In this SAC, blanket bog and heath communities are likely to dominate shorelines. Poor fen and flush may also occur. 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.</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Natural dystrophic lakes and ponds in Ox Mountains Bogs SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>This SAC has extensive blanket bog pool systems. Douglas et al. (1989) said the interconnecting pool system in Letterunshin, NW of L. Easky was the largest recorded in the blanket bog survey and of very high scientific and conservation value. Not all of the pools are mapped in the 1:5,000 OSI data. The 201 pools less than 1ha in area have been mapped as potential 3160 (see map 3). As all lakes in the SAC are surrounded by blanket bog and wet heath, 3160 likely also occurs in the larger lakes. The habitat is considered to be of high conservation value in the site. 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 relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes</td>
<td>As noted above, the habitat is widespread and of high conservation value in the SAC (see map 3)</td>
</tr>
<tr>
<td>Typical species</td>
<td>Occurrence</td>
<td>Typical species present, in good condition, and demonstrating typical abundances and distribution</td>
<td>For lists of typical plant and invertebrate species, see Article 17 habitat assessment for 3160 (NPWS, 2013) and the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)</td>
</tr>
<tr>
<td>Vegetation composition: characteristic zonation</td>
<td>Occurrence</td>
<td>All characteristic zones should be present, correctly distributed and in good condition</td>
<td>The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.), however, significant further work is necessary to describe the characteristic zonation and other spatial patterns in the other four Annex I lake habitats. Spatial patterns are likely to be relatively simple in 3160 lakes and ponds, with limited zonation</td>
</tr>
<tr>
<td>Vegetation distribution: maximum depth</td>
<td>Metres</td>
<td>Maintain maximum depth of vegetation, subject to natural processes</td>
<td>The maximum depth of vegetation is likely to be specific to the lake shoreline in question. An indicative target has not yet been set for this lake habitat type. Lakes in the SAC typically have very clear water and, therefore, maximum depth is expected to be large</td>
</tr>
<tr>
<td>Hydrological regime: water level fluctuations</td>
<td>Metres</td>
<td>Maintain appropriate natural hydrological regime necessary to support the habitat</td>
<td>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 and pools 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. Owing to their size and the sensitivity of peatland, 3160 lakes and pools can easily be damaged or destroyed by drainage. Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that habitat 3160 is associated with nutrient-poor peat and silt substrates</td>
</tr>
<tr>
<td>Lake substratum quality</td>
<td>Various</td>
<td>Maintain appropriate substratum type, extent and chemistry to support the vegetation</td>
<td></td>
</tr>
<tr>
<td>Water quality: transparency</td>
<td>Metres</td>
<td>Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency. Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A specific target has yet to be established for this Annex I lake habitat. Habitat 3160 is associated with very clear water. The OECD fixed boundary system set transparency targets for ultra-oligotrophic lakes of ≥12m annual mean Secchi disk depth, and ≥6m annual minimum Secchi disk depth.</td>
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<td>--------------------------</td>
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<td></td>
</tr>
<tr>
<td>Water quality: nutrients</td>
<td>µg/l P; mg/l N</td>
<td>Maintain 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 3160 lakes and pools, annual average TP concentration should be ≤5µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009.</td>
<td></td>
</tr>
<tr>
<td>Water quality: phytoplankton biomass</td>
<td>µg/l Chlorophyll a</td>
<td>Maintain appropriate water quality to support the habitat, including high chlorophyll a status. Oligotrophic and WFD 'high' status targets apply to lake habitat 3160. The average growing season (March-October) chlorophyll a concentration must be &lt;5.8µg/l (The European Communities Environmental Objectives (Surface Waters) Regulations 2009). Where a lake has a chlorophyll a concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The OECD targets may be more appropriate for habitat 3160: annual average chlorophyll a concentration &lt;1µg/l and annual peak chlorophyll a concentration ≤2.5µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009.</td>
<td></td>
</tr>
<tr>
<td>Water quality: phytoplankton composition</td>
<td>EPA phytoplankton composition metric</td>
<td>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, habitat 3160 requires WFD high status.</td>
<td></td>
</tr>
<tr>
<td>Water quality: attached algal biomass</td>
<td>Algal cover and EPA phytobenthos metric</td>
<td>Maintain trace/ absent attached algal biomass (&lt;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 3160 lakes and pools should, therefore, be trace/ absent (&lt;5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, habitat 3160 requires high phytobenthos status.</td>
<td></td>
</tr>
<tr>
<td>Water quality: macrophyte status</td>
<td>EPA macrophyte metric (The Free Index)</td>
<td>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 3160 lakes and pools 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.</td>
<td></td>
</tr>
<tr>
<td>Metric</td>
<td>Unit</td>
<td>Description</td>
<td>Specification/Motivation</td>
</tr>
<tr>
<td>--------</td>
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</tr>
<tr>
<td>Acidification status</td>
<td>pH units; mg/l</td>
<td>Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes</td>
<td>Acidification can impact on species abundance and composition in soft water lake habitats. Although EC (2013) describes habitat 3160 as having pH 3-6, Drinan (2012) found mean pHs of 5.16 and 5.62 in upland and lowland 3160 lakes, respectively. The target for lake habitat 3160 is pH &gt;4.5 and &lt;9.0, in line with the surface water standards for soft waters (where water hardness is ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. The specific requirements of habitat 3160, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined.</td>
</tr>
<tr>
<td>Water colour</td>
<td>mg/l PtCo</td>
<td>Maintain appropriate water colour to support the habitat</td>
<td>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 &lt;50mg/l PtCo. Water colour can be very low (&lt;20mg/l PtCo or even &lt;10mg/l PtCo) in 3160 lakes and pools where the peatland in the catchment is intact.</td>
</tr>
<tr>
<td>Dissolved organic carbon (DOC)</td>
<td>mg/l</td>
<td>Maintain appropriate organic carbon levels to support the habitat</td>
<td>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.</td>
</tr>
<tr>
<td>Turbidity</td>
<td>Nephelometric turbidity units/ mg/l SS/ other appropriate units</td>
<td>Maintain appropriate turbidity to support the habitat</td>
<td>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.</td>
</tr>
<tr>
<td>Fringing habitat: area</td>
<td>Hectares</td>
<td>Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3160</td>
<td>Most 3160 lake and pool shorelines intergrade with blanket bog, flush, poor-fen or heath habitats and these support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and can support wetland communities and species of conservation concern.</td>
</tr>
</tbody>
</table>
Conservation Objectives for Ox Mountains Bogs SAC [002006]

4010 Northern Atlantic wet heaths with Erica tetralix

To restore the favourable conservation condition of Northern Atlantic wet heaths with *Erica tetralix* in Ox Mountains Bogs SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area increasing, subject to natural processes</td>
<td>Ox Mountains Bogs SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of wet heath stated by Perrin et al. (2013) is 1083.2ha, covering 10.2% of the SAC. Perrin et al. (2013) report obvious losses of habitat since 1995 of less than 0.01ha through landslides. A summary of the mapping methodology and a brief discussion of restoration potential are presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 4</td>
<td>Wet heath was recorded by Perrin et al. (2013) throughout the SAC mainly on the lower slopes. Extensive patches occur on the slopes above Cloonacool, and Carronwened in the east. It also occurs through Fiddenderry and on the slopes above Easkey Lough. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded six different wet heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: cross-leaved heath</td>
<td>Occurrence within 20m of a representative number of 2m x 2m monitoring stops</td>
<td>Cross-leaved heath (<em>Erica tetralix</em>) present near each monitoring stop</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of positive indicator species at least 50%</td>
<td>Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). Further details can be found in the uplands supporting document.</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of <em>Cladonia</em> and <em>Sphagnum</em> species, <em>Racomitrium lanuginosum</em> and pleurocarpous mosses at least 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: ericoid species and crowberry</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of ericoid species and crowberry (<em>Empetrum nigrum</em>) at least 15%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: dwarf shrub species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of dwarf shrubs less than 75%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. <em>Campylopus introflexus</em> was recorded within this habitat by Perrin et al. (2013) at two monitoring stops with extensive carpets at one of these. Scattered non-native conifers were also recorded.</td>
</tr>
<tr>
<td>Vegetation composition: native trees and shrubs</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of scattered native trees and shrubs less than 20%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------------------</td>
<td>------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>Vegetation composition: bracken</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of bracken (<em>Pteridium aquilinum</em>) less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: soft rush</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of soft rush (<em>Juncus effusus</em>) less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: <em>Sphagnum</em> condition</td>
<td>Condition at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 10% of the <em>Sphagnum</em> cover is crushed, broken and/or pulled up</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: signs of browsing</td>
<td>Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 33% collectively of the last complete growing season’s shoots of ericoids, crowberry (<em>Empetrum nigrum</em>) and bog-myrtle (<em>Myrica gale</em>) showing signs of browsing</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: burning</td>
<td>Occurrence in local vicinity of a representative number of 2m x 2m monitoring stops</td>
<td>No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning</td>
<td>Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: drainage</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of European dry heaths in Ox Mountains Bogs SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Ox Mountains Bogs SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of dry heath stated by Perrin et al. (2013) is 332.9ha, covering 3.1% of the SAC. It occurs at low frequency throughout the SAC, but is locally abundant on the rocky slopes above Easky Lough and above Cloonacool. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology is presented in the uplands supporting document</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 5</td>
<td>Dry heath was recorded by Perrin et al. (2013) throughout the SAC, but was most abundant on the eastern slopes above Easky Lough. A summary of the mapping methodology is presented in the uplands supporting document</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded three different dry heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities is presented in Perrin et al. (2014)</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of bryophyte or non-crustose lichen species present at each monitoring stop is at least three, excluding Campylopus and Polytrichum mosses</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: number of positive indicator species</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of positive indicator species present at each monitoring stop is at least two</td>
<td>Based on Perrin et al. (2014). The list of positive indicator species for this habitat, which is composed of dwarf shrubs, is presented in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: cover of positive indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of positive indicator species at least 50% for siliceous dry heath and 50-75% for calcareous dry heath</td>
<td>Based on Perrin et al. (2014). The list of positive indicator species for this habitat, which is composed of dwarf shrubs, is presented in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: dwarf shrub composition</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Proportion of dwarf shrub cover composed collectively of bog-myrtle (Myrica gale), creeping willow (Salix repens) and western gorse (Ulex gallii) is less than 50%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. Scattered non-native conifers were observed within the habitat but this was limited to a few individuals</td>
</tr>
<tr>
<td>Vegetation composition: native trees and shrubs</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of scattered native trees and shrubs less than 20%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
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<td>------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Vegetation composition: bracken</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of bracken (<em>Pteridium aquilinum</em>) less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: soft rush</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of soft rush (<em>Juncus effusus</em>) less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: senescent ling</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Senescent proportion of ling (<em>Calluna vulgaris</em>) cover less than 50%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: signs of browsing</td>
<td>Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 33% collectively of the last complete growing season's shoots of ericoids showing signs of browsing</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: burning</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>No signs of burning in sensitive areas</td>
<td>Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: growth phases of ling</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Outside sensitive areas, all growth phases of ling (<em>Calluna vulgaris</em>) should occur throughout, with at least 10% of cover in the mature phase</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
Conservation Objectives for: Ox Mountains Bogs SAC [002006]

To restore the favourable conservation condition of Blanket bogs in Ox Mountains Bogs SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area increasing, subject to natural processes</td>
<td>Ox Mountains Bogs SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). Perrin et al. (2013) state that the current total area of blanket bog is 7249.6ha (68.5% of the SAC). This comprises 7097.3ha of active blanket bog area and 152.3ha of inactive blanket bog. Perrin et al. (2014) also report obvious losses of habitat since 1995 of approximately 5.8ha. However, this is almost certainly an under-estimate, as chronic losses due to erosion since 1995 cannot be quantified (106.6ha were mapped as eroding blanket bog by Perrin et al. (2013)). It should be noted that further restoration of blanket bog would be required in order to fulfil the targets for peat formation and hydrology presented below. A summary of the mapping methodology and a brief discussion of restoration potential are presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 6</td>
<td>Blanket bog was recorded by Perrin et al. (2013) across the SAC and was by far the most dominant habitat type. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Ecosystem function: peat formation</td>
<td>Active blanket bog as a proportion of the total area of Annex I blanket bog</td>
<td>At least 99% of the total Annex I blanket bog area is active</td>
<td>From the habitat areas given by Perrin et al. (2013) above, 97.9% of the Annex I blanket bog habitat is currently actively peat-forming. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Ecosystem function: hydrology</td>
<td>Flow direction, water levels, occurrence of drains and erosion gullies</td>
<td>Natural hydrology unaffected by drains and erosion</td>
<td>Further details and a brief discussion of restoration potential is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded six different active blanket bog communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of positive indicator species at each monitoring stop is at least seven</td>
<td>Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: lichens and bryophytes</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of bryophytes or lichens, excluding Sphagnum fallax, at least 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: potential dominant species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of each of the potential dominant species less than 75%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details, including the list of potentially dominant species</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. Campylopus introflexus was recorded within this habitat by Perrin et al. (2013) with extensive carpets recorded.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Vegetation composition: native trees and scrub</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of scattered native trees and shrubs less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: Sphagnum condition</td>
<td>Condition at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 10% of the Sphagnum cover is crushed, broken and/or pulled up</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: signs of browsing</td>
<td>Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops</td>
<td>Last complete growing season’s shoots of ericoids, crowberry (<em>Empetrum nigrum</em>) and bog-myrtle (<em>Myrica gale</em>) showing signs of browsing collectively less than 33%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: burning</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning</td>
<td>Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Physical structure: drainage</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Physical structure: erosion</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details.</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Transition mires and quaking bogs in Ox Mountains Bogs SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Ox Mountains Bogs SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of transition mires and quaking bogs in the SAC stated by Perrin et al. (2013) is 36.6ha. This covers 0.3% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 7</td>
<td>Transition mire was recorded by Perrin et al. (2013) scattered throughout the SAC. It is frequent in the small valleys of the upland plateau, along the eastern fringes of the SAC, through Letterrunshion Bog and the southern section of Fiddenderry. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Community diversity</td>
<td>Abundance of variety of vegetation communities</td>
<td>Maintain variety of vegetation communities, subject to natural processes</td>
<td>Perrin et al. (2013) recorded three different transition mire communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these vegetation communities is presented in Perrin et al. (2014).</td>
</tr>
<tr>
<td>Vegetation composition: number of positive indicator species</td>
<td>Number at a representative number of 2m x 2m monitoring stops</td>
<td>Number of positive indicator species at least three for in-filling pools and flushes and at least six for fens</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: number of core positive indicator species</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>At least one core positive indicator species present</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: cover of positive indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of positive indicator species is at least 25%</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. No non-native species were recorded within this habitat by Perrin et al. (2013)</td>
</tr>
<tr>
<td>Vegetation structure: height</td>
<td>Percentage at a representative number of 2m x 2m monitoring stops</td>
<td>Proportion of live leaves and/or flowering shoots of vascular plants that are more than 15cm above the ground surface should be at least 50%</td>
<td>Based on Perrin et al. (2014). This attribute is only applicable to fen and flush examples, not to in-filling pool examples. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Physical structure: drainage</th>
<th>Percentage area in local vicinity of a representative number of monitoring stops</th>
<th>Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%</th>
<th>Based on Perrin et al. (2014). See the uplands supporting document for further details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Depressions on peat substrates of the Rhynchosporion in Ox Mountains Bogs SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes</td>
<td>Ox Mountains Bogs SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of Depressions on peat surfaces of the Rhynchosporion in the SAC stated by Perrin et al. (2013) is 49.6ha. This covers 0.5% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline from current distribution, subject to natural processes. See map 8</td>
<td>Rhynchosporion depressions were recorded by Perrin et al. (2013) scattered through the western portion of the SAC, particularly through Letterunshion Bog and at Tawnamore. A summary of the mapping methodology is presented in the uplands supporting document.</td>
</tr>
<tr>
<td>Ecosystem function: soil nutrients</td>
<td>Soil pH and appropriate nutrient levels at a representative number of monitoring stops</td>
<td>Maintain soil nutrient status within natural range</td>
<td>See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: positive indicator species</td>
<td>Number of species at a representative number of 2m x 2m monitoring stops</td>
<td>Number of positive indicator species at each monitoring stop is at least five</td>
<td>Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. Further details can be found in the uplands supporting document.</td>
</tr>
<tr>
<td>Vegetation composition: Rhynchospora spp.</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of white beaked sedge (<em>Rhynchospora alba</em>) and brown beaked sedge (<em>R. fusca</em>) at least 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: potential dominant species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Cover of each of the potential dominant species less than 35%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details, including the list of potentially dominant species.</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover at a representative number of 2m x 2m monitoring stops</td>
<td>Total cover of negative indicator species less than 1%</td>
<td>Based on Perrin et al. (2014), where the list of negative indicator species is also presented. See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: non-native species</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of non-native species less than 1%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details. <em>Campylopus introflexus</em> was recorded within this habitat by Perrin et al. (2013) but did not form extensive carpets.</td>
</tr>
<tr>
<td>Vegetation composition: native trees and scrub</td>
<td>Percentage cover in local vicinity of a representative number of monitoring stops</td>
<td>Cover of scattered native trees and shrubs less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: Sphagnum condition</td>
<td>Condition at a representative number of 2m x 2m monitoring stops</td>
<td>Less than 10% of the <em>Sphagnum</em> cover is crushed, broken and/or pulled up</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: signs of browsing</td>
<td>Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops</td>
<td>Last complete growing season's shoots of ericoids, crowberry (<em>Empetrum nigrum</em>) and bog-myrtle (<em>Myrica gale</em>) showing signs of browsing collectively less than 33%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: burning</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning</td>
<td>Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Physical structure: disturbed bare ground</td>
<td>Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops</td>
<td>Cover of disturbed bare ground less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: drainage</td>
<td>Percentage area in local vicinity of a representative number of monitoring stops</td>
<td>Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: erosion</td>
<td>Occurrence in local vicinity of a representative number of monitoring stops</td>
<td>Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas</td>
<td>Based on Perrin et al. (2014). See the uplands supporting document for further details</td>
</tr>
<tr>
<td>Indicators of local distinctiveness</td>
<td>Occurrence and population size</td>
<td>No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat</td>
<td>Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details</td>
</tr>
</tbody>
</table>
**Conservation Objectives for: Ox Mountains Bogs SAC [002006]**

### Geyer's Whorl Snail *Vertigo geyeri*

To maintain the favourable conservation condition of Geyer's Whorl Snail in Ox Mountains Bogs SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution: occupied sites</td>
<td>Number</td>
<td>No decline. There is one known site for this species in this SAC within the 1km square G4429. See map 9</td>
<td>From Moorkens and Killeen (2011) (site code VgCAM21)</td>
</tr>
<tr>
<td>Presence in suitable habitat</td>
<td>Occurrence</td>
<td>Snails (living or recently dead adults and/or juveniles) are present in at least 60% of samples defined as suitable habitat</td>
<td>Based on Moorkens and Killeen (2011)</td>
</tr>
<tr>
<td>Species abundance</td>
<td>Number of individuals per sample</td>
<td>No decline in adult abundance in appropriate number of samples</td>
<td>Based on Moorkens and Killeen (2011). There should be at least five adults detected in 40% of samples</td>
</tr>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Stable or increasing, subject to natural processes. Suitable habitat is defined as areas of flushed fen with small sedges and saturated mosses</td>
<td>Based on Moorkens and Killeen (2011). Optimal habitat is defined as flushed fen with sedge/moss lawns and mounds 5-20cm tall, containing a high diversity of plant species such as small-fruited yellow-sedge (<em>Carex viridula</em>), grass-of-Parnassus (<em>Parnassia palustris</em>), marsh horsetail (<em>Equisetum palustre</em>), jointed rush (<em>Juncus articulatus</em>) and the mosses <em>Scorpidium revolvens</em> and <em>Campylium stellatum</em>, with scattered tussocks of black bog-rush (<em>Schoenus nigricans</em>) no greater than 80cm tall</td>
</tr>
<tr>
<td>Habitat quality: optimal habitat</td>
<td>Hectares</td>
<td>At least 0.3ha of optimal habitat present</td>
<td>Based on Moorkens and Killeen (2011). There should be at least 0.3ha of optimal habitat present at the site to maintain the species. See description of optimal habitat above</td>
</tr>
<tr>
<td>Habitat quality: soil wetness</td>
<td>Water table level</td>
<td>Water table should be between 0-5cm of the soil surface, but not above ground level at time of sampling</td>
<td>Based on Moorkens and Killeen (2011)</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of *Saxifraga hirculus* in Ox Mountains Bogs SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution</td>
<td>Number and geographical spread</td>
<td>No loss in geographical spread and number of populations, subject to natural processes</td>
<td>Three populations of <em>Saxifraga hirculus</em>, in three flushes (A-C) lying in close proximity to each other, were discovered in the Ox Mountains Bogs SAC in June 2012. See Muldoon et al. (2014) for further details</td>
</tr>
<tr>
<td>Population size: number of rosettes</td>
<td>Number</td>
<td>Maintain the size of each population, subject to natural processes. The target numbers of rosettes are: &gt;40,000 rosettes in Flush A; &gt;4,800 rosettes in Flush B; &gt;480 rosettes in Flush C</td>
<td>The number of rosettes was estimated to be: c.50,000 in Flush A; c.6,000 in Flush B and c.600 in Flush C. The target figures are a 20% reduction of the recorded number to allow for a margin of error and variability over monitoring seasons</td>
</tr>
<tr>
<td>Population size: area of occupancy</td>
<td>Hectares</td>
<td>Maintain the extent of each population, subject to natural processes. The target areas are: &gt; 0.0234 ha (&gt; 234 m²) in Flush A, &gt; 0.0053 ha ( &gt; 52.5 m²) in Flush B and &gt; 0.0016 ha (&gt; 16.2 m²) in Flush C</td>
<td>The area of cover of <em>Saxifraga hirculus</em> was estimated as 260 m² in Flush A, 58.3 m² in Flush B and 18 m² in Flush C. The target area figures are a 10% reduction of the recorded areas to allow for a margin of error</td>
</tr>
<tr>
<td>Hydrological conditions: water levels</td>
<td>Occurrence of high or fluctuating water levels</td>
<td>Maintain appropriate natural hydrological regime necessary to support the habitat for the species</td>
<td>In Ireland, <em>Saxifraga hirculus</em> is now restricted to mineral flushes in blanket bog where rising groundwater forms small streams and seepage areas suitable for the species. Based on Muldoon (2011) and Muldoon et al. (2015)</td>
</tr>
<tr>
<td>Vegetation structure: sward height</td>
<td>Centimetres</td>
<td>Maintain a mean vegetation height of less than 15cm</td>
<td>See Muldoon (2011) and Muldoon et al. (2015) for further details</td>
</tr>
<tr>
<td>Vegetation composition: associated species</td>
<td>Species composition and abundance</td>
<td>Maintain appropriate associated species and vegetation communities to support the populations of <em>Saxifraga hirculus</em></td>
<td>Presence of knotted pearlwort (<em>Sagina nodosa</em>), a positive indicator species and low cover of purple moor-grass (<em>Molinia caerulea</em>) and Yorkshire-fog (<em>Holcus lanatus</em>), both negative indicator species, should be maintained. See Muldoon (2011) and Muldoon et al. (2015) for further details</td>
</tr>
<tr>
<td>Vegetation structure: grazing levels</td>
<td>Evidence of grazing</td>
<td>Maintain grazing at light to moderate levels to ensure an open vegetation structure and to allow flowering to occur</td>
<td>See Muldoon (2011) and Muldoon et al. (2015) for further details</td>
</tr>
</tbody>
</table>
MAP 1:
OX MOUNTAINS BOGS SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.


Legend

Ox Mountains Bogs SAC 002006

SITE CODE:
SAC 002006; version 3.01. Counties Sligo / Mayo
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.


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 Rialtas na hÉireann.
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.


Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach 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.

Legend

- Ox Mountains Bogs SAC 002006
- OSI/Discovery Series County Boundaries

**Lake Habitats**

- 3110 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae)
- Potential 3110 / Potential 3160, Potential Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae) / Potential Natural dystrophic lakes and ponds
- Potential 3160 Natural dystrophic lakes and ponds
Map 4: Ox Mountains Bogs SAC Conservation Objectives Wet Heath

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

Legend

- Ox Mountains Bogs SAC 002006
- OSI Discovery Series County Boundaries

Cover of 4010 Northern Atlantic wet heaths with Erica tetralix

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.


Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na Rialtas na hÉireann.
MAP 5:
OX MOUNTAINS BOGS SAC
CONSERVATION OBJECTIVES
DRY HEATHS

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

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.


Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach 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.

Legend
- Ox Mountains Bogs SAC 002006
- OSI Discovery Series County Boundaries
- Cover of 4030 European dry heaths

0% | 8.1% - 20%
20.1% - 40%
40.1% - 60%
60.1% - 80%
80.1% - 100%

± 0 1 2 3 4 km

SITE CODE:
SAC 002006; version 3.01. Counties Sligo / Mayo

Map Version 1
Date: July 2016
MAP 6:
OX MOUNTAINS BOGS SAC
CONSERVATION OBJECTIVES
BLANKET BOGS (* IF ACTIVE BOG)

Site Code:
SAC 002006; version 3.01. Counties Sligo / Mayo

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.


Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach 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.
Map Version 1
Date: July 2016

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

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.


Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach 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.

Legend
- Ox Mountains Bogs SAC 002006
- OSI Discovery Series County Boundaries

Cover of 7140 Transition mires and quaking bogs
- 0% - 0.1%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

SITE CODE:
- SAC 002006; version 3.01. Counties Sligo / Mayo

MAP 7:
OX MOUNTAINS BOGS SAC
CONSERVATION OBJECTIVES
TRANSITION MIREs

SITE CODE:
SAC 002006; version 3.01. Counties Sligo / Mayo

Legend
- Ox Mountains Bogs SAC 002006
- OSI Discovery Series County Boundaries

Cover of 7140 Transition mires and quaking bogs
- 0% - 0.1%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%
MAP 8: OX MOUNTAINS BOGS SAC CONSERVATION OBJECTIVES RHYNCHOSPORION DEPRESSIONS

SITE CODE: SAC 002006; version 3.01. Counties Sligo / Mayo

Legend

- Ox Mountains Bogs SAC 002006
- OSI Discovery Series County Boundaries

Cover of 7150 Depressions on peat substrates of the Rhynchosporion

- 0%
- 0.1% - 20%
- 20.1% - 40%
- 40.1% - 60%
- 60.1% - 80%
- 80.1% - 100%

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.


Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach 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.

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

<table>
<thead>
<tr>
<th>Bird Code</th>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>A103</td>
<td>Peregrine</td>
<td>Falco peregrinus</td>
</tr>
<tr>
<td>A346</td>
<td>Chough</td>
<td>Pyrrhocorax pyrrhocorax</td>
</tr>
</tbody>
</table>
Citation: NPWS (2016) Conservation objectives for Sligo/Leitrim Uplands SPA [004187]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>001680</td>
<td>Streedagh Point Dunes SAC</td>
</tr>
<tr>
<td>1014</td>
<td>Narrow-mouthed Whorl Snail <em>Vertigo angustior</em></td>
</tr>
<tr>
<td>1140</td>
<td>Mudflats and sandflats not covered by seawater at low tide</td>
</tr>
<tr>
<td>1220</td>
<td>Perennial vegetation of stony banks</td>
</tr>
<tr>
<td>1330</td>
<td>Atlantic salt meadows (Glauco-Puccinellietalia maritimae)</td>
</tr>
<tr>
<td>1410</td>
<td>Mediterranean salt meadows (Juncetalia maritimoi)</td>
</tr>
<tr>
<td>2120</td>
<td>Shifting dunes along the shoreline with <em>Ammophila arenaria</em> (white dunes)</td>
</tr>
<tr>
<td>2130</td>
<td>Fixed coastal dunes with herbaceous vegetation (grey dunes)*</td>
</tr>
</tbody>
</table>

Please note that this SAC adjoins Bunduff Lough and Machair/Trawalua/Mullaghmore SAC (000625). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjacent site as appropriate.
### NPWS Documents

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>National Shingle Beach Survey of Ireland 1999</td>
<td>Moore, D.; Wilson, F.</td>
<td>Unpublished Report to NPWS</td>
</tr>
<tr>
<td>2007</td>
<td>Management prescriptions for <em>Vertigo angustior</em> at cSAC sites for the species in the Republic of Ireland</td>
<td>Moorkens, E.</td>
<td>Unpublished report to NPWS</td>
</tr>
<tr>
<td>2011</td>
<td>Monitoring and condition assessment of populations of <em>Vertigo geyeri</em>, <em>Vertigo angustior</em> and <em>Vertigo mouliinsiana</em> in Ireland</td>
<td>Moorkens, E.; Killeen, I.</td>
<td>Irish Wildlife Manual No. 55</td>
</tr>
</tbody>
</table>

### Other References

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>The phytosociology and conservation value of Irish sand dunes</td>
<td>Gaynor, K.</td>
<td>Unpublished PhD thesis, National University of Ireland, Dublin</td>
</tr>
<tr>
<td>2012</td>
<td>Intertidal benthic surveys of Streedagh Point Dunes SAC</td>
<td>MERC</td>
<td>Unpublished report to the Marine Institute and NPWS</td>
</tr>
</tbody>
</table>
### Spatial data sources

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>GIS Operations</th>
<th>Used For</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpolated 2014</td>
<td>Intertidal survey, 2011</td>
<td>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</td>
<td>1140, marine community types (maps 3 and 4)</td>
</tr>
<tr>
<td>2005</td>
<td>OSi Discovery series vector data</td>
<td>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</td>
<td>Marine community types base data (map 4)</td>
</tr>
<tr>
<td>Revision 2010</td>
<td>Saltmarsh Monitoring Project 2007-2008. Version 1</td>
<td>QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used</td>
<td>1330, 1410 (map 5)</td>
</tr>
<tr>
<td>2009</td>
<td>Coastal Monitoring Project 2004-2006. Version 1</td>
<td>QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used</td>
<td>2120, 2130 (map 6)</td>
</tr>
<tr>
<td>2015</td>
<td>NPWS rare and threatened species database</td>
<td>Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising</td>
<td>1014 (map 7)</td>
</tr>
</tbody>
</table>
**Conservation Objectives for: Streedagh Point Dunes SAC [001680]**

**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 Streedagh Point Dunes SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>The permanent habitat area is stable or increasing, subject to natural</td>
<td>Habitat area was estimated as 338ha using OSI data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>processes. See map 3</td>
<td></td>
</tr>
<tr>
<td>Community distribution</td>
<td>Hectares</td>
<td>Conserve the following community types in a natural condition: Sand</td>
<td>Based on an intertidal survey undertaken in 2011 (MERC, 2012). See marine supporting document for further information</td>
</tr>
<tr>
<td></td>
<td></td>
<td>with <em>Pygospio elegans</em> and <em>Cerastoderma edule</em> community complex;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mobile sand with <em>Haustorius arenarius</em> and polychaetes community</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>complex. See map 4</td>
<td></td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of **Perennial vegetation of stony banks** in Streedagh Point Dunes SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes, including erosion and succession</td>
<td>Current area unknown. It was recorded as being present during the National Shingle Beach Survey (NSBS) (Moore and Wilson, 1999), but extent was not mapped from one sub-site: Streedagh. NB further unsurveyed areas maybe present within the SAC. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, or change in habitat distribution, subject to natural processes. See map 6 for survey location</td>
<td>Full distribution unknown at present, although the habitat has been recorded at Streedagh by Moore and Wilson (1999) where it fronts the entire dune system. The dunes at Streedagh also support cobble based flats between the dunes similar to Ballyteige Burrow, County Wexford. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: functionality and sediment supply</td>
<td>Presence/ absence of physical barriers</td>
<td>Maintain the natural circulation of sediment and organic matter, without any physical obstructions</td>
<td>The shingle beaches within this SAC appear to be functioning naturally, with no artificial restrictions to beach dynamics (Moore and Wilson, 1999). Shingle features are relatively stable in the long term. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession</td>
<td>The Streedagh sub-site is associated with shingle-based grassland, sand dunes and saltmarsh. Lichens are present, indicating a degree of stability. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover at a representative number of monitoring stops</td>
<td>Maintain the typical vegetated shingle flora including the range of sub-communities within the different zones</td>
<td>Streedagh supports good quality vegetated shingle flora. Based on data from Moore and Wilson (1999). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species</td>
<td>Percentage cover</td>
<td>Negative indicator species (including non-natives) to represent less than 5% cover</td>
<td>Based on data from Moore and Wilson (1999). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See coastal habitats supporting document for further details</td>
</tr>
</tbody>
</table>
To restore the favourable conservation condition of Atlantic salt meadows (Glauco-Puccinellietalia maritimae) in Streedagh Point Dunes SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Streedagh Point - 12.82ha. See map 5.</td>
<td>Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). One sub-site that supports Atlantic Salt Meadows was mapped (12.82ha) and additional areas of potential ASM habitat (0.21ha) were identified from an examination of aerial photographs, giving a total estimated area of 13.03ha. NB further unsurveyed areas maybe present within the SAC. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline or change in habitat distribution, subject to natural processes. See map 5 for known distribution.</td>
<td>Based on data from McCorry and Ryle (2009). The saltmarsh at Streedagh is widely distributed throughout the SAC. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Physical structure: sediment supply</td>
<td>Presence/ absence of physical barriers</td>
<td>Maintain natural circulation of sediments and organic matter, without any physical obstructions.</td>
<td>See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Physical structure: creeks and pans</td>
<td>Occurrence</td>
<td>Maintain creek and pan structure, subject to natural processes, including erosion and succession.</td>
<td>Based on data from McCorry and Ryle (2009). A large area of ASM on the spit is unmodified and in relatively good condition. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Physical structure: flooding regime</td>
<td>Hectares flooded; frequency</td>
<td>Maintain natural tidal regime.</td>
<td>See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession.</td>
<td>Based on data from McCorry and Ryle (2009). The ASM at Streedagh is quite diverse and several typical ASM communities were noted by the SMP. The ASM is part of a larger coastal ecosystem. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: vegetation height</td>
<td>Centimetres</td>
<td>Maintain structural variation within sward.</td>
<td>Based on data from McCorry and Ryle (2009). Most of the saltmarsh is grazed by cattle though intensity varies and some areas are left ungrazed. Heavy grazing was noted adjacent to the sandhills at Streedagh in a commonage area. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: vegetation cover</td>
<td>Percentage cover at a representative sample of monitoring stops</td>
<td>Maintain more than 90% area outside creeks vegetated.</td>
<td>Based on data from (McCorry and Ryle, 2009). At Streedagh there is some severe poaching of the saltmarsh by cattle in the commonage adjacent to the sandhills. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover at a representative number of monitoring stops</td>
<td>Maintain range of sub-communities with typical species listed in SMP (McCorry and Ryle, 2009)</td>
<td>See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: negative indicator species - Spartina anglica</td>
<td>Hectares</td>
<td>There is currently no common cordgrass (Spartina anglica) recorded at this SAC. This species should be prevented from establishing here.</td>
<td>Based on data from McCorry and Ryle (2009). Common cord grass (Spartina anglica) is absent from the site. See coastal habitats supporting document for further details.</td>
</tr>
</tbody>
</table>
### Conservation Objectives for: Streedagh Point Dunes SAC [001680]

**Mediterranean salt meadows (Juncetalia maritimi)**

To maintain the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in Streedagh Point Dunes SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Streedagh Point - 6.69ha. See map 5.</td>
<td>Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). One sub-site that supports Mediterranean Salt Meadow was mapped, giving a total estimated area of 6.69ha. NB further unsurveyed areas maybe present within the SAC. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, subject to natural processes. See map 5 for known distribution.</td>
<td>See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Physical structure: sediment supply</td>
<td>Presence/absence of physical barriers</td>
<td>Maintain natural circulation of sediments and organic matter, without any physical obstructions.</td>
<td>See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Physical structure: creeks and pans</td>
<td>Occurrence</td>
<td>Maintain creek and pan structure, subject to natural processes, including erosion and succession.</td>
<td>Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Physical structure: flooding regime</td>
<td>Hectares flooded; frequency</td>
<td>Maintain natural tidal regime.</td>
<td>Mediterranean salt meadows is found high up in the saltmarsh but requires occasional tidal inundation. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain range of saltmarsh habitats including transitional zones, subject to natural processes including erosion and succession.</td>
<td>Based on data from McCorry and Ryle (2009). The MSM at Streedagh is quite diverse and some transitional vegetation has developed along the upper MSM in places. It is part of a larger coastal ecosystem. See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: vegetation height</td>
<td>Centimetres</td>
<td>Maintain structural variation in the sward.</td>
<td>See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation structure: vegetation cover</td>
<td>Percentage cover at a representative number of monitoring stops</td>
<td>Maintain more than 90% of area outside creeks vegetated.</td>
<td>See coastal habitats supporting document for further details.</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover at a representative number of monitoring stops</td>
<td>Maintain range of sub-communities with characteristic species listed in SMP (McCorry and Ryle, 2009). Species of local distinctiveness such as saltmarsh flat-sedge ($Blysmus rufus$) was recorded in the MSM and forms a distinctive community in places in the upper marsh. See coastal habitats supporting document for further details.</td>
<td></td>
</tr>
<tr>
<td>Vegetation structure: negative indicator species - <em>Spartina anglica</em></td>
<td>Hectares</td>
<td>There is currently no common cordgrass (<em>Spartina anglica</em>) recorded at this SAC. This species should be prevented from establishing here.</td>
<td>Based on data from McCorry and Ryle (2009). Common cord grass (<em>Spartina anglica</em>) is absent from the site. See coastal habitats supporting document for further details.</td>
</tr>
</tbody>
</table>

---

19 Mar 2015  
Version 1  
Page 10 of 13
To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in Streedagh Point Dunes SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Streedagh Point - 2.12ha. See map 6.</td>
<td>Habitat was mapped from a single site during the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Habitat is very difficult to measure in view of its dynamic nature. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Occurrence</td>
<td></td>
<td>No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution</td>
<td>Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Presence/ absence of physical barriers</td>
<td></td>
<td>Maintain the natural circulation of sediment and organic matter, without any physical obstructions</td>
<td>Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (<em>Ammophila arenaria</em>) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Occurrence</td>
<td></td>
<td>Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession</td>
<td>Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Percentage cover</td>
<td></td>
<td>More than 95% of marram grass (<em>Ammophila arenaria</em>) and/or lyme-grass (<em>Leymus arenarius</em>) should be healthy (i.e. green plant parts above ground and flowering heads present)</td>
<td>Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Percentage cover at a representative number of monitoring stops</td>
<td></td>
<td>Maintain the presence of species-poor communities dominated by marram grass (<em>Ammophila arenaria</em>) and/or lyme-grass (<em>Leymus arenarius</em>)</td>
<td>Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Percentage cover</td>
<td></td>
<td>Negative indicator species (including non-natives) to represent less than 5% cover</td>
<td>Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<em>Hippophae rhamnoides</em>) should be absent or effectively controlled. See coastal habitats supporting document for further details</td>
</tr>
</tbody>
</table>
To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in Streedagh Point Dunes SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat area</td>
<td>Hectares</td>
<td>Area increasing, subject to natural processes including erosion and succession. For sub-site mapped: Streedagh Point- 82.44ha. See map 6</td>
<td>Habitat was mapped from a single site during the Coastal Monitoring Project (CMP) (Ryle et al., 2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Habitat distribution</td>
<td>Occurrence</td>
<td>No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution</td>
<td>See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Physical structure: functionality and sediment supply</td>
<td>Presence/ absence of physical barriers</td>
<td>Maintain the natural circulation of sediment and organic matter, without any physical obstructions</td>
<td>Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: zonation</td>
<td>Occurrence</td>
<td>Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession</td>
<td>Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: bare ground</td>
<td>Percentage cover</td>
<td>Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes</td>
<td>Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation structure: sward height</td>
<td>Centimetres</td>
<td>Maintain structural variation within sward</td>
<td>Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: typical species and sub-communities</td>
<td>Percentage cover</td>
<td>Maintain range of sub-communities with typical species listed in Ryle et al. (2009)</td>
<td>Based on data from Gaynor (2008) and Ryle et al. (2009). The habitat supports a typical dune flora. It also supports a population of the Annex II snail species <em>Vertigo angustior</em>. See coastal habitats supporting document and the conservation objective for <em>V. angustior</em> (1014) for further details</td>
</tr>
<tr>
<td>Vegetation composition: negative indicator species (including Hippophae rhamnoides)</td>
<td>Percentage cover</td>
<td>Negative indicator species (including non-natives) to represent less than 5% cover</td>
<td>Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (<em>Hippophae rhamnoides</em>) should be absent or effectively controlled. See coastal habitats supporting document for further details</td>
</tr>
<tr>
<td>Vegetation composition: scrub/trees</td>
<td>Percentage cover</td>
<td>No more than 5% cover or under control</td>
<td>Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details</td>
</tr>
</tbody>
</table>
To maintain the favourable conservation condition of Narrow-mouthed Whorl Snail \textit{Vertigo angustior} in Streedagh Point Dunes SAC, which is defined by the following list of attributes and targets:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Measure</th>
<th>Target</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution: occupied sites</td>
<td>Number</td>
<td>No decline. Streedagh Dunes can be considered as a single site for this species as the area of habitat is continuous. This overlaps with five 1km squares, G6350, G6450, G6551, G6552 and G6651. See map 7.</td>
<td>\textit{Vertigo angustior} occurs extensively within the SAC and there are confirmed records from the five 1km squares (Moorkens 2007; Moorkens and Killeen 2011) (site code VaCAM14)</td>
</tr>
<tr>
<td>Occurrence in suitable habitat</td>
<td>Percentage positive records at a representative number of monitoring stops</td>
<td>No decline. A minimum of 60% positive samples in areas of habitat that are optimal/suboptimal; 20% in areas defined as suboptimal.</td>
<td>From Moorkens and Killeen (2011). Positive samples mean the confirmed presence of snails (living or recently dead adults and/or juveniles). See habitat extent target below for definition of optimal and sub-optimal habitat</td>
</tr>
<tr>
<td>Optimal soil wetness</td>
<td>Metres along transect; Percentage of representative number of monitoring stops</td>
<td>127.5m of the established monitoring transect assessed as optimal wetness; at least 75% of sampling stops assessed as optimal wetness.</td>
<td>Transect established as part of condition assessment monitoring (Moorkens and Killeen, 2011). Optimal wetness also defined by Moorkens and Killeen (2011)</td>
</tr>
<tr>
<td>Habitat extent</td>
<td>Hectares</td>
<td>Stable or increasing, subject to natural processes. Area of habitat that is in at least suboptimal condition is at least 105ha.</td>
<td>Optimal habitat is defined as either fixed dune, species-rich grassland with vegetation height of 10-30cm and dominated by \textit{Festuca rubra}, with sparse \textit{Ammophila arenaria}, \textit{Geum verum}, \textit{Pilosella officinarum}, \textit{Anacamptis pyramidalis}, \textit{Plantago lanceolata} and other low growing herbs, growing on damp, friable soil covered with a layer of humid, open structured thatch; or, transition marsh with vegetation height of 25-40cm of \textit{Iris pseudacorus}, \textit{Equisetum palustre}, \textit{Caltha palustris}, \textit{Lychnis flos-cuculi}, \textit{Mentha aquatica} with an understorey of moss and litter. Sub-optimal fixed dune habitat is as above but either height is less than 10cm or between 30 and 50cm, or soil is dry and sandy, or thatch is wetter with a denser structure. Sub-optimal transition marsh is as above but either vegetation is less than 25cm high or over 50cm, or soil is very wet with pools of standing water, or thatch is wetter with a denser structure (Moorkens and Killeen, 2011).</td>
</tr>
</tbody>
</table>
Map Version 1
Date: March 2015

MAP 1:
STREEDAGH POINT DUNES SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

Legend

Streedagh Point Dunes SAC 001680

Grange
Bundoran
Cliffony
Sligo
CO. MAYO
CO. SLIGO
CO. LEITRIM

SITE CODE:
SAC 001680; version 3. CO. SLIGO

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

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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 0059214. © Suirbhéarachta Ordonáis Rialtas na hÉireann

Map Version 1
Date: March 2015
MAP 2: STREEDAGH POINT DUNES SAC CONSERVATION OBJECTIVES ADJOINING DESIGNATION

SITE CODE:
SAC 000625; version 3.01,
SAC 001680; version 3, CO. LEITRIM / SLIGO

Legend

- Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625
- Streedagh Point Dunes SAC 001680
- OSI Discovery Series County Boundary

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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Legend

- Streedagh Point Dunes SAC 001680
- 1140 Mudflats and sandflats not covered by sea water at low tide
- OSI Discovery Series County Boundary

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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Níl sna teorainneacha ar na léarscáileanna ach nóideáireachta ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe.

Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann
Legend

- Streedagh Point Dunes SAC 001680
- OSI Discovery Series County Boundary

**Marine Community Types**

- Yellow: Mobile sand with *Haustorius arenarius* and polychaetes community complex
- Brown: Reef community
- Orange: Sand with *Pygospio elegans* and *Cerastoderma edule* community complex

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

**SITE CODE:** SAC 001680; version 3. CO. SLIGO

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

**SALTMARSH HABITATS**

The map will be read in conjunction with the NPWS Conservation Objectives Document.

**Legend**

- Red: Streedagh Point Dunes SAC 001680
- Yellow: OSI Discovery Series County Boundary
- Dark Green: SMP: 0121 Saltmarsh Monitoring Project Site Codes

**Saltmarsh Habitats**

**Qualifying Interests**

- **1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)**
- **1330 / 1410 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) / Mediterranean salt meadows (Juncetalia maritimi)**
- **1410 Mediterranean salt meadows (Juncetalia maritimi)**
- **Potential 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)**

**Non Qualifying Interests**

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

---

**SITE CODE:** SAC 001680; version 3. CO. SLIGO

0 0.2 0.4 0.6 0.8 1 km

---

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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

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Map Version 1
Date: March 2015
Map Version 1

Date: March 2015

**MAP 6:**

**STREEDAGH POINT DUNES SAC CONSERVATION OBJECTIVES**

**SAND DUNE HABITATS & PERENNIAL VEGETATION OF STONY BANKS**

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

**Legend**

- Streedagh Point Dunes SAC 001680
- OSI Discovery Series County Boundary
- National Shingle Beach Survey sub-sites
- CMP: 137 Coastal Monitoring Project Site Codes

**Sand Dune Habitats**

**Qualifying Interests**

- 2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')
- 2130 *Fixed coastal dunes with herbaceous vegetation ('grey dunes')*

**Non Qualifying Interests**

- 1210 Annual vegetation of drift lines
- 2110 Embryonic shifting dunes
- 2190 Humid dune slacks

**Legend**

- Streedagh Point Dunes SAC 001680
- OSI Discovery Series County Boundary
- National Shingle Beach Survey sub-sites
- CMP: 137 Coastal Monitoring Project Site Codes

**Legend**

- Streedagh Point Dunes SAC 001680
- OSI Discovery Series County Boundary
- National Shingle Beach Survey sub-sites
- CMP: 137 Coastal Monitoring Project Site Codes

**Legend**

- Streedagh Point Dunes SAC 001680
- OSI Discovery Series County Boundary
- National Shingle Beach Survey sub-sites
- CMP: 137 Coastal Monitoring Project Site Codes

**Legend**

- Streedagh Point Dunes SAC 001680
- OSI Discovery Series County Boundary
- National Shingle Beach Survey sub-sites
- CMP: 137 Coastal Monitoring Project Site Codes
Map Version 1
Date: March 2015

Legend
- Streedagh Point Dunes SAC 001680
- 1014 Narrow-Mouthed Whorl Snail - Vertigo angustior
- OSI Discovery Series County Boundary

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

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

SITE CODE: SAC 001680; version 3. CO. SLIGO

<table>
<thead>
<tr>
<th>0</th>
<th>0.2</th>
<th>0.4</th>
<th>0.6</th>
<th>0.8</th>
<th>1 km</th>
</tr>
</thead>
</table>

G6350
G6450
G6550
G6551
G6552
Conservation objectives for Templehouse and Cloonacleigha Loughs SAC [000636]

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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3140</td>
<td>Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.</td>
</tr>
<tr>
<td>3260</td>
<td>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation</td>
</tr>
</tbody>
</table>

* denotes a priority habitat
Citation: NPWS (2016) Conservation objectives for Templehouse and Cloonacleigha Loughs SAC [000636]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3180</td>
<td>Turloughs*</td>
</tr>
</tbody>
</table>

* denotes a priority habitat
Citation: NPWS (2016) Conservation objectives for Turloughmore (Sligo) SAC [000637]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>91A0</td>
<td>Old sessile oak woods with <em>Ilex</em> and <em>Blechnum</em> in the British Isles</td>
</tr>
</tbody>
</table>

* denotes a priority habitat

For more information please go to: [www.npws.ie/protected-sites/conservation-management-planning](http://www.npws.ie/protected-sites/conservation-management-planning)
Citation: NPWS (2016) Conservation objectives for Union Wood SAC [000638]. Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3260</td>
<td>Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation</td>
</tr>
<tr>
<td>6210</td>
<td>Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia) (<em>important orchid sites)</em></td>
</tr>
<tr>
<td>6410</td>
<td>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)</td>
</tr>
<tr>
<td>91E0</td>
<td>Alluvial forests with <em>Alnus glutinosa</em> and <em>Fraxinus excelsior</em> (Alno-Padion, Alnion incanae, Salicion albae)*</td>
</tr>
</tbody>
</table>

* denotes a priority habitat

For more information please go to: [www.npws.ie/protected-sites/conservation-management-planning](http://www.npws.ie/protected-sites/conservation-management-planning)
<table>
<thead>
<tr>
<th>Code</th>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1106</td>
<td>Salmon</td>
<td><em>Salmo salar</em></td>
</tr>
<tr>
<td>1355</td>
<td>Otter</td>
<td><em>Lutra lutra</em></td>
</tr>
</tbody>
</table>

**Citation:** NPWS (2016) Conservation objectives for Unshin River SAC [001898], Generic Version 5.0. Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
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