

BLACK BOG SAC
UK0016609

CONSERVATION OBJECTIVES

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V1	June 2013	Internal working document	
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BLACK BOG SAC CONSERVATION OBJECTIVES

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives¹ to ensure that all habitats and species of Community Interest are maintained or restored to Favourable Conservation Status (FCS). Natura 2000 sites have a crucial role to play in achieving this overall objective since they are the most important core sites for these species and habitats. Each site must therefore be managed in a way that ensures it contributes as effectively as possible to helping the species and habitats for which it has been designated reach a favourable conservation status within the EU.

To ensure that each Natura 2000 site contributes fully to reaching this overall target of FCS, it is important to set clear conservation objectives for each individual site. These should define the desired state, within that particular site, of each of the species and habitat types for which the site was designated.

Once a site has been included in the Natura 2000 network, Member States are required to implement, on each site, the necessary conservation measures which correspond to the ecological requirements of the protected habitat types and species of Community Interest present, according to Article 6.1 of the Habitats Directive. They must also prevent any damaging activities that could significantly disturb those species and habitats (Article 6.2) and to protect the site from new potentially damaging plans and projects likely to have a significant effect on a Natura 2000 site (Article 6.3, 6.4).

Conservation measures can include both site-specific measures (i.e. management actions and/or management restrictions) and horizontal measures that apply to many Natura 2000 sites over a larger area (e.g. measures to reduce nitrate pollution or to regulate hunting or resource use).

In Northern Ireland, Natura 2000 sites are usually underpinned by the designation of an Area of Special Scientific Interest (ASSI) under the Environment (NI) Order 2002 (as amended).

¹ 92/43/EEC and 2009/147/EC (codified version of Directive 79/409/EEC as amended)

2. ROLE OF CONSERVATION OBJECTIVES

Conservation Objectives have a role in

- Conservation Planning and Management – guide management of sites, to maintain or restore the habitats and species in favourable condition
- Assessing Plans and Projects, as required under Article 6(3) of the Habitats Directive - Habitats Regulations Assessments (HRA) are required to assess proposed plans and projects in light of the site's conservation objectives.
- Monitoring and Reporting – Provide the basis for assessing the condition of a feature, the factors that affect it and the actions required.

3. DEFINITION OF FAVOURABLE CONSERVATION STATUS

Favourable Conservation Status as defined in Articles 1(e) and 1(i) of the Habitats Directive:

The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

- Its natural range and areas 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 as defined in Article 1(i).

For species, favourable conservation status is defined in Article 1(i) as 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 population on a long term basis.

3.1 DEFINITION OF FAVOURABLE CONDITION

Favourable Condition is defined as “**the target condition for an interest feature in terms of the abundance, distribution and/or quality of that feature within the site**”.

The standards for favourable condition (Common Standards) have been developed by JNCC and are applied throughout the UK. Achieving Favourable Condition on individual sites will make an important contribution to achieving Favourable Conservation Status across the Natura 2000 network.

4. SITE INFORMATION

COUNTY: TYRONE

G.R : IH 635810

AREA: 194 ha

5. SUMMARY SITE DESCRIPTION

Black Bog lies at the source of the Owenreagh River approximately equal distance between Omagh and Cookstown in Omagh District. The bog lies at a moderate elevation between 130m and 140m O.D. and displays some characteristics of transitional/intermediate bog. With an uncut dome estimated to be just over 147 ha, it represents the largest area of uncut lowland raised bog in Northern Ireland. The active raised bog supports well-developed and extensive hummock and hollow topography, and notable peatland flora including *Empetrum nigrum*, the oceanic liverwort *Pleurozia purpurea* and the bog mosses *Sphagnum fuscum* and *S. imbricatum*. One of the most important features of Black Bog is the unbroken transition through a lagg, dominated by Purple Moor-grass *Molinia caerulea*, to swamp and fen along the Owenreagh River.

5.1 BOUNDARY RATIONALE

The boundary of Black Bog has been demarcated to include all areas of intact raised bog and associated semi-natural habitats, including cutover bog, pockets of acid grassland and a fairly extensive area of lagg vegetation associated with the Owenreagh River. The boundary around the entire site is

defined as the edge of high quality semi-natural habitat associated with the raised bogs hydrological unit.

The boundary itself is rather complex incorporating a stretch of the Owenreagh River, ditches, banks old tracks, road verges, hedges and fences. The river forms the boundary along the south eastern periphery of the bog and Cashel wood, whilst a forestry plantation stretches right along the opposite bank of the river. Although some cutover bog areas have been included in the site, more severely degraded bog has been excluded from the SAC, being agriculturally improved cutover bog.

Most of the boundaries are stock proof, but there are some fences that have fallen into disrepair and stock can move across into the designated area at these points. In addition, the unfenced verge of Black Bog Road forms part of the boundary along the northern edge of the bog.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ population
Habitat	Active raised bog	B	166.2 ha
Habitat	Degraded raised bog still capable of regeneration	D	13 ha
Habitat	Depressions on peat substrates of the <i>Rhynchosporion</i>	D	0.1 ha

Table 1. List of SAC selection features. Those with status A-C will be referred to in ANNEX I

The global status is an expert judgement of the overall value of the site for the conservation of the relevant Annex I habitat. Sites have been graded A, B or C - in the UK these gradings have been interpreted as follows:

A - Sites holding outstanding examples of the habitat in a European context.

B - Sites holding excellent stands of the habitat, significantly above the threshold for SSSI/ASSI notification but of somewhat lower value than grade A sites.

C - Examples of the habitat which are of at least national interest (i.e. usually above the thresholdfor SSSI/ASSI notification on terrestrial sites) but not

significantly above this. These habitats are not the primary reason for SACs being selected.

D - Habitat present but not of sufficient extent or quality to merit listing as SAC feature.

There is therefore a distinction between the principal features for which sites have been selected (those graded A or B) and those which are only of secondary interest (those graded C). This is a useful distinction but it is important to note that all three grades are qualifying SAC interest features.

Click [here](#) to go to the Natura 2000 Standard Data Form for Black Bog SAC.

6.1 ASSI SELECTION FEATURES

Feature Type	Feature	Size/ extent/ population
Habitat	Lowland Raised Bog	194 ha
Species	Breeding Bird Assemblage	

Table 2. List of ASSI features

7. CONSERVATION OBJECTIVES

The *Conservation Objective* for this site is:

To maintain (or restore where appropriate) the active raised bog to favourable condition.

For each SAC feature, there are a number of component objectives which are outlined in the table below. These include a series of attributes, measures and targets which form the basis of *Condition Assessment*. The results of this will determine whether the feature is in favourable condition or not. The feature attributes and measures are found in the attached annex.

8. SAC SELECTION FEATURE OBJECTIVE REQUIREMENTS

Feature	Global Status	Component Objective
Active raised bog	B	Maintain the extent of intact lowland raised bog and actively regenerating raised bog vegetation.
		Maintain and enhance the quality of the lowland raised bog community types including the presence of notable species.
		Seek to expand the extent of actively regenerating raised bog vegetation into degraded (non-active) areas of cutover bog.
		Maintain the diversity and quality of other habitats associated with the active raised bog, e.g. acid grassland, fen and swamp, especially where these exhibit natural transition to the raised bog.
		Maintain the hydrology of the raised bog peat mass.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for lowland raised bog rehabilitation.

9. ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Lowland Raised Bog	Maintain the extent of intact lowland raised bog.
	Seek to expand the extent of actively regenerating raised bog.
	Maintain the hydrology of the raised bog peat mass.
Breeding Bird Assemblage	To be finalised.

10. MANAGEMENT CONSIDERATIONS

Ownership

Black Bog is mainly privately owned with around 7 individuals identified as owner/occupiers of the site and a number of individuals identified as having the right to cut turf on the bog for domestic use. Forest Service also own a considerable proportion of the site with 48 ha. of intact raised bog declared as a Forest Nature Reserve

The complex pattern of ownership makes a unified approach to site management more difficult.

11. MAIN THREATS, PRESSURES AND ACTIVITIES WITH IMPACTS ON THE SITE

Both on-site and off-site activities can potentially affect SAC/ASSI features. The list below is not exhaustive, but deals with the most likely factors that are either affecting Black Bog, or could affect it in the future. Although Active Raised Bog is the qualifying SAC feature, factors affecting ASSI features are also considered.

NOTE - Carrying out any of the Notifiable Operations listed in the ASSI schedule could affect the site.

Peat Cutting

There has been some hand cutting for turf around the periphery of Black Bog, which has encroached into the intact surface of the raised bog. However, many of the old hand cuttings now support actively regenerating bog vegetation. More recent mechanised peat cutting has taken place in some areas of the bog and in some instances encroached onto the intact surface of the bog. Peat cutting at the time of designation was problematical, but now appears to have largely stopped. During the 2005 condition assessment evidence of small-scale, hand cutting was encountered. However, no such areas of cutting were encountered in the 2011 assessment.

ACTION: No peat cutting within the SAC.

Burning

Burning of the vegetation has taken place occasionally, with some areas of past burning identified. Excessive burning will tend to reduce the cover of *Sphagnum* mosses and ericaceous species, increasing the proportion of *Molinia caerulea* and *Trichophorum cespitosum*. In addition, structural diversity will be reduced.

ACTION: No burning within the SAC.

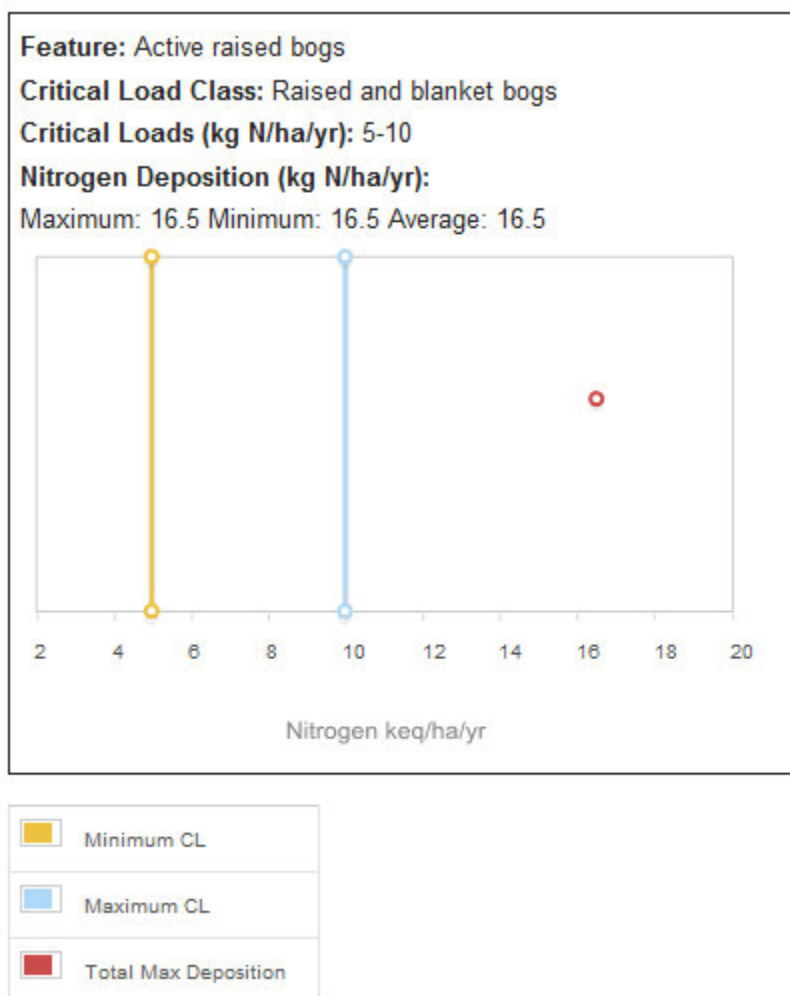
Drainage

The northern section of the main uncut dome of Black Bog, has been drained in the past by a series of about 30 north-west to south-east drains at 20 m intervals. These drains were subsequently blocked after the site was declared as an ASSI in 1987. In addition, there are several very old drains cut right across the main dome of the raised bog. All of these drains show up on the aerial photograph and are clearly apparent on the ground. Any drains that are currently carrying water away from the peat mass should be identified and blocked. Note that drainage works outside of the site's boundaries could potentially impact upon the bog's hydrology.

ACTION: Block active drains where appropriate.

Nitrogen Deposition

Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the UK. Lower and upper critical loads have been calculated for Black Bog SAC.



(Source: Air Pollution Information System (APIS) website- www.apis.ac.uk)

ACTION: Seek to maintain or, where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant critical load.

Changes to surrounding land-use

Any changes in local land-use e.g. drainage, road improvements, afforestation, agricultural intensification and development, may be detrimental to the SAC.

ACTION: Reduce the risk of surrounding agricultural intensification by encouraging the adjacent owner/occupiers to enter into agri-environment schemes. Use Habitats Regulations Assessments (HRAs), through the planning process, to minimise any development risks adjacent to the SAC.

Scrub Encroachment

There are some pockets of trees and scrub associated with the lagg and cutover bog around the periphery of the intact surface at Black Bog. Any further scrub encroachment into the actively regenerating cutover areas, or onto the intact surface is undesirable.

ACTION: Monitor further scrub encroachment (where it occurs) and take remedial action if required. Remove any invasive exotic species, such as *Rhododendron* as a matter of urgency.

Grazing

Lowland raised bogs are not suitable for grazing as the surface is fragile and easily damaged by poaching. The boundary is not entirely stock proof and there had been evidence of grazing in the past, however, there was no sign of any grazing on site in 2011 or 2005 or any damage caused through grazing.

ACTION: Fences around the periphery of the bog should be maintained to prevent grazing occurring on the site. Where there are no fences around the edges of improved agricultural land, fences should be erected.

Fly-tipping

There are some instances of localised fly-tipping occurring along the Black Bog Road. Where the ramparts extend into the cutover areas from the edge of the road, the periphery of the cutover is particularly vulnerable to fly tipping. There was no evidence of any fly-tipping noted in 2011.

ACTION: Remove all evidence of past fly-tipping. If localised dumping does reoccur, it should be removed as soon as possible to help prevent any further incidences of dumping.

Shooting

There are what appears to be old Pheasant breeding pens on the periphery of Black bog and it is apparent that there is some degree of rough shooting being carried out across the lowland raised bog. It should be noted that there should be no use of lead shot over wetlands including the surface of lowland raised bogs.

ACTION: Monitor the use of lead shot in the area and liaise with the various gun clubs in the area, to encourage the use of lead free shot.

Climate Change

Northern Ireland faces changes to its climate over the next century. Indications are that we will face hotter, drier summers, warmer winters and more frequent extreme weather events.

ACTION: When developing SAC management plans, the likely future impacts of climate change should be considered and appropriate changes made.

12. MONITORING

Monitoring of SACs takes place using two monitoring techniques.

Site Integrity Monitoring (SIM) - is carried out to ensure compliance with the ASSI/ SAC Schedule. The most likely processes of change will either be picked up by SIM (e.g. dumping, burning, turf cutting, grazing etc.) or will be comparatively slow (e.g. gradual degradation of the bog and associated habitats through desiccation).

These longer-term changes will be picked up by monitoring of the feature via **Site Condition Assessment** this is carried out on a rolling basis to pick up subtle changes in the condition of the feature.

The method for Condition Assessment was agreed by the relevant JNCC-led Lead Co-ordination Network although the methodology was modified to reflect individual site attributes in Northern Ireland.

12.1 MONITORING SUMMARY

- ***Monitor the integrity of the site (SIM or Compliance Monitoring)*** – Complete boundary survey. Ensure that there has been no peat cutting, dumping or burning carried out within the SAC boundary. This SIM should be carried out once a year.
- ***Monitor the condition of the site (Condition Assessment)*** – Monitor the key attributes for the active raised bog. This will detect if the active raised bog is in favourable condition or not. See Annex 1 for SAC features.

The favourable condition table provided in Annex 1 is intended to supplement the conservation objectives only in relation to management of established and ongoing activities and future reporting requirements on monitoring condition of the site and its features. It does not by itself provide a comprehensive basis on which to assess plans and projects, but it does provide a basis to inform the scope and nature of any Habitats Regulations Assessment (HRA) that may be needed. It should be noted that completion of a HRA is a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

13. REFERENCES

Cooper, A., McCann, T. and Rogers, D. (2009). Northern Ireland Countryside Survey 2007: Broad Habitat Change 1998-2007. Northern Ireland Environment Agency Research and Development Series No.09/06

Cruickshank, M. M. & Tomlinson, R. W. (1988). *Northern Ireland Peatland Survey*.

Department of the Environment for Northern Ireland (Countryside and Wildlife Branch). Belfast.

Department of the Environment for Northern Ireland (1993a). Conserving Peatland in Northern Ireland – A Statement of Policy.

Department of the Environment for Northern Ireland (2003). Northern Ireland Habitat Action Plan - Lowland Raised Bog.

European Commission (2000). Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Commission (2001). Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

European Commission (2014). Establishing conservation measures for Natura 2000 Sites.

Joint Nature Conservation Committee (JNCC) (2013). 3rd UK Habitats Directive Report.

ANNEX 1

Feature 1 (SAC) - Active Raised Bog (Status B)

(* = primary attribute. One failure among primary attributes = unfavourable condition)

Attribute	Targets/Limits	Method of Assessment	Comments
* Area of intact surface (ha)	Maintain the extent of intact bog surface at 194ha.	Visual estimate in 2x2 plots and across the intact raised bog using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Any loss of the current intact area is unacceptable. The active raised bog communities include M18 <i>Erica tetralix-Sphagnum papillosum</i> raised and blanket mire community and M2, the <i>Sphagnum cuspidatum/recurvum</i> bog pool community dominated by <i>S. cuspidatum</i> .
* Area of actively regenerating cutover bog (ha)	Maintain the current extent of actively regenerating cutover bog. This area should be extended where possible.	Visual estimate in 2x2 plots and across the intact raised bog using a combination of aerial photographs, SIM and Condition Assessment structured walk.	There should be no loss in extent of actively regenerating bog to scrub encroachment or further peat cutting.

* Area of mosaic communities and associated habitats	Maintain associated mosaic communities and habitats.	Visual estimate across the ASSI using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Repeat monitoring using condition assessment, SIM, and aerial photographs should indicate whether mosaics and associated habitats have changed or been lost.
Dwarf-shrub height	Average ericoid height should be 15–35cm.	Visual estimate in 2x2 m plots.	
* Bare Peat (%)	Peat cutting or drainage should not damage the intact surface of the active raised bog. Bare peat should occupy < 5% of the total area of the active raised bog.	Visual estimate in 2x2m plots	
* Pool/hummock system extent and diversity	The extent and diversity of the raised bog pool system must be at least maintained. Permanent pools containing any of the species listed below within a 10 m radius of the plot should be recorded. <i>S. cuspidatum</i> , <i>S. denticulatum</i> <i>S. magellanicum</i> , <i>Drosera, anglica</i> , <i>D. intermedia</i> , <i>Menyanthes trifoliata</i> .	Visual estimate within a 10m radius of plots <u>and</u> across the feature using a combination of aerial photographs and Condition Assessment structured walk.	Pool systems do not always occur on lowland raised bog systems. However, where they do occur, they are a very important micro-topographical feature of bog surface and their extent and condition should be maintained.

* <i>Sphagnum</i> cover/abundance (% cover and frequency) Active Peat Formation (DAFOR)	Ombrotrophic <i>Sphagnum</i> moss species should have a minimum cover of 33% over at least 66% of the intact lowland raised bog surface. Thick, hummock forming species of sphagnum should be at least occasional. Species present should include a mixture of both thin species: - <i>S. capillifolium</i> and <i>S. tenellum</i> and the thick hummock forming species: - <i>S. papillosum</i> and <i>S. magellanicum</i> at least occasional over the surface.	Visual estimate in 2x2m plots. Visual estimate in 2x2m plots.	A constant <i>Sphagnum</i> moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. <i>Sphagnum</i> moss is therefore used to measure the hydrological integrity of the intact bog surface.
* Ericaceous cover (%) and frequency of <i>Erica tetralix</i> (DAFOR).	Ericoid cover should be maintained between 40% and 60% of the intact bog surface. <i>Erica tetralix</i> should be at least present over a minimum 66% of the intact lowland raised bog surface.	Visual estimate in 2x2m plots	A mono-dominant sward of <i>Calluna vulgaris</i> may suggest that the surface of the intact bog is drying out – i.e. the water table is too far below the surface of the bog.
* Graminoid cover (%)	Graminoid cover should be maintained between 10 and 40 %.	Visual estimate in 2x2m plots	

* Frequency and % cover of scrub/tree encroachment on any active peat surface (DAFOR and % cover)	Scrub/tree encroachment should be no more than rare on the intact raised bog surface or in the actively regenerating cutover areas. Mean cover should be less than 2%.	Visual estimate within a 10 m radius of plots and across the active peat surface using aerial photographs and Condition Assessment structured walk.	If scrub/tree species are more than rare on any active peat surface, scrub control should be carried out.
* <i>Rhynchospora alba</i> abundance (% cover)	<i>Rhynchospora alba</i> cover should be less than 10%.	Visual estimate in 2x2m plots	<i>Rhynchospora alba</i> only occurs as a natural component of the bog vegetation around pool systems. A high frequency of this species over the intact surface of the bog may be a consequence of excessive burning.
* <i>Myrica gale</i> abundance (% cover)	<i>Myrica gale</i> cover should be less than 10%.	Visual estimate in 2x2m plots	
* Management - Burning (% cover)	Signs of recent burning should occupy less than 5% of the intact raised bog surface and the actively regenerating cutover areas. Recent burning is represented by areas burnt within the last two years.	Visual estimate in 2x2 m plots <u>and</u> across the active bog surface using a combination of aerial photographs and Condition Assessment structured walk.	

* Management - Grazing (% cover)	Signs of grazing (poaching/dung) should be no more than rare on the intact raised bog surface and the actively regenerating cutover areas. The frequency of droppings, the extent of poaching, uprooting of dwarf shrubs, invasion by <i>Juncus squarrosus</i> etc. and the presence of grazing induced <i>Calluna vulgaris</i> growth forms indicate moderate and heavy grazing.	Visual estimate in 2x2 m plots.	
Indicators of Local Distinctiveness			
* Presence of rare or scarce species specific to the site. <i>Sphagnum austinii</i> <i>Sphagnum fuscum</i> <i>Sphagnum pulchrum</i> <i>Utricularia</i> spp. <i>Andromeda polifolia</i>	Locally distinctive species recorded for the site should be at least present along the length of the Condition Assessment structured walk. If these species are not recorded on any one visit, it does not automatically make the site unfavourable.	Visual estimate.	

Frequency -

1-20% = Rare

21-40% = Occasional

41- 60% = Frequent

> 60% = Constant

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7, as amended by Resolution VIII.13 of the Conference of the Contracting Parties.

Note for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers are strongly urged to provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of maps.

1. Name and address of the compiler of this form:

FOR OFFICE USE ONLY.

DD MM YY

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Designation date

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Site Reference Number



Telephone/Fax: +

Email:

[Redacted contact information]

2. Date this sheet was completed/updated:

Designated: 14 December 1999 / Updated: May 2005

3. Country:

UK (Northern Ireland)

4. Name of the Ramsar site:

Black Bog

5. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps.

a) hard copy (required for inclusion of site in the Ramsar List): yes ☒ -or- no ☐

b) digital (electronic) format (optional): Yes

6. Geographical coordinates (latitude/longitude):

054 40 21 N

007 01 00 W

7. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

In County Tyrone in the centre of Northern Ireland about 17 km west of Cookstown.

Administrative region: Cookstown; Omagh; Tyrone

8. Elevation (average and/or max. & min.) (metres): 9. Area (hectares): 183.42

Min. 155

Max. 170

Mean No information available

10. Overview:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

This site is one of the two largest intact active bogs in Northern Ireland with hummock and hollow pool complexes and represents one of the best examples of this habitat type in the UK.

11. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1

12. Justification for the application of each Criterion listed in 11. above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Criterion 1

The site is a large and relatively intact example of a lowland raised bog and one of the best examples of this habitat in the UK.

13. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

14. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	acidic, peat, nutrient-poor, basalt
Geomorphology and landscape	lowland
Nutrient status	oligotrophic
pH	acidic, strongly acidic
Salinity	fresh
Soil	mainly organic
Water permanence	usually permanent
Summary of main climatic features	Annual averages (Aldergrove, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/aldergrove.html) Max. daily temperature: 12.5° C Min. daily temperature: 5.8° C Days of air frost: 39.1 Rainfall: 862.4 mm Hrs. of sunshine: 1313.7

General description of the Physical Features:

No information available

15. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

No information available

16. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

No special values known

17. Wetland types

Inland wetland

Code	Name	% Area
U	Peatlands (including peat bogs swamps, fens)	100

18. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site.

The site is especially important for its extensive hummock-hollow complex, high cover of *Sphagnum* species and largely intact lagg. There are some very large *Sphagnum* hummocks including *S. imbricatum* and *S. fuscum*. Another feature of the bog surface is the occurrence of an unusual plant community with locally high cover of *Empetrum nigrum* and large hummocks of *Cladonia impexa*.

19. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.

Internationally important species occurring on the site

Habitat:

Active raised bog

Nationally important species occurring on the site

Habitat:

Lowland raised bog

20. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.

Species Information

None reported

21. Social and cultural values:

e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

No special values known

22. Land tenure/ownership:

Ownership category	On-site	Off-site
National/Crown estate	+	+
Private		+

23. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	
Rough or shifting grazing	+	

24. Factors adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.
2. Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
No factors reported	NA				

For category 2 factors only.

What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?

Is the site subject to adverse ecological change? NO

25. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
SSSI / ASSI	+	
Management agreement	+	
Site management statement/plan implemented	+	
AONB	+	
SAC	+	

26. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

27. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

- The site was subject to detailed habitat and species surveys prior to its designation as an ASSI
- The integrity of the site is regularly monitored
- A basin profiling and hydrological survey was carried out in 1996.

28. Current conservation education:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

None reported

29. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

None reported

30. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Department of the Environment (Northern Ireland), Environment and Heritage Service,
Commonwealth House, Castle Street, Belfast, Northern Ireland, BT1 1GU

31. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Department of the Environment (Northern Ireland), Environment and Heritage Service,
Commonwealth House, Castle Street, Belfast, Northern Ireland, BT1 1GU

32. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 13 above), list full reference citation for the scheme.

Site-relevant references

- Corbett, P. McM & Seymour, GR (1997) The conservation of peatland in Northern Ireland. In: *Conserving peatlands*, ed by L Parkyn, RE Stoneman & HAP Ingram. CAB International, Wallingford, for Scottish Wildlife Trust
- Frazer, JS, Cruickshank, MM & Tomlinson, RW (1988) *Northern Ireland Peatland Survey*. Unpublished report to Department of the Environment (Northern Ireland), Countryside and Wildlife Branch, Belfast
- McLeod, CR, Yeo, M, Brown, AE, Burn, AJ, Hopkins, JJ & Way, SF (eds.) (2004) *The Habitats Directive: selection of Special Areas of Conservation in the UK*. 2nd edn. Joint Nature Conservation Committee, Peterborough.
www.jncc.gov.uk/SACselection
-

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Northern Ireland Environment Agency
Gníomhaireacht Comhshaoil Thuaisceart Éireann
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OWENKILLEW RIVER SPECIAL AREA OF CONSERVATION

Site Code: UK0030233

SITE CONSERVATION OBJECTIVES & Supporting advice

Version 4
6 September 2024

Sustainability at the heart of a living, working, active landscape valued by everyone.



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Document Details

Owenkillew River SAC Conservation Objectives

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Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	[REDACTED]
V2	January 2015	Complete review	[REDACTED]
V3	July 2017	Edit and minor correction	[REDACTED]
V4	July 2024	Complete review of supporting advice at Annex A - freshwater features, additional minor updates.	[REDACTED]

Site Relationships

The Owenkillew River SAC boundary adjoins the boundary of the River Foyle and Tributaries SAC.

1. INTRODUCTION

There is a clear responsibility under the Habitats and Birds Directives¹ and associated domestic legislation, namely the Conservation (Natural Habitats &c.) Regulations (Northern Ireland) 1995 (as amended)², hereafter referred to as the Habitats Regulations, to ensure that all habitats and species listed in Annexes I and II of the Habitats Directive, are maintained or restored to Favourable Conservation Status (FCS).

Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) also contribute to meeting UK international legal obligations, such as the Bern Convention, the Oslo and Paris Conventions (OSPAR), Bonn and Ramsar Conventions.

The UK national site network of European sites, formerly known as Natura 2000 sites, have a crucial role to play in achieving the overall objective of FCS since they are the most important core sites for these species and habitats. Each site must therefore be managed in a way that ensures it contributes as effectively as possible to helping the species and habitats for which it has been designated reach a favourable conservation status within the UK.

To ensure that each site contributes fully to reaching this overall target of FCS, it is important to set clear conservation objectives for each individual site. These should define the desired state, within that particular site, of each of the species and habitat types for which the site was designated.

Once a site has been included in the national site network, countries are required to implement, on each site, the necessary conservation measures which correspond to the ecological requirements of the protected habitat types and species of Community Interest present, according to Article 6.1 of the Habitats Directive. They must also prevent any damaging activities that could significantly disturb those species and habitats (Article 6.2) and to protect the site from new potentially damaging plans and projects likely to have a significant effect on a Natura 2000 site (Article 6.3, 6.4).

Conservation measures can include both site-specific measures (i.e. management actions and/or management restrictions) and horizontal measures that apply to the national site network over a larger area (e.g. measures to reduce nitrate pollution or to regulate hunting or resource use).

In Northern Ireland, national site network sites are usually underpinned by the designation of an Area of Special Scientific Interest (ASSI) under the Environment (NI) Order 2002 (as amended).

¹ 92/43/EEC and 2009/147/EC (codified version of Directive 79/409/EEC as amended)

² Updated through the Conservation (Natural Habitats &c.) (Amendment)(Northern Ireland)(EU Exit) Regulations 2019.

2. ROLE OF CONSERVATION OBJECTIVES

Conservation Objectives have a role in:

- Conservation Planning and Management – guide management of sites, to maintain or restore the habitats and species in favourable condition
- Assessing Plans and Projects, as required under Article 6(3) of the Habitats Directive - Habitats Regulations Assessments (HRA) are required to assess proposed plans and projects in light of the site's conservation objectives.
- Monitoring and Reporting – Provide the basis for assessing the condition of a feature, the factors that affect it and the actions required.

The site-level conservation objectives, the supporting advice (at Annex A) and any case-specific advice given by NIEA Natural Environment Division, should be used when developing, proposing or assessing an activity, plan or project that may affect this site.

3. DEFINITION OF FAVOURABLE CONSERVATION STATUS

Favourable Conservation Status is defined in Articles 1(e) and 1(i) of the Habitats Directive:

The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

- Its natural range and areas 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 as defined in Article 1(i).

For species, favourable conservation status is defined in Article 1(i) as 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 population on a long-term basis.

3.1 DEFINITION OF FAVOURABLE CONDITION

Favourable Condition is defined as “the target condition for an interest feature in terms of the abundance, distribution and/or quality of that feature within the site”.

The standards for favourable condition (Common Standards) have been developed by JNCC and are applied throughout the UK. Achieving Favourable Condition on individual sites will make an important contribution to achieving Favourable Conservation Status across the Natura 2000 network.

4. SITE INFORMATION

SITE: Owenkilleg River SAC

COUNTY: TYRONE

GRID REFERENCE: IH 553868

LOWER GR: IH 409863

UPPER GR: IH 699862

AREA: 213.46 ha

5. SUMMARY SITE DESCRIPTION

The SAC includes the river (42 km stretch) and its associated riverine flora and fauna and adjacent semi-natural vegetation, primarily woodland flora and fauna. The river rises at an altitude of 415m and flows into the Strule at an altitude of 35m. It is a fast-flowing spate river; notable for the physical diversity and naturalness of the bank and channel, the richness and naturalness of its plant and animal communities, which includes extensive beds of Stream Water Crowfoot *Ranunculus penicillatus* var. *penicillatus* and the largest Northern Ireland population of the now rare Fresh Water Pearl Mussel *Margaritifera margaritifera*. In addition, the river is important for Otter *Lutra lutra* and Atlantic Salmon *Salmo salar*.

Guidance and literature: <https://www.daera-ni.gov.uk/protected-areas/owenkilleg-river-sac>

Adjacent woodlands which form part of the SAC include Drumlea and Mullan Woods ASSI and the Owenkilleg and Glenelly Woods ASSI, two of the largest stands of Oak woodland in Northern Ireland. An area of localised waterlogging in the former woodland has resulted in the development of Bog Woodland.

Further details of the site are contained in the relevant ASSI Citations and Views About Management statements, which are available on the DAERA website (<https://www.daera-ni.gov.uk/protected-areas>).

5.1 BOUNDARY RATIONALE

Defining the extent of site boundaries for rivers is variable across the UK. The four options currently in use are:-

- (1) whole catchments
- (2) main river stem from source to mouth, tributaries and upland catchment
- (3) main river stem from source to mouth and tributaries
- (4) main river stem from source to mouth only

The option used is dependent on the qualifying features for that site and the current knowledge of distribution of that feature. In the case of the Owenkillev River, the main SAC qualifying features are *Margaritifera margaritifera* and *Ranunculus* communities, which are confined to the main channel.

The upper limits of the site have been determined by the restricted size of the channel. Downstream limit is at the confluence with the Strule, where the site joins with the adjacent River Foyle and Tributaries SAC.

The lateral boundary beyond the river channel follows the same guidelines as that for all ASSIs, which is dependent on the type and quality of adjacent habitat. Much of the SAC has limited adjacent habitat. Therefore, the boundary is frequently restricted to the top of the riverbank. However, in places, there is significant adjoining woodland interest, and this is generally included. In addition, the SAC includes both Drumlea and Mullan Woods ASSI and the Owenkillev and Glenelly Woods ASSI.

The boundary uses permanent man-made features where possible. However, along some stretches of the river and woodland edge, such boundaries were absent and recognisable topographical or physical features such as breaks in slope, scrub or tree line were used.

6. SAC SELECTION FEATURES

Table 1. List of SAC selection features. Those with global status A-C will be referred to in ANNEX A.

Feature Type	Feature	Global Status	Size/ extent/ pop~
Species	Freshwater Pearl Mussel <i>Margaritifera margaritifera</i>	B	10,000
Habitat	Water courses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachion</i> vegetation	B	83% of channel length
Habitat	Old Sessile Oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	B	79ha
Habitat	Bog Woodland	C	1.5ha
Species	Otter <i>Lutra lutra</i>	C	
Species	Atlantic Salmon <i>Salmo salar</i>	C	2,700*
Species	Brook Lamprey <i>Lampetra planeri</i>	D	P

The global status is an expert judgement of the overall value of the site for the conservation of the relevant Annex A feature. Sites have been graded A, B or C - in the UK these gradings have been interpreted as follows:

A - Sites holding outstanding examples of the habitat in a European context.

B - Sites holding excellent stands of the habitat, significantly above the threshold for SSSI/ASSI notification but of somewhat lower value than grade A sites.

C - Examples of the habitat which are of at least national interest (i.e. usually above the threshold for SSSI/ASSI notification on terrestrial sites) but not significantly above this. These habitats are not the primary reason for SACs being selected.

D - Habitat present but not of sufficient extent or quality to merit listing as SAC feature.

There is therefore a distinction between the principal features for which sites have been selected (those graded A or B) and those which are only of secondary interest (those graded C). This is a useful distinction, but it is important to note that all three grades are qualifying SAC interest features.

Click [here](#) to go to the Standard Data Form for Owenkillev River SAC (UK national site network of European sites).

6.1 ASSI SELECTION FEATURES

Owenkillew River ASSI

Table 2. List of ASSI features.

Feature Type	Feature	Size/ extent/ pop~
Habitat	Series of river types present with corresponding macrophyte assemblages, ranging from ultra-oligotrophic, to mesotrophic types.	
Habitat	Oak Woodland	79 ha
Habitat	Wet Woodland	1.5 ha
Species	Freshwater Pearl Mussel <i>Margaritifera margaritifera</i>	
Species	Otter <i>Lutra lutra</i>	
Species	Atlantic Salmon <i>Salmo salar</i>	

7. CONSERVATION OBJECTIVES

The *Conservation Objective* for this site is:

To maintain (or restore where appropriate) the

- Fresh Water Pearl Mussel *Margaritifera margaritifera*
- Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitriche-Batrachion* vegetation
- Old Sessile Oak woods with *Ilex* and *Blechnum* in the British Isles
- Bog Woodland
- Otter *Lutra lutra*
- Atlantic Salmon *Salmo salar*

to favourable condition.

For each SAC feature, there are a number of component objectives which are outlined in the table below. These include a series of attributes, measures and targets which form the basis of *Condition Assessment*. The results of this will determine whether the feature is in favourable condition or not. The feature attributes and measures are found in the attached annex.

8. SAC SELECTION FEATURE OBJECTIVE REQUIREMENTS

Feature	Grade	Objective
Freshwater Pearl Mussel <i>Margaritifera margaritifera</i>	B	Maintain and if feasible enhance population numbers through natural recruitment.
		Improve age structure of population.
		Improve water quality.
		Improve channel substrate quality by reducing siltation.
		Ensure host fish population is adequate for recruitment.
		Increase the amount of shading through marginal tree cover along those sections of river currently supporting this species.
Water courses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachion</i> vegetation	B	Maintain and if feasible enhance extent and composition of community.
		Improve water quality
		Improve channel substrate quality by reducing siltation.
		Maintain and if feasible enhance the river morphology
Old Sessile Oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	B	Maintain and <u>expand</u> the extent of existing oak woodland. (There is an area of degraded bog, wetland and damp grassland which have the potential to develop into oak woodland)
		Maintain and enhance Oak woodland species diversity and structural diversity.
		Maintain the diversity and quality of habitats associated with the Oak woodland, e.g. fen, swamp, grasslands, scrub, especially where these exhibit natural transition to Oak woodland
		Seek nature conservation management over adjacent forested areas outside the ASSI where there may be potential for woodland rehabilitation.
		Seek nature conservation management over suitable areas immediately outside the ASSI where there may be potential for woodland expansion.

Bog Woodland	C	Maintain and expand the extent of existing bog woodland. (There is an area of degraded bog, wetland and damp grassland that have the potential to develop into bog woodland.
		Maintain and enhance bog woodland species diversity and structural diversity.
		Maintain the diversity and quality of habitats associated with the bog woodland, e.g. fen, swamp, especially where these exhibit natural transition to swamp woodland.
		Seek nature conservation management over adjacent forested areas outside the ASSI where there may be potential for woodland rehabilitation.
		Seek nature conservation management over suitable areas immediately outside the ASSI where there may be potential for woodland expansion.
Otter <i>Lutra lutra</i>	C	Population numbers and distribution to be maintained and if possible, expanded.
		Maintain the extent and quality of suitable Otter habitat, in particular the chemical and biological quality of the water, and all associated wetland habitats
Atlantic Salmon <i>Salmo salar</i>	C	Maintain and if possible, expand existing population numbers and distribution
		Maintain and where possible, enhance the extent and quality of suitable Salmon habitat, in particular the chemical and biological quality of the water

9 ADDITIONAL ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Series of river types present with corresponding macrophyte assemblages, ranging from ultra-oligotrophic, to mesotrophic types.	Maintain and if feasible enhance extent and composition of community.
	Improve water quality
	Improve channel substrate quality by reducing siltation.
	Maintain and if feasible enhance the river morphology
	Maintain the diversity and quality of habitats associated with the river e.g. bog, wet grasslands, scrub, swamp and oak woodland.
Oak Woodland	See SAC Selection Feature Objective Requirements table.
Wet Woodland	See SAC Selection Feature Objective Requirements table.
Freshwater Pearl Mussel <i>Margaritifera margaritifera</i>	See SAC Selection Feature Objective Requirements table.
Otter <i>Lutra lutra</i>	See SAC Selection Feature Objective Requirements table.
Atlantic Salmon <i>Salmo salar</i>	See SAC Selection Feature Objective Requirements table.

10. MANAGEMENT CONSIDERATIONS

Ownership

There are a total of 206 individuals or organisations with ownership or other rights associated with this site.

Adjoining Land Use

In the upper reaches, the river flows through a predominantly upland peatland landscape used for rough grazing. The river channel is generally unenclosed. Along its mid-reaches, the surrounding landscape is improved or semi-improved pasture used for silage and grazing, and is generally fenced from the surrounding land at least along one bank top. In the lower reaches, the main adjacent agricultural uses include tilled land and silage production as well as stock grazing. Here, a significant proportion of the river is bounded by woodland either as discrete woodland blocks along the valley side or as a thin bank top belt. The river channel and adjacent woodlands are only partially fenced.

11. MAIN THREATS, PRESSURES AND ACTIVITIES WITH IMPACTS ON THE SITE

Both on-site and off-site activities can potentially affect SAC/ASSI features. The list below is not exhaustive but deals with the most likely factors that are either affecting Owenkillev River or could affect it in the future.

Although Fresh Water Pearl Mussel *Margaritifera margaritifera*, Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitriche-Batrachion* vegetation, Old Sessile Oak woods with *Ilex* and *Blechnum* in the British Isles, Bog Woodland, Otter *Lutra lutra* and Atlantic Salmon *Salmo salar* are the qualifying SAC features, factors affecting ASSI features are also considered.

NOTE - Carrying out any of the Notifiable Operations listed in the ASSI schedule could affect the site.

RIVER HABITATS AND SPECIES

Water Quality/Eutrophication

Water quality is probably the most important single factor for the SAC and ASSI selection features, with both point and diffuse sources of pollution potentially damaging. These are dependent on human activities throughout the catchment, the majority of which are largely beyond the direct control of the current designation. The total catchment area feeding into the river is 45,469ha and consists of seven sub-catchment areas. The designation only includes the main channel of the Owenkillev and has excluded 36 minor tributaries (<=2.5m wide) and 6 major tributaries (>2.5m wide).

A significant portion of the upper catchment of this river and some of its tributaries are afforested; there is a potential for enrichment of the river during forestry operations (planting and fertiliser application).

Stock have open access to the channel in many sections and have caused poaching of the bank and channel. This represents another possible source of enrichment.

ACTION: Reduce enrichment of the water column by minimising point source pollution and through a catchment-wide campaign, encourage landowners to avoid excessive fertiliser inputs, thus reducing diffuse pollution. Restrict stock access to less sensitive watering points.

Channel & Bank Modification

The Owenkillev River has been extensively altered by man in the past, especially along the upper reach of the river, resulting in a reduction of the natural channel area available to *M. margaritifera* and macrophyte communities. The river has recovered somewhat from the effects of re-sectioning. Several fisheries weirs and

one fish counter have been recently created in the lower reach of the river. These modifications have changed the natural flow regime of the river.

The river is a designated watercourse, which requires the Rivers Agency to undertake regular maintenance under their statutory requirements.

ACTION: Future in-river works should be minimised as they reduce habitat and species diversity and threaten vulnerable shellfish populations. Due to the dynamic nature of rivers, work carried out at any point on the river may have a significant impact on the catchment as a whole.

Habitat enhancement schemes, such as the 'Salmonid Enhancement Programme' should be thoughtfully planned. Properly executed enhancement schemes can significantly improve the wildlife potential of rivers, but it is important to effectively manage the installation of structures such as weirs, as they may have a negative effect on species diversity by causing excessive damming of the channel. In the past, the construction of weirs by fishing clubs as part of the programme has locally altered the morphology of the river. Enhancement work should be limited to areas of river that have been extensively modified by past drainage schemes and which have lost much of their natural dynamic character.

ACTION: Initiate discussions with Loughs Agency/DAERA Marine and Fisheries Division and NIEA Water Management Unit to co-ordinate action.

Substrate Siltation

A significant portion of the area is afforested (especially the upper catchments), with a potential risk of sediment release during forestry operations, especially clear-felling.

ACTION: Liaise with Forest Service during felling and re-stocking programmes to minimise potential impacts (including potential eutrophication from planting and fertiliser application).

Sand wash from a number of commercial sandpits in the upper reaches of the river has resulted in siltation of the riverbed downstream.

ACTION: Monitor and control sediment input levels immediately downstream of sandpits.

Where the bank and channel of the river are accessible to stock, damage to *Margaritifera* beds, Salmon spawning grounds and the macrophyte community may occur. Trampling has an obvious direct impact but in some sections of the river, trampling and poaching of the river bank and channel have caused erosion, resulting in siltation of the riverbed downstream.

ACTION: Restrict livestock access to drinking areas only.

Sand Extraction

Small-scale sand extraction from the riverbed has been an ongoing practice by farmers, particularly in the lower reaches of the river. This disturbance results in

damage to the river morphology and increase in sediment loading, thus directly and indirectly affecting spawning beds and the macrophyte community.

ACTION: Under the Notifiable Operations, this activity is prohibited; ensure compliance with the ASSI Schedule.

Fish Farms

Fish farms can have a very serious impact on rivers. Fish farms normally abstract water from the river and release effluent downstream. Where the abstraction is large relative to streamflow, the channel between points of abstraction and release may have a much reduced discharge and water velocity. The effect can be so extreme that the upstream movement of migrating fish and other water-borne wildlife is obstructed.

In addition, effluents from intensive fish farms may have a modified temperature and pH, may be contaminated with toxic materials and may carry waste and partly decomposed food and the metabolic products of the fish. This can lead to increased oxygen demand (and hence a low oxygen concentration in the water), increased suspended solids and enrichment of the recipient stream.

Proposals for fish farms in the area will require very careful environmental assessment. In particular, it is imperative to ensure that an adequate compensatory flow is maintained and that the effluent is adequately treated.

ACTION: Review existing Water Order consents.

Water Extraction

A natural flow regime is essential for the maintenance of many of the selection features. Proposals for water extraction in the area will require very careful environmental assessment.

ACTION: Review existing Water Order consents.

Fly-tipping

Small-scale fly tipping has occurred along the river banks and in the river channel as well as in adjacent woodland.

ACTION: Removal of dumped material from the banks and channel and removal of any rubbish from the woodland, to prevent the build-up of debris and so discourage further tipping.

Alien species

At present Giant Hogweed *Heracleum mantegazzianum* and Himalayan Balsam *Impatiens glandulifera* are present along the riverbanks only in limited sections of the lower river reaches.

ACTION: Monitor and if necessary control the spread of alien species.

WOODLAND HABITATS AND SPECIES

Grazing/Poaching/Tree barking and Browsing

Free access to some woodland by domestic stock and feral goats is causing direct damage to the ground flora community by poaching and trampling. Grazing, barking and browsing can prevent regeneration leading to profound changes in woodland structure and composition. Information on current grazing levels of domestic stock within privately owned woodland is not readily available. No information of the current population of feral goats is available.

ACTION: Investigate current grazing practices. Where necessary, reduce stocking pressure in woods to sustainable levels or exclude stock altogether by fencing off woodland under MOSS agreements. Undertake census of the current feral goat population. If necessary, initiate control measures to reduce numbers to acceptable levels.

Invasion by exotics

Exotic species are widespread in the Owenkillew Woodland. They vary in the degree of impact they have and the threats they pose – for example, species such as Sycamore *Acer pseudoplatanus*, Himalayan Balsam *Impatiens glandulifera*, Salmon Berry *Rubus spectabilis* can be very invasive, while some are not seen as an immediate threat due to their limited occurrence (e.g. Rhododendron *Rhododendron ponticum*), or slow rate of spread (e.g. Beech *Fagus sylvatica*).

The most invasive species require management to control their spread – i.e. removal of seed sources. This is impractical with species such as Himalayan Balsam *Impatiens glandulifera* whose seed supply is partly recruited annually from water-borne seeds – indeed, it may be impossible to control the spread of this species, so research needs to be carried out to identify the effect it may have on the woodland community.

ACTION: Control invasive species where appropriate (e.g. Remove seeding Sycamore). Monitor other exotic species.

Nitrogen Deposition

Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the UK. Critical levels and critical loads have been calculated for protected site features.

Please refer to the UK Air Pollution Information System (APIS) for site relevant critical loads and levels at www.apis.ac.uk

ACTION: Seek to maintain, or where necessary restore, concentrations and deposition of air pollutants to at or below the site-relevant critical levels and loads.

Changes to surrounding land use

Any changes in local land-use e.g. agricultural intensification, drainage works and development) may be detrimental to the SAC.

ACTION: Reduce the risk of surrounding agricultural intensification by encouraging the adjacent owner/occupiers to enter into agri-environment schemes. Use Habitats Regulations Assessments (HRAs), through the planning process, to minimise any development risks adjacent to the SAC.

Climate Change

Northern Ireland faces changes to its climate over the next century. Indications are that we will face hotter, drier summers, warmer winters and more frequent extreme weather events.

ACTION: When developing SAC management plans, the likely future impacts of climate change should be considered and appropriate changes made.

12. CONSERVATION MANAGEMENT PLAN

The Owenkillew SAC Conservation Management Plan can be viewed at - [Owenkillew River SAC \(arcgis.com\)](http://arcgis.com)

13. MONITORING

Monitoring of SACs takes place using two monitoring techniques.

Site Integrity Monitoring (SIM) is carried out to ensure compliance with the ASSI/ SAC Schedule. The most likely processes of change will either be picked up by SIM (e.g. dumping, burning, turf cutting, grazing etc.) or will be comparatively slow (e.g. gradual degradation of the habitat).

These longer-term changes will be picked up by monitoring of the feature via **Site Condition Assessment** - this is carried out on a rolling basis to pick up subtle changes in the condition of the feature.

The method for Site Condition Assessment was agreed by the relevant JNCC-led Lead Co-ordination Network although the methodology has been modified to reflect individual site attributes in Northern Ireland.

13.1 MONITORING SUMMARY

1. Monitor the integrity of the site (SIM or Compliance Monitoring)

Complete boundary survey to ensure that the boundary features, where present, are still intact. Ensure that there has been no tree felling, ground or riverbed disturbance, fly-tipping or inappropriate burning carried out within the SAC

boundary. Evaluating stocking densities would also be desirable, whilst a check for feral goat damage should be carried out throughout the site. Inspection of river reaches with Pearl Mussel colonies should be undertaken once a year to ensure there has not been any pearl fishing. The SIM should be carried out once a year.

2. Monitor the condition of the site (Condition Assessment)

Monitor the key attributes for each of the SAC selection features. This will detect if the features are in favourable condition or not. See Annex A.

The favourable condition table provided in Annex A is intended to supplement the conservation objectives only in relation to management of established and ongoing activities and future reporting requirements on monitoring condition of the site and its features. It does not by itself provide a comprehensive basis on which to assess plans and projects, but it does provide a basis to inform the scope and nature of any Habitats Regulations Assessment (HRA) that may be needed. It should be noted that completion of a HRA is a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects

14. REFERENCES

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Cooper, A., McCann, T. and Rogers, D. (2009). Northern Ireland Countryside Survey 2007: Broad Habitat Change 1998-2007. Northern Ireland Environment Agency Research and Development Series No.09/06

Department of the Environment for Northern Ireland (2005). Northern Ireland Species Action Plan – Freshwater Pearl Mussel *Margaritifera margaritifera*.

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ANNEX A – Supporting advice

Feature 1 (SAC) – Freshwater Pearl Mussel *Margaritifera margaritifera* (Status B)

(* = primary attribute. One failure among primary attribute = unfavourable condition)

Attribute	Target	Method of Assessment	Comments
Population			
a. Spatial Extent	Should reflect distribution under near-natural conditions	Visual survey of riverbed	Population distribution should be close to that expected under near-natural conditions throughout the site, taking into account natural habitat conditions and allowing for natural fluctuations. The target is to secure a sustainable population of mussels that is able to utilise all naturally suitable habitat within the river
b. Population density	≥ 5 mussels per m ² within sample transects	Visual survey of riverbed.	The density data from all transects within each monitoring unit should be aggregated and the resulting figure assessed against the target. In smaller rivers where 50m transects have not been surveyed, density data from all quadrats should be aggregated and assessed against the target.
c. Age structure	i. At least 20% of population ≤65mm ii. At least 5% of population ≤ 30mm.	Length measurement of mussels recorded in quadrats within 50m transects.	Population profiles should not be attempted where mussel beds are vulnerable to damage. In this case, the target is to find at least one pearl mussel ≤65mm. This results in a lower degree of confidence that the population is reproductively viable but should protect it from potential adverse disturbance during survey. A threshold of at least one mussel is

			required in order to confirm recent recruitment and minimise disturbance of a population during survey.
d. Dead shells	<1% of population per year and scattered distribution.	Counting within 50m transects.	1% (based on a 100-year life span) considered to be indicative of natural losses for survey sites and for the entire river population per year. Where >1% dead shells are found, an investigation into the cause should be carried out to assess whether it may be an exceptional natural event or an indication of an unnatural kill. The dead shells should be examined for freshness (by checking the colour of the nacre) to help assess the likelihood of a problem.

Attribute	Target	Method of Assessment	Comments
Water Quality			
For freshwater pearl mussel, organic pollution, reactive phosphorous, acidification, and other nutrients are particularly important. Nutrient concentrations should be near natural.	See sub-attributes below. Targets included in the CSM guidance for Rivers should be used. These targets are intended to support a healthy, naturally functioning river ecosystem which protects the whole biological community and individual species to a degree characteristic of the river. Some more stringent chemical targets for pearl mussel are listed below.	Standard monitoring protocols in CSM Guidance for Rivers. (Data from NIEA).	Water quality should not be injurious to any life stage. All classified reaches within the designated site that contain, or should contain, freshwater pearl mussel should comply with targets given. Data from the last 3 years should be used. All water quality data should be available on request from NIEA.
a. Phosphorus	In locations where annual mean soluble reactive phosphorous (SRP) levels are $<5 \mu\text{g L}^{-1}$, the target should be $5 \mu\text{g L}^{-1}$. For rivers that exceed this, the target is	Standard monitoring protocols in CSM Guidance for Rivers. (Data from NIEA).	The SRP target value should not be set for a river without first checking the baseline P levels and any historical data available for the that river.

	the more stringent value of either: high status values for SRP under the WFD, or the SRP target for CSM river habitat.		Undetectable levels of SRP are not necessarily a guarantee of good health, particularly if the local analysis equipment is unable to perform at low concentrations. If all the available phosphorus is being transferred into filamentous algae, then it will not be detectable as SRP in open water. A combination of very low SRP with the absence of filamentous algae is considered to indicate nutrient levels conducive to <i>Margaritifera</i> populations in favourable condition.
b. Nitrogen	Nitrate annual median value of $<0.125 \text{ mg L}^{-1} \text{ N}$	Standard monitoring protocols in CSM guidance for Rivers (Data from NIEA).	This threshold is based on a study of 560 sites in 126 rivers: $0.125 \text{ mg L}^{-1} \text{ N}$ for Ireland (Moorkens, 2006). Like phosphorous, nitrate levels are a measure of the naturalness of the surrounding catchment, and limits should be set at those natural for that catchment. Where nutrient levels are too high to sustain pearl mussel populations, levels of all nutrients should be reduced until sustainability is achieved.
c. BOD	Mean BOD $<1.0 \text{ mg L}^{-1}$	Standard monitoring protocols in CSM Guidance for Rivers. (Data from NIEA).	Rivers with reproducing populations in the UK, Ireland and Spain have BOD levels consistently $<1.0 \text{ mg L}^{-1}$

Attribute	Target	Method of Assessment	Comments
Flow	Flow targets included in the CSM guidance for Rivers should be used, as these are intended to support a healthy naturally functioning river ecosystem which protects the whole biological community and individual species to a degree characteristic of the river. As a minimum, UKTAG standards for GES under the WFD should be met. River flow rates should be as natural as possible throughout the site, avoiding human induced high and low extremes.	Gauging stations (Data from DfI Rivers).	River flow affects a range of habitat factors of critical importance to FPM, including current velocity, water depth, wetted area, substrate quality, dissolved oxygen levels and water temperature. The maintenance of both flushing flows and base flows, based on natural hydrological processes, is vital. Detailed investigations of habitat-flow relationships may indicate that a more or less stringent threshold may be appropriate for a specified reach; however, a precautionary approach would need to be taken to the use of less stringent values. Naturalised flow is defined as the flow in the absence of abstractions and discharges. The availability and reliability of data is patchy – long term gauged data can be used until adequate naturalised data become available, although the impact of abstractions on historical flow records should be considered.

Attribute	Target	Method of Assessment	Comments
Habitat Structure In channel structures and morphology	Refer to River Habitat Assessment Tool (RHAT) guidance used in NI.	Assess using RHAT methodology for river habitat or species-specific methods if available and appropriate. River Hydromorphology Assessment Technique - Training Manual Department of	The river's natural form and function should support all of the habitat features necessary for pearl mussels to thrive, in characteristic proportions. Widening or deepening of channels, and extensive artificial

		Agriculture, Environment and Rural Affairs (daera-ni.gov.uk)	reinforcement of banks, are indicators of unfavourable condition. Further information on the importance of physical habitat to pearl mussels is available in published CEN guidance. Information on in-channel structures is available in CSM Guidance for Rivers.
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Attribute	Target	Method of Assessment	Comments
Other Attributes			
a. Fine sediment (redox)	There should be no pronounced difference in redox potential (typically <20%) between open water and interstitial water at 5cm depth.	Redox measurements collected in open water and riverbed, at or around population transect locations.	Excessive delivery of fine sediment, from the catchment or artificially enhanced bank erosion, may lead to a range of problems relating to surface siltation, the compaction or concretion of riverbeds and to the infilling of substrate interstices. This affects oxygen supply and exchange within the substrate as well as the ability of juvenile mussels to burrow. Infiltration by fine sediments is one of the main causes of decline in juvenile recruitment for pearl mussel populations. *Infiltration of high loads of fine sediment typically results in low oxygen supply to interstices of the substrate. Redox measurements provide a reliable estimate as a surrogate for the oxygen level within the interstices of the substrate compared with the open water.
B. Fine sediment (siltation) and Suspended Solids	No unnaturally high levels of siltation indicated by: 'silt on substrate' highlighted in	Field observations and site-specific information derived from RHAT.	Direct measurement of turbidity is not recommended, because values vary naturally in response to

	section K of the RHAT form ('Bank and channel features') OR One-third or more of the total number of RHAT spot-checks in the assessment unit have silt (SI) as the predominant channel substrate where not expected from local geology. The continued use of the following Suspended Solids target is under further review by NIEA - Annual mean $<10\text{mg L}^{-1}$		changes in flows with no clear understanding of a suitable reference value.
c. Filamentous algae	<5% cover across assessment units	Visual assessment during mussel survey and relevant metrics collected during LEAFPACS survey by NIEA.	Filamentous algal cover should be measured during the pearl mussel survey. In oligotrophic conditions nutrient levels should never be high enough to allow dense mats of filamentous algae growth. The persistence of filamentous algae is an indication that nutrient levels may be too high for sustainable <i>Margaritifera</i> populations but may also indicate low flow problems. Using the LEAFPACS method, with 3-5 sections per assessment unit surveyed depending on its size. More variable assessment units may require more surveys.
d. Fish host populations: native juvenile salmonid densities (0+ and 1+ year classes)	1. Should be abundant: >0.1 native juvenile host salmonids per m^2. 2. Should be able to find fish infected with glochidia between September and May.	Standard electrofishing protocols. Visual inspection of gills, particularly later in glochidia incubation period.	An abundant supply of native juvenile salmonids is vital to the survival of the larval stage. The relative importance of salmon and migratory and non-migratory brown trout populations to pearl mussels will vary between rivers. Physical and chemical conditions need to be suitable for the well-being of all life stages of salmonids, including free access up the river and conditions in the estuary and lower

			river where the juveniles of migratory salmonids are present. It is important to determine the species of host fish that a mussel population needs in a particular river as local pearl mussel populations can use salmon, trout or both species. Electrofishing should be carried out twice using standard methods, once in early autumn to establish the presence and density of suitable fish hosts as a proportion of the fish population just downstream of mussel beds, and again in late spring to establish the presence of 1+ fish in the vicinity of permanent mussel habitat. This does not adversely affect pearl mussels. The fish in the second survey should be checked for encystment of glochidia on the gills which are visible on the live fish. More detailed studies of fish numbers and glochidial encystment (e.g. number of glochidia per fish) can be undertaken but the above should be considered as a minimum requirement.
e. Alien/locally non-native species	No non-native species likely to cause impairment of freshwater pearl mussel populations	Survey data collected and analysed by NIEA.	Non-native species constitute a major threat to many river systems. Impacts may be on the river habitat itself (e.g. damage to banks and consequent siltation) or directly on characteristic biota (through predation, competition, and disease), or a combination of these. Assessment of non-native species is based on the principles used in assessing high ecological

			status under the WFD, and applies to species on the banks and in the riparian zone as well as species of the channel and the margins. alien species wfd uktag. Note: This document includes a separate list of alien species for Ecoregion 17 (in which Northern Ireland lies); this list contains only high-impact species.
f. Stocking transfers of other species	No inappropriate stocking/translocation of fish species.	Fishery stocking consents. Impact assessments of stocking consents on a catchment scale may be required to determine an acceptable level.	Rainbow trout and brook trout are resistant to glochidial infection and are not, therefore, suitable host species. Stocking of these species will create competition with native salmonids and is likely to reduce host opportunities for glochidia. Any stocking of native salmonids must take account of the genetic diversity of resident salmonids. The host fish/mussel relationship seems likely to have a genetic component, which could be affected by inappropriate stocking.
g. Introduction/transfers of freshwater pearl mussel	No introduction/transfers of freshwater pearl mussel unless agreed to be in the best interest of the population	Knowledge of site management	Translocation is not generally recommended as a conservation tool. It is a technique that has been little used and must still be considered experimental. Translocation (if feasible) should therefore be seen as a last resort. In GB and Northern Ireland, genetically distinct freshwater pearl mussel populations have been found to exist in separate catchments (Cauwelier, 2009). Any translocations or transfers of FPM must follow IUCN and other local guidelines.

h. Pearl Fishing	No evidence of pearl fishing	Standard survey protocol	Pearl mussel fishing is prohibited under the Wildlife (NI) Order 1985.
i. in-stream activities	No evidence of damage of existing mussel beds	NIEA monitoring/consenting programmes and standard survey protocol.	Engineering works that disturb riverbeds can be disastrous for mussel populations, so every effort needs to be made to leave them undisturbed. Other relevant activities include fishing (wading in the river) and canoeing (at access points to the river) particularly for vulnerable populations. As a minimum, existing areas should be safeguarded, whilst habitat lost through engineering works should be reinstated.

Feature 2 (SAC) – Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitriche-Batrachion* vegetation (Status B)

Attribute	Measure	Targets	Comments
Water quantity	Flow	The natural flow regime of the river should be protected. Daily flows should be close to what would be expected in the absence of abstractions and discharges (the naturalized flow). Flow targets for WFD high ecological status should be used to avoid deterioration and for restoration if this is technically feasible. These are: <5% deviation at <Q _n 95 and <10% at >Q _n 95 based on 'natural' water (i.e. water that has not been abstracted and returned). There should be no obvious problems with water availability within the assessment unit. Springs in aquifer-fed rivers should be maintained.	The principal flow targets given in Table 3 of CSM Guidance for Rivers should be taken as the minimum expected for an SAC river where appropriate and locally agreed targets are not already in place. Flow data is available at Search Data National River Flow Archive (ceh.ac.uk)
Water Quality	Organic pollution	Organic pollution is assessed using a combination of physico-chemical and biological attributes. Targets apply throughout the assessment unit, not just at sparsely distributed monitoring sites. Targets: 10%ile DO (% saturation) = 85 Mean BOD (mg L ⁻¹) = 1.5 90%ile total ammonia (NH ₃ -N, mg L ⁻¹) = 0.25 95%ile un-ionised ammonia (NH ₃ -N, mg L ⁻¹) = 0.025	Chemical data from all routine monitoring sites should be obtained from NIEA for the 3 years preceding the time of condition assessment. The statistics in the table should be calculated using all samples within that 3-year period.
	Reactive phosphorus	Compliance with these two targets is mandatory <u>as an annual mean and March-September growing season mean. See tables 5 and 6 of CSM Guidance for Rivers for targets.</u>	Table 5 of CSM Guidance for Rivers has targets for phosphorus (µg L ⁻¹ SRP) for near-natural examples of ASSI/SAC river habitat and Table 6 of CSM Guidance for Rivers has targets for maximum phosphorus concentrations (µg L ⁻¹ SRP) consistent with favourable condition of ASSI/SAC river habitat.
	Trophic Diatom Index	The target using the Trophic Diatom Index (TDI) Ecological Quality Ratio should be a normalized EQR of ≥ 0.8, equivalent to high ecological status (WFD-UKTAG, 2014a). This target should be used as an adjunct to nutrient targets proposed in Tables 5 and 6	Environment agencies typically take two or three diatom samples each year at routine monitoring sites. Any sample failing to comply with the relevant biological target within the 3-year period at any sampling site in the assessment unit should be regarded as non-

	Acidification	respectively. The targets proposed here are the same as the high/good boundary proposed for the WFD (WFD-UKTAG, 2012a). Targets: pH (Clear waters with $\text{DOC} < 10\text{mg L}^{-1}$) : mean > 6.54 pH (Humic waters with $\text{DOC} > 10\text{mg L}^{-1}$) : mean > 5.1	compliant. This target applies only to assessment units whose WFD water body type is classified as siliceous or peat. Other types have buffering capacity and are therefore will not be affected by acidification. Analysis of water chemistry data from NIEA. At least 3 years of data are required, which must include winter samples.
	Other pollutants	Good chemical status is the target for any pollutant listed on Annex X of the WFD and not specifically considered above.	Data on the chemical status of individual water bodies are available from NIEA.
Habitat Structure	Assess using River Habitat Assessment Tool (RHAT)	Refer to River Habitat Assessment Tool (RHAT) guidance used in NI - River Hydromorphology Assessment Technique - Training Manual Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk)	The minimum frequency should be a 10% coverage (i.e. 1 site every 5km), coincident with macrophyte monitoring sites where this is done. The location of each RHAT assessment unit (and macrophyte monitoring) should be marked on a map of the site. It is recommended that GPS and site photographs are used to facilitate accurate relocation of sites on future visits.
Fine Sediment	Siltation	No unnaturally high levels of siltation indicated by: 'silt on substrate' highlighted in section K of the RHAT form ('Bank and channel features') OR One-third or more of the total number of RHAT spot-checks in the assessment unit have silt (SI) as the predominant channel substrate where not expected from local geology.	Direct measurement of turbidity is not recommended, because values vary naturally in response to changes in flows with no clear understanding of a suitable reference value. Field observations and site-specific information derived from RHAT.
Negative Indicators	Alien/locally absent species	No high-impact alien species established (i.e. self-sustaining populations). Standard checklists of species are based on those used for WFD assessments¹. A site will be assessed as unfavourable when there is good evidence that any non-native species or locally absent species is causing an impact on site integrity.	Where a macrophyte survey has been carried out, the presence of alien species in the UKTAG lists¹ should be noted. Where there are no macrophyte survey data, and for other organisms (e.g. invertebrates, mink), contact NIEA for local reports on alien or locally absent species.

Biological Assemblages	Plant community	LEAFPACS tool should give a result of high ecological status for the assessment unit.	LEAFPACS method, with 3-5 sections per assessment unit surveyed depending on its size. More variable assessment units may require more surveys. *See Box 3.0 of CSM Guidance for Rivers Version 2016 for further info on LEAFPACS method. RICT macroinvertebrate data, collected by NIEA. See – RICT & RIVPACS User Guides – Freshwater Biological Association (fba.org.uk)
	Macroinvertebrates	WHPT tool should give a result of high ecological status for the assessment unit.	
Indicators of local distinctiveness	Targets for local distinctiveness (discretionary)	Maintain distinctive elements (e.g. rare species, habitat features) at current extent/levels and/or in current locations.	As appropriate.
Direct human disturbance	Fish stocking	Fish introductions should not interfere with the ability of the river to support self-sustaining populations of characteristic species.	Use stocking consents.
	Exploitation	Exploitation (e.g. netting or angling) should not interfere with the ability of the river to support self-sustaining populations of characteristic species.	Assessed through recorded exploitation and status of target species.
	Weed cutting	A sufficient proportion of all aquatic macrophytes should be allowed to reproduce in suitable habitat, unaffected by river management practices.	Field observations during macrophyte survey.

¹ <http://www.wfduk.org/tagged/alien-species#> Note: This document includes a separate list of alien species for Ecoregion 17 (in which Northern Ireland lies); this list contains only high-impact species.

Feature 3 (SAC) - Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles (Status B)

* = primary attribute. One failure among primary attribute = unfavourable condition

Attribute	Targets	Method of Assessment	Comments
* Area of Oakwood	Maintain the extent of Oakwood at 79.3ha.	Visual estimate in 10x10m plots <u>and</u> across the extent of the woodland using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Loss due to natural processes (e.g. wind-throw during extreme storm) is acceptable.
Oakwood community diversity	Maintain presence of woodland communities, W11, W17, W9 & W7 as established at base line survey.	Visual estimate in 10x10m plots	
Presence of associated features and semi-natural habitats	Maintain existing associated features and semi-natural habitats (wet/bog woodland, wet heath, semi-natural grasslands etc.)	Visual estimate in 10x10m plots <u>and</u> across the extent of the ASSI using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Repeat monitoring of plots using GPS should indicate whether mosaics and associated habitats have changed or been lost. Note: Loss of associated habitats to Oakwood may be desirable in some instances.

* Structural variation (% cover)	Mean canopy cover greater than 70%	Estimate within the visual vicinity of the monitoring plots.	A well structured wood should have a well developed canopy and shrub layer.
	Mean shrub cover should be maintained between 20 - 50%	Estimate within the visual vicinity of the monitoring plots.	
	Maintain current levels of standard variation within reasonable limits for field, herb and moss cover. Where present assess cover of <i>Luzula sylvatica</i> .	Visual estimate in 10x10m plots.	At least the current level of structural diversity should be maintained for field cover, herb cover and moss cover. Limits to be set for each site after the baseline survey. Note: <i>L. sylvatica</i> may be dominant in many W11 oakwood communities. The percentage cover of this species may affect Oak regeneration, but more information is required before that assumption can be made.
		Visual estimate in 10x10m plots.	
		Visual estimate in 10x10m plots.	
		Visual estimate in 10x10m plots.	
	Mean cover of bare ground should be less than 5% Bare ground does not include boulders or rocks.	Visual estimate in 10x10m plots.	
* Age-class variation (DAFOR)	Young trees (5- 20cm diameter) at least occasional in 25% of plots	Estimate within the visual vicinity of the monitoring plots.	Age-class structure should be appropriate to the site, its history and management; however, in general, there should be a spread of different age-classes present, including young and over-mature trees. However, on very steep sided slopes with shallow soils, over-mature trees are unlikely to occur as larger trees are likely to fall over before becoming over –mature. Note, that in many cases achieving the set targets is a long term aim. However, providing the correct management practices are in place, this attribute may be recorded as Unfavourable - recovering.
	Mature trees (20 - 75cm diameter) at least frequent in 75% of plots	Estimate within the visual vicinity of the monitoring plots.	
	Over-mature trees (>75cm diameter) at least present in 10% of plots	Estimate within the visual vicinity of the monitoring plots.	

* Presence of standing and fallen dead wood (DAFOR)	Standing dead wood at least occasional in 70% of plots and at least frequent in 30% of plots.	Visual estimate in 10x10m plots.	
	Fallen dead wood at least occasional in 70% of plots and at least frequent in 30% of plots.	Visual estimate in 10x10m plots.	
* Presence of epiphytes and climbers (DAFOR)	Epiphytes and climbers at least occasional in 70% of plots and at least frequent in 30% of plots.	Visual estimate in 10x10m plots.	Epiphytes and climbers are an important component in all woodlands. However, in the extreme south east of Northern Ireland, where the climate is much warmer and drier, the generic limits may be set too high and may need amended for individual sites.
* Presence of epiphytic bryophytes and lichens (DAFOR)	Epiphytic bryophytes and lichens at least occasional in 70% of plots and frequent in 30% of plots.	Visual estimate in 10x10m plots.	Epiphytic bryophytes and lichens are an important component in all woodlands. However, in the extreme south east of Northern Ireland, where the climate is much warmer and drier, the generic limits may be set too high and may need amended for individual sites.
* Regeneration potential (DAFOR) Maintain current levels of native tree regeneration within reasonable limits for the current structure of the Oak woodland.	Regeneration of Oak seedlings.	Visual estimate in 10x10m plots.	The general aim is for the successful establishment of young stems (i.e. seedlings growing through to saplings to young trees) in gaps or on the edge of a stand at sufficient density to maintain canopy density over a 10 year period. Regeneration of Oak in particular is likely to be slow and sporadic; in some stands, there may currently not be sufficient and/or extensive enough gaps in the canopy for oak to regenerate. This does not necessarily indicate unfavourable condition.
	Regeneration of Oak saplings	Visual estimate in 10x10m plots.	
	Regeneration of other native seedlings.	Visual estimate in 10x10m plots.	
	Regeneration of other native saplings.	Visual estimate in 10x10m plots.	

* Cover of non-native species (all layers) (presence/absence)	Non-native invasive canopy species should be present in less than 20% of plots, but never frequent.	Visual estimate in 10x10m plots.	The canopy of the Oak woodland should be largely comprised of Oak trees. Non-native species are undesirable in the canopy, particularly invasive species such as Sycamore. In addition, non-native invasive species in any one layer is un-desirable. Note that non-invasive species are not viewed as a significant threat, and a low level of occurrence may be acceptable.
	Non-native invasive shrub species should be present in less than 20% of plots, but never frequent.	Visual estimate in 10x10m plots.	
	Non-native invasive canopy species seedlings/saplings should be present in less than 20% of plots, but never frequent.	Visual estimate in 10x10m plots.	
	Non-native invasive ground flora species should be present in less than 20% of plots, but never frequent.	Visual estimate in 10x10m plots.	
*Frequency and cover of eutrophication indicators: (DAFOR)	No one negative species no more than occasional throughout the wood and/or singly or together comprising more than 5% cover. <i>Galium aparine</i> , <i>Urtica dioica</i> , <i>Heracleum</i> spp, <i>Epilobium</i> spp. <i>Rumex obtusifolius</i> No more than occasional is equivalent to less than 40% occurrence in recorded plots.	Visual estimate in 10x10m plots.	
* Cover of <i>Pteridium</i> (% cover)	The mean cover of <i>Pteridium</i> for the wood should be less than 10%	Visual estimate in 10x10m plots.	

* Cover of grasses (non-woodland species) (% cover)	The mean cover of grass for the wood should be less than 10%.	Visual estimate in 10x10m plots.	A high cover of grasses indicates past and/or present grazing. Where heavy grazing has been a past management practice, the natural woodland ground flora will take a considerable time to re-establish (time limits for restoration currently unknown). However, providing the grazing pressure has been addressed, and there is evidence that woodland flora is beginning to re-appear, this attribute may be recorded as unfavourable, recovering.
Management /Disturbance			
* Grazing (DAFOR)	Grazing should be recorded as no more than occasional over 80% of plots.	Estimate within the visual vicinity of the monitoring plots.	Grazing by domestic stock, where it occurs should be light resulting in minimal damage to the ground flora through poaching and damage to seedlings and saplings.
* Poaching by cattle (DAFOR)	Poaching should be absent, or recorded in less than 20% of plots and frequent in less than 10% of plots.	Visual estimate in 10x10m plots.	
*Frequency of recent goat damage (1-2 years) (DAFOR)	Recent goat damage should be absent, or recorded in less than 20% of plots.	Visual estimate in 10x10m plots.	
*Frequency of damage to seedlings/saplings (DAFOR)	Damage to seedling/saplings should be absent, or recorded in less than 20% of plots.	Visual estimate in 10x10m plots.	
Frequency of felling/coppicing (within 6 year monitoring cycle)	There should be no felling or coppicing of native trees or shrubs.	Visual estimate in 10x10m plots <u>and</u> across the extent of the ASSI using a	Felling non-native species as part of management for conservation is acceptable.

(DAFOR)		combination of aerial photographs, SIM and Condition Assessment structured walk.	
Maintain the diversity of woodland species throughout the wood.	Record the % of plots with each of the acid woodland indicators (W11 & W17 communities) listed below:- <i>Vaccinium myrtillus</i> , <i>Blechnum spicant</i> , <i>Dicranum spp.</i> , <i>Luzula pilosa</i> , <i>Rhytidiadelphus loreus</i>	Visual estimate in 10x10m plots.	Within any Oak woodland, there may be pockets of base-rich woodland and or flushed woodland within the boundaries of the SAC. The diversity of these woodland communities should be maintained. However, the W11 & W17 communities should dominate the woodland.
Maintain the diversity of woodland species throughout the wood.	Record the % of plots with each of the base-rich woodland indicators (W9 community) listed below:- <i>Sanicla europea</i> , <i>Geum urbanum</i> , <i>Polystichum setiferum</i> , <i>Aneomne nemorosa</i> , <i>Primula vulgaris</i> .	Visual estimate in 10x10m plots.	Within any Oak woodland, there may be pockets of base-rich woodland and or flushed woodland within the boundaries of the SAC. The diversity of these woodland communities should be maintained.
Maintain the diversity of woodland species throughout the wood.	Record the % of plots with each of the flushed woodland indicators (W7 community) listed below:- <i>Carex remota</i> , <i>Ranunculus repens</i> , <i>Chrysosplenium oppositifolium</i> , <i>Filipendula ulmaria</i> , <i>Lysimachia nemorum</i> .	Visual estimate in 10x10m plots.	Within any Oak woodland, there may be pockets of base-rich woodland and or flushed woodland within the boundaries of the SAC. The diversity of these woodland communities should be maintained.

Presence of rare or scarce species specific to the site.	Maintain current levels of standard variation within reasonable limits for rare and notable species. If these species are not recorded on any one visit, it does not automatically make the site unfavourable.	Name the species at least present along the length of the Condition Assessment structured walk.	
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Frequency -

1-20% = Rare

21-40% = Occasional

41- 60% = Frequent

> 60% = Constant

Feature 4 (SAC) – Bog woodland (Status C)

* = primary attribute. One failure among primary attribute = unfavourable condition

Attribute	Targets	Method of Assessment	Comments
* Area of Bog woodland	Maintain the extent of Bog woodland at 1.5ha.	Visual estimate in 10x10m plots <u>and</u> across the extent of the woodland using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Loss due to natural processes (e.g. wind-throw during extreme storm) is acceptable
Wet woodland community diversity	Maintain presence of the woodland communities W4 and W2 as established at base line survey.	Visual estimate in 10x10m plots	
Presence of associated features and semi-natural habitats	Maintain existing associated features and semi-natural habitats.	Visual estimate in 10x10m plots <u>and</u> across the extent of the ASSI using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Repeat monitoring of plots using GPS should indicate whether mosaics and associated habitats have changed or been lost. Note: Loss of associated habitats to Bog woodland may be desirable in some instances.
Vegetation structure			
* Structural Variation (% cover)	Mean canopy cover greater than 60%	Estimate within the visual vicinity of the monitoring plots.	A well structured wood should have a well developed canopy and shrub layer.

	Mean shrub cover should be maintained between 10-50%	Estimate within the visual vicinity of the monitoring plots.	At least the current level of structural diversity should be maintained for field cover, herb cover and moss cover.
	Maintain current levels of standard variation within reasonable limits for field, herb cover and moss cover. In addition record the cover of <i>Molinia caerulea</i> and the cover of <i>Sphagnum</i> mosses.	Visual estimate in 10x10m plots.	
		Visual estimate in 10x10m plots.	
		Visual estimate in 10x10m plots.	
		Visual estimate in 10x10m plots.	
		Visual estimate in 10x10m plots.	
* Age-class variation (DAFOR)	Mean cover of bare ground should be less than 5% Bare ground does not include boulders or rocks	Visual estimate in 10x10m plots.	
	Young trees (5- 20cm diameter) at least occasional in 25% of plots	Visual estimate in 10x10m plots.	Age-class structure should be appropriate to the site, its history and management; however, in general, there should be a spread of different age-classes present, including young and over-mature trees. Note that definition of young, mature and over-mature differs from drier woodland types, reflecting the fact that Birch will generally be the dominant species.
	Mature trees (20 - 75cm diameter) at least frequent in 50% of plots	Visual estimate in 10x10m plots.	
* Presence of standing and fallen dead wood (DAFOR)	Over-mature trees (>75cm diameter) at least present in 5% of plots	Visual estimate in 10x10m plots.	
	Standing dead wood at least occasional in 70% of plots and at least frequent in 30% of plots.	Visual estimate in 10x10m plots.	In wet woodland, dead wood is often abundant but because there tend to be fewer big trees the size of the fallen wood is often small.
	Fallen dead wood at least	Visual estimate in 10x10m	

	occasional in 70% of plots and at least frequent in 30% of plots.	plots.	
* Presence of epiphytes and climbers (DAFOR)	Epiphytes and climbers at least frequent in 10% of plots.	Visual estimate in 10x10m plots.	Epiphytes and climbers are an important component in all woodlands. However, they are less of a feature in Bog Woodlands than in other woodland types.
* Presence of epiphytic bryophytes and lichens (DAFOR)	Epiphytic bryophytes and lichens at least frequent in 75% of plots.	Visual estimate in 10x10m plots.	Epiphytic bryophytes and lichens are an important component in all woodlands, especially Bog woodlands.
* Regeneration potential (DAFOR)	Regeneration of native seedlings.	Visual estimate in 10x10m plots.	The general aim is for the successful establishment of young stems (i.e. seedlings growing through to saplings to young trees) in gaps or on the edge of a stand at sufficient density to maintain canopy density over a 10 year period. Regeneration of some native species is likely to be slow and sporadic; in some stands, there may currently not be sufficient and/or extensive enough gaps for young trees to regenerate. This does not necessarily indicate unfavourable condition.
Maintain current levels of native tree regeneration within reasonable limits for the current structure of Bog woodland.	Regeneration of native saplings.	Visual estimate in 10x10m plots.	
* Cover of non-native species (all layers) (presence/absence)	Non-native invasive canopy species should be present in less than 20% of plots, but never frequent.	Visual estimate in 10x10m plots.	The canopy of Bog Woodland should be largely comprised of Birch and Willow trees with associated native species. Non-native species are undesirable in the canopy, particularly invasive species such as Sycamore.
	Non-native invasive shrub species should be present in less than 20% of plots, but	Visual estimate in 10x10m plots.	

	never frequent.		In addition, non-native invasive species in any one layer is un-desirable. Note that non-invasive species are not viewed as a significant threat, and a low level of occurrence may be acceptable.
	Non-native invasive canopy species seedlings/saplings should be present in less than 20% of plots, but never frequent.	Visual estimate in 10x10m plots.	
	Non-native invasive ground flora species should be present in less than 20% of plots, but never frequent.	Visual estimate in 10x10m plots.	
* Frequency and cover of eutrophication indicators: (DAFOR)	No one negative species no more than occasional throughout the wood and/or singly or together comprising more than 5% cover. <i>Galium aparine</i> , <i>Urtica dioica</i> , <i>Heracleum spp</i> , <i>Epilobium spp</i> , <i>Rumex obtusifolius</i> No more than occasional is equivalent to less than 40% occurrence in recorded plots.	Visual estimate in 10x10m plots.	
* Cover of <i>Pteridium</i> (% cover)	The mean cover of <i>Pteridium</i> for the wood should be less than 10%.	Visual estimate in 10x10m plots.	
* Cover of grasses (excluding <i>Molinia</i> and woodland species) (% cover)	The mean cover of undesirable grass species for the wood should be less than 10%.	Visual estimate in 10x10m plots.	W4 <i>Betula pubescens</i> - <i>Molinia caerulea</i> woodland is the main bog woodland community in Northern Ireland and has a naturally high <i>Molinia</i> component of the ground flora. However, where <i>Molinia</i> is not predominant, a high grass component other than woodland species indicates past and/or

			present grazing and is undesirable. Nevertheless, providing the grazing pressure has been addressed, and there is evidence that woodland flora is beginning to re-appear, this attribute may be recorded as unfavourable, recovering.
Management /Disturbance			
*Grazing (DAFOR)	Grazing should be recorded as no more than occasional over 80% of plots.	Estimate within the visual vicinity of the monitoring plots.	Grazing by domestic stock, where it occurs should be light resulting in minimal damage to the ground flora through poaching and damage to seedlings and saplings.
*Poaching by cattle (DAFOR)	Poaching should be absent, or recorded in less than 20% of plots and frequent or more in less than 10 % of plots.	Visual estimate in 10x10m plots.	
*Frequency of recent goat damage (1-2 years) (DAFOR)	Recent goat damage should be absent, or recorded in less than 20% of plots.	Visual estimate in 10x10m plots.	
*Frequency of damage to seedlings/saplings (DAFOR)	Damage to seedling/saplings should be absent, or recorded in less than 20% of plots.	Visual estimate in 10x10m plots.	
Frequency of felling/coppicing (within 6 year monitoring cycle) (DAFOR)	There should be no felling or coppicing of native trees or shrubs.	Visual estimate in 10x10m plots <u>and</u> across the extent of the ASSI using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Felling non-native species as part of management for conservation is acceptable.

Vegetation composition -			
Maintain the diversity of woodland species throughout the wood.	Record the % of plots with each of the Bog Woodland indicators (W2 and W4 communities) listed below:- <i>Betula pubescens</i> , <i>Salix cinerea</i> , <i>Filipendula ulmaria</i> , <i>Viola palustris</i> , <i>Phragmites australis</i> , <i>Molinia caerulea</i> , <i>Carex laevigata</i> , <i>Brachythecium rutabulum</i> , <i>Sphagnum squarrosum</i> , <i>S. recurvum</i> , <i>S. fimbriatum</i> , <i>S. palustris</i> .	Visual estimate in 10x10m plots.	
Indicators of Local Distinctiveness			
Presence of rare or scarce species specific to the site.	Maintain current levels of standard variation within reasonable limits for rare and notable species. If these species are not recorded on any one visit, it does not automatically make the site unfavourable.	Name the species at least present along the length of the Condition Assessment structured walk.	

Frequency -

1-20% = Rare

21-40% = Occasional

41- 60% = Frequent

> 60% = Constant

Feature 5 (SAC) – Otter *Lutra lutra* (Status C)

Attribute	Measure	Target	Notes
Presence of otters	Presence of one or more of the following signs within the site: Positive identification of otter spraint, footprints, tracks, paths, lying-up sites or feeding signs.	Signs of otters found at least once per year	Use available data from other surveys or CeDAR.
	Sightings of otters.		
	Positive identification of holt(s).		
Bankside/ Waterside cover	Presence of cover: Mature trees, woodland, scrub, other tall bankside vegetation, reed and sedge beds.	No overall permanent decrease	Some change acceptable as long as it is appropriately mitigated
Water quality	WFD Chemical and Ecological status	Water quality should be at least 'Good' status, with no pollution incidents	Refer to NIEA Water Management Unit for data
Food Sources	Assessment of fish stocks and other food sources (e.g., amphibians)	Fish stocks appropriate to the nutrient status of the river, with no significant decline in fish biomass or species diversity	Refer to appropriate Loughs Agency/ AFBI for monitoring data where available. (This information may need to be inferred from the water quality category).
Disturbance	Extent of public access to river	No significant change to river or bankside usage; no significant development	

Flow rate	Mean annual flow rate	No reduction attributable to increased abstraction.	Refer to data from Rivers Agency/NIEA Water Management Unit if available
Site integrity	Total area	No reduction or fragmentation of area	

Feature 6 (SAC) – Atlantic Salmon (*Salmo salar*) (Status C)

Attribute	Target	Method of Assessment	Comments
Population			
a. Spatial Extent	Should reflect distribution under near-natural conditions	Electrofishing	Juvenile Atlantic salmon should be present in all areas of the catchment to which they have natural access. This does not include areas above naturally impassable barriers, but areas where access has been limited by man-made obstructions should be identified. See the associated AFBI/ Loughs Agency monitoring protocol for further details.
b. Population density - Juveniles	These should not differ significantly from those expected for the river type/reach under conditions of high physical and chemical quality.	Quantitative, semi-quantitative and timed electrofishing	Juvenile densities vary naturally between rivers and between survey sites on rivers, depending on the productivity and natural habitat character of the system. Observed densities therefore need to be assessed in relation to the expectation for each river and each river reach. See the associated AFBI/ Loughs Agency monitoring protocol for further details.
c. Population density: adult run size	Total run size at least matching an agreed reference level, including a seasonal pattern of migration characteristic of the river and maintenance of the multi-sea-winter component.	Fish counters where available. Rod catch data	The numbers of returning salmon should be sufficient to ensure that all naturally available spawning and nursery habitats is utilised. Different rivers have different seasonal patterns of adult migration associated with the environmental characteristics of the catchment and river system.

			Multi-sea winter fish are an important component of natural salmon run and have declined considerably in recent years. The data available to assess this attribute may vary. See the associated AFBI/ Loughs Agency monitoring protocol.
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Attribute	Target	Method of Assessment	Comments
Water Quality			
Organic pollution, reactive phosphorus, acidification, other pollutants	Targets included in the CSM Guidance for Rivers should be used as follows: - 10%ile DO (% saturation) 85 - Mean BOD (mg L⁻¹) 1.5 - 90%ile total ammonia (NH₃-N, mg L⁻¹) 0.25 - 95%ile un-ionised ammonia (NH₃-N, mg L⁻¹) 0.025 - Mean pH >6.54 (clear waters)/ >5.1 (humic waters) Nutrient concentrations should be near-natural. SRP may vary depending upon river size, site altitude and alkalinity. Given that the SAC covers a large catchment and each of these elements varies throughout the site, it is not appropriate to set one SAC-wide target for SRP.	Standard monitoring protocols in CSM Guidance for Rivers. (Data from NIEA).	Atlantic salmon are susceptible to a range of water quality impacts, particularly juvenile life stages (egg, fry, parr and smolt). Generally, water quality should not be injurious to any life stage. All reaches within the designated site that contain, or should contain, Atlantic salmon should comply with the targets given. Data from the last 3 years should be used.

Attribute	Target	Method of Assessment	Comments
Flow	Flow targets included in the CSM guidance for Rivers should be used, as these are intended to support a healthy, naturally functioning river ecosystem which protects the whole biological community and individual species to a degree characteristic of the river. As a minimum, UKTAG standards for GES under the WFD should be met.	Gauging stations (Data from DfI Rivers).	River flow affects a range of habitat factors of critical importance to designated interest features, including current velocity, water depth, wetted area, substrate quality, dissolved oxygen levels and water temperature. The maintenance of both flushing flows and baseflows, based on natural hydrological processes, is vital. Detailed investigation of habitat-flow relationships may indicate that a more or less stringent threshold may be appropriate for a specified reach; however, a precautionary approach would need to be taken to the use of less stringent values. Naturalised flow is defined as the flow in the absence of abstractions and discharges. The availability and reliability of data is patchy – long term gauged data can be used until adequate naturalised data become available, although the impact of abstractions on historical flow records should be considered. Headwater sections are particularly vulnerable to abstraction, and this may affect the survival of juvenile fish and prevent the upstream migration of adult fish to key habitats.

Attribute	Target	Method of Assessment	Comments
Habitat Structure In channel structures and morphology	Refer to River Habitat Assessment Tool (RHAT) guidance used in NI.	RHAT scoring system - River Hydromorphology Assessment Technique - Training Manual Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk)	The characteristic channel morphology provides the diversity of water depths, current velocities, and substrate types necessary to fulfil the spawning, juvenile and migratory requirements of Atlantic Salmon. The proximity of different habitats facilitates movement to new preferred habitats with age. Operations that widen, deepen and/or straighten the channel reduce variations in habitat. New operations that would have this effect are not acceptable within an SAC, while restoration may be needed in some reaches. There should be no artificial barriers preventing unimpeded migration to natural spawning areas. Where barriers exist, they should be removed wherever possible, or at least made passable. Spawning habitat; defined as stable coarse substrate without an armoured layer, in the pebble to cobble size range (16-256mm) but with the majority being <150mm. Water depth during the spawning and incubation periods should be 15-75 cm. Coarse woody debris should not be removed from rivers as it plays a significant role in the

			formation of new gravel beds, except where infrastructure, human life or property is under threat. Fry habitat; indicated by water of <20cm deep and a gravel/pebble/cobble substrate. Parr habitat is indicated by water 20-40cm deep and similar substrate. Holding areas: defined as pools of at least 1.5 m depth, with cover from features such as undercut banks, vegetation, submerged objects, and surface turbulence. Bankside tree cover: overhanging trees provide valuable shade and food sources, while tree root systems provide important cover and flow refuge for juveniles.
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Attribute	Target	Method of Assessment	Comments
Other Attributes			
a. Fine sediment and Suspended Solids	No unnaturally high levels of siltation indicated by: 'silt on substrate' highlighted in section K of the RHAT form ('Bank and channel features') OR One-third or more of the total number of RHAT spot-checks in the assessment unit have silt (SI) as	Field observations and site-specific information derived from RHAT.	Elevated levels of suspended solids can clog the respiratory structures of Atlantic Salmon. Siltation can also prevent the flow of dissolved oxygen to eggs and prevent the movement of waste products from redds.

	the predominant channel substrate where not expected from local geology. The continued use of the following Suspended Solids targets is under further review by NIEA - Annual mean <10mg L⁻¹ (spawning and nursery grounds) Annual mean <25mg L⁻¹ (migratory passage)		
b. Alien/locally non-native species	No non-native species likely to cause impairment of Atlantic Salmon Populations	Various sources, including ad hoc observations, specific site investigations and data collected by the environment agencies.	Refer to the WFD list of alien/locally absent species (but not to be used exclusively). Be aware that Pacific Pink Salmon has occurred in NI.
c. Stocking/transfers of Atlantic Salmon	No stocking/transfers of Atlantic Salmon unless agreed to be in the best interests of the population.	Knowledge of site management	Stocking represents a loss of naturalness and, if successful, obscures the underlying causes of poor performance (potentially allowing these risks to perpetuate). It carries various ecological risks, including the loss of natural spawning from broodstock, competition between stocks and naturally produced individuals, disease introduction and genetic alterations to the population. There is a large body of evidence indicating that rearing locally sourced juveniles for release has a long-term impact on salmon populations by removing natural selection mechanisms in the juvenile phase of life. The

			management objective for sites notified for Atlantic Salmon is to attain naturally self-sustaining populations. Stocking of Atlantic Salmon should not be routinely used as a management measure. The nature conservation aim is to provide conditions in the river that support a healthy and natural population, achieved through habitat protection or restoration and the control of exploitation as necessary.
d. Stocking/transfers of other species	No stocking/transfers of fish species at excessively high densities	Fishery stocking consents. Impact assessments of stocking consents at catchment scale may be required to determine an acceptable level.	Excessively high densities of other fish species may cause unacceptably high predation pressure and competitive interactions. Care needs to be taken to ensure that stocking exercises do not keep the densities of such species at unnaturally high levels.
e. Abstraction intakes and discharges	Effective screening on all intakes and discharges.	Environment agencies monitoring/consenting programmes.	The entrainment of juvenile and adult fish into hydropower intakes or even fish farms can lead to a loss of fish. This can be avoided through the use of screening at appropriate locations. Guidance on screening is available through regulatory bodies such as the NIEA. It is important that screens are also used to prevent the escape of fish from fish farms and fisheries connected to rivers.

			Escapes from fish farms are a form of uncontrolled introduction and should be prevented.
f. Exploitation	All exploitation should be undertaken sustainably without compromising any components of the population	Loughs Agency/ DAERA data on licences and catch statistics.	Exploitation controls should be applied to all areas where Atlantic Salmon migrate to designated sites, within territorial waters. This should include estuarine and coastal net fisheries, as well as exploitation within the ASSI/SAC from rod fisheries.
g. Weed-cutting	Should not interfere with the provision of juvenile habitat in river types naturally supporting submerged vascular plants	Evaluation of conditions on land drainage consents and knowledge of adherence to them.	Areas of submerged and marginal plants: juvenile salmon in chalk rivers use submerged and marginal vegetation as cover. Cutting operations should aim to leave at least 50% of the vegetation uncut.

TEAL LOUGH SAC

UK0016608

CONSERVATION OBJECTIVES

Document Details

Title	<i>Teal Lough SAC Conservation Objectives</i>
Prepared By	
Approved By	
Date Effective From	<i>13/10/2017</i>
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Contact	

Revision History:

Version	Date	Summary of Changes	Initials
V1.0	June 2013	Internal working document	E
V2.0	Nov 2014	Complete review	
V2.0	01.04.2015	Effective date of Version 2	
V2.1	11.10.2017	Removed wording 'excluding recently burnt areas' from bare peat target in all relevant Annex tables	

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives¹ to ensure that all habitats and species of Community Interest are maintained or restored to Favourable Conservation Status (FCS). Natura 2000 sites have a crucial role to play in achieving this overall objective since they are the most important core sites for these species and habitats. Each site must therefore be managed in a way that ensures it contributes as effectively as possible to helping the species and habitats for which it has been designated reach a favourable conservation status within the EU.

To ensure that each Natura 2000 site contributes fully to reaching this overall target of FCS, it is important to set clear conservation objectives for each individual site. These should define the desired state, within that particular site, of each of the species and habitat types for which the site was designated.

Once a site has been included in the Natura 2000 network, Member States are required to implement, on each site, the necessary conservation measures which correspond to the ecological requirements of the protected habitat types and species of Community Interest present, according to Article 6.1 of the Habitats Directive. They must also prevent any damaging activities that could significantly disturb those species and habitats (Article 6.2) and to protect the site from new potentially damaging plans and projects likely to have a significant effect on a Natura 2000 site (Article 6.3, 6.4).

Conservation measures can include both site-specific measures (i.e. management actions and/or management restrictions) and horizontal measures that apply to many Natura 2000 sites over a larger area (e.g. measures to reduce nitrate pollution or to regulate hunting or resource use).

In Northern Ireland, Natura 2000 sites are usually underpinned by the designation of an Area of Special Scientific Interest (ASSI) under the Environment (NI) Order 2002 (as amended).

¹ 92/43/EEC and 2009/147/EC (codified version of Directive 79/409/EEC as amended)

2. ROLE OF CONSERVATION OBJECTIVES

Conservation Objectives have a role in

- Conservation Planning and Management – guide management of sites, to maintain or restore the habitats and species in favourable condition
- Assessing Plans and Projects, as required under Article 6(3) of the Habitats Directive - Habitats Regulations Assessments (HRA) are required to assess proposed plans and projects in light of the site's conservation objectives.
- Monitoring and Reporting – Provide the basis for assessing the condition of a feature, the factors that affect it and the actions required.

3. DEFINITION OF FAVOURABLE CONSERVATION STATUS

Favourable Conservation Status is defined in Articles 1(e) and 1(i) of the Habitats Directive:

The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

- Its natural range and areas 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 as defined in Article 1(i).

For species, favourable conservation status is defined in Article 1(i) as 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 population on a long term basis.

3.1 DEFINITION OF FAVOURABLE CONDITION

Favourable Condition is defined as “**the target condition for an interest feature in terms of the abundance, distribution and/or quality of that feature within the site**”.

The standards for favourable condition (Common Standards) have been developed by JNCC and are applied throughout the UK. Achieving Favourable Condition on individual sites will make an important contribution to achieving Favourable Conservation Status across the Natura 2000 network.

4. SITE INFORMATION

COUNTY: TYRONE, LONDONDERRY

GRID REFERENCE: IH737880

AREA: 198.22 ha

5. SUMMARY SITE DESCRIPTION

Teal Lough Bog lies to the north-west of Cookstown beyond Lough Fea at an elevation of 220m. It is bisected by the county boundary, which runs through Teal Lough itself. This is one of the largest and least disturbed upland blanket peat and raised bog habitats in Northern Ireland. The features of interest are all hydrologically linked; being four actively developing upland raised bogs surrounded by active blanket peat with an oligotrophic lake to the north.

The pool and hummock complexes display rich bryophyte communities (including *Sphagnum imbricatum* and *Mytilia taylorii*), a limited but notable range of upland invertebrates (including *Salda muelleri* and *Agabus arcticus*) and a vascular flora uncommon in Northern Ireland (*Drosera intermedia* and *Utricularia minor*). The underlying Pleistocene sand and gravel fluvioglacial outwash series, together with the ridge series, are important, being related to a major deglaciation phase of the South Sperrins.

Further details of the site are contained in the ASSI Citation and Views About Management statement, which are available on the NIEA website (www.doeni.gov.uk/niea).

5.1 BOUNDARY RATIONALE

The SAC is comprised of the major part of two ASSIs: Teal Lough and Slaghtfreeden Bogs ASSI designated in 1987 and Teal Lough Part II designated in 1995. The original ASSI boundary included the minimum area of highest conservation value, excluding the partially disturbed bog to the south. Teal Lough Part II included this previously excluded cut-over but regenerating area as well as the base-poor lake to the north because of their hydrological links with the main Teal Lough bogs.

Two separate parcels of bog lying within the edge of Davagh Forest were included within the original ASSI but are not included in the SAC because the adverse impacts of adjacent trees has adversely affected these bog areas. However, these two ASSI areas excluded from the SAC will be subject to the same objectives and management as the rest of the SAC, and may undergo restoration in the future once the trees are felled.

The SAC boundary encompasses a single hydrological unit bounded by Tullybrick Road to the east. The rest of the boundary follows several topographical features, particularly associated with the hydrology of the site e.g. streams and esker bases, as well as some man-made features such as ditches and tracks. It is all well fenced.

6. SAC SELECTION FEATURES

Feature Type	Feature	Global Status	Size/ extent/ population
Habitat	Active blanket bog	B	155.5 ha
Habitat	Northern Atlantic wet heaths with <i>Erica tetralix</i>	D	9.5 ha
Habitat	Natural dystrophic lakes and ponds	D	1.45 ha
Habitat	Depressions on peat substrates of the Rhynchosporion	D	0.1 ha
Habitat	European dry heaths	D	26.0 ha

Table 1. List of SAC selection features. Those with global status A-C will be referred to in ANNEX I.

The global status is an expert judgement of the overall value of the site for the conservation of the relevant Annex I habitat. Sites have been graded A, B or C - in the UK these gradings have been interpreted as follows:

A - Sites holding outstanding examples of the habitat in a European context.

B - Sites holding excellent stands of the habitat, significantly above the threshold for SSSI/ASSI notification but of somewhat lower value than grade A sites.

C - Examples of the habitat which are of at least national interest (i.e. usually above the threshold for SSSI/ASSI notification on terrestrial sites) but not significantly above this. These habitats are not the primary reason for SACs being selected.

D - Habitat present but not of sufficient extent or quality to merit listing as SAC feature.

There is therefore a distinction between the principal features for which sites have been selected (those graded A or B) and those which are only of secondary interest (those graded C). This is a useful distinction but it is important to note that all three grades are qualifying SAC interest features.

Click [here](#) to go to the Natura 2000 Standard Data Form for Teal Lough SAC.

6.1 ASSI SELECTION FEATURES

Teal Lough ASSI

Feature Type	Feature	Size/extent/ population
Habitat	Blanket Bog	155.5 ha
Species	Invertebrate Assemblage	
Earth Science	Pleistocene glacial depositional series – underlies the entire Teal Lough SAC peatland complex	

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The *Conservation Objective* for this site is:

To maintain (or restore where appropriate) the Active Blanket Bog to favourable condition.

For each SAC feature, there are a number of component objectives which are outlined in the table below. These include a series of attributes, measures and targets which form the basis of *Condition Assessment*. The results of this will determine whether the feature is in favourable condition or not. The feature attributes and measures are found in the attached annex.

8. SAC SELECTION FEATURE OBJECTIVE REQUIREMENTS

Feature	Global Status	Component Objectives
Active blanket bog	B	Maintain the extent of intact blanket bog and actively regenerating blanket bog vegetation.
		Maintain and enhance the quality of the blanket bog community types including the presence of notable species.
		Seek to expand the extent of actively regenerating blanket bog vegetation into degraded (non-active) areas of cutover bog.
		Maintain the diversity and quality of other habitats associated with the blanket bog, especially where these exhibit natural transition to the blanket bog.
		Maintain the hydrology of the intact blanket bog peat mass.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be the potential for blanket bog rehabilitation.

9. ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Blanket Bog	See SAC Selection Feature Objective Requirements table.
Invertebrate Assemblage	To be finalised.
Pleistocene glacial depositional series	Maintain extent of the sand and gravel series.
	No disturbance of the sand and gravel series.

10. MANAGEMENT CONSIDERATIONS

Ownership

Most of the area is owned by Forest Service, with the remaining area owned by 3 private landowners.

Part of the SAC area (85.14ha), including the 40ha of Teal Lough Forest Nature Reserve, is currently managed by Ulster Wildlife as a Nature Reserve, to which UW members have access by arrangement. The county boundary acts as the northern edge of this Reserve, which is important for nesting teal and black headed gulls and winter visitors such as Greylag Geese.

Adjoining Land Use

The main adjoining land-use outside the SAC is afforestation and degraded blanket bog/wet grasslands that are more intensively grazed by cattle and in some instances sheep. There are also surrounding areas of severely degraded peatland complexes as a consequence of drainage and mechanised peat extraction.

11. MAIN THREATS, PRESSURES AND ACTIVITIES WITH IMPACTS ON THE SITE

Both on-site and off-site activities can potentially affect SAC/ASSI features. The list below is not exhaustive, but deals with the most likely factors that are either affecting Teal Lough, or could affect it in the future. Although Active Blanket Bog is the qualifying SAC feature, factors affecting ASSI features are also considered

NOTE - Carrying out any of the Notifiable Operations listed in the ASSI schedule could affect the site.

Mineral extraction

Any removal of minerals, e.g. peat or sand, from the site will destroy that part of the site and may have consequential effects on the rest of the area due to its fragile, integrated structure and hydrology.

ACTION: No extraction of minerals from the SAC.

Burning

Excessive burning will reduce the cover of *Sphagnum* mosses and Ericaceous species, increasing the proportion of *Trichophorum cespitosum* and grasses. Structural diversity may also be reduced. Blanket bog should not be burnt.

ACTION : No burning within the SAC

Reclamation of heathland

This always causes permanent damage to the ecology and hydrology of the bog, because of the drainage, cultivation, fertilising, liming, re-seeding and management changes involved. The obtrusive bright green rectangles of re-seeded grassland are a common adjunct to heathland landscapes throughout the country, and unless very intensively managed these revert to poor quality, rush-dominated land with little agricultural or ecological interest.

ACTION:- Ensure there are no reclamation works within the SAC through liaison and management agreements with owner/occupiers. Maintain any existing blockages of drains.

Grazing

Under-grazing, or the cessation of grazing, results in vegetation change on heathland, with the prevalence of over-mature and degenerate *Calluna vulgaris*. Over-grazing leads to poaching, trampling and, at worst vegetation removal which can result in soil exposure and eventual erosion. Less dramatic change is in the range and proportions of plant species e.g. a decline in dwarf shrubs. The timing of grazing can also cause potential problems – winter sheep grazing is most likely to result in erosion effects, whilst autumn grazing can cause great damage to *Calluna vulgaris*.

ACTION: Liaise with local landowners and DARD to set grazing intensity for the SAC at an appropriate level. Ensure fencing is maintained.

Supplementary stock feeding

This can cause localised overgrazing and poaching damage and should ideally be avoided. If this not an option, it should be confined to less sensitive areas, e.g. tracks.

ACTION: Liase with local landowners to avoid using feeding areas within the SAC.

Application of fertiliser/slurry/manure

The whole site is very nutrient-poor and and so very vulnerable to nutrient enrichment. Eutrophication would be particularly damaging to the nutrient poor pool system and lake. As the hydrology of the whole site is linked any type of fertiliser application to a part of the SAC area will be affect other parts.

ACTION: Ensure there is no nutrient enrichment of any kind. Liase with local landowners to prevent the discharge of slurry onto the site.

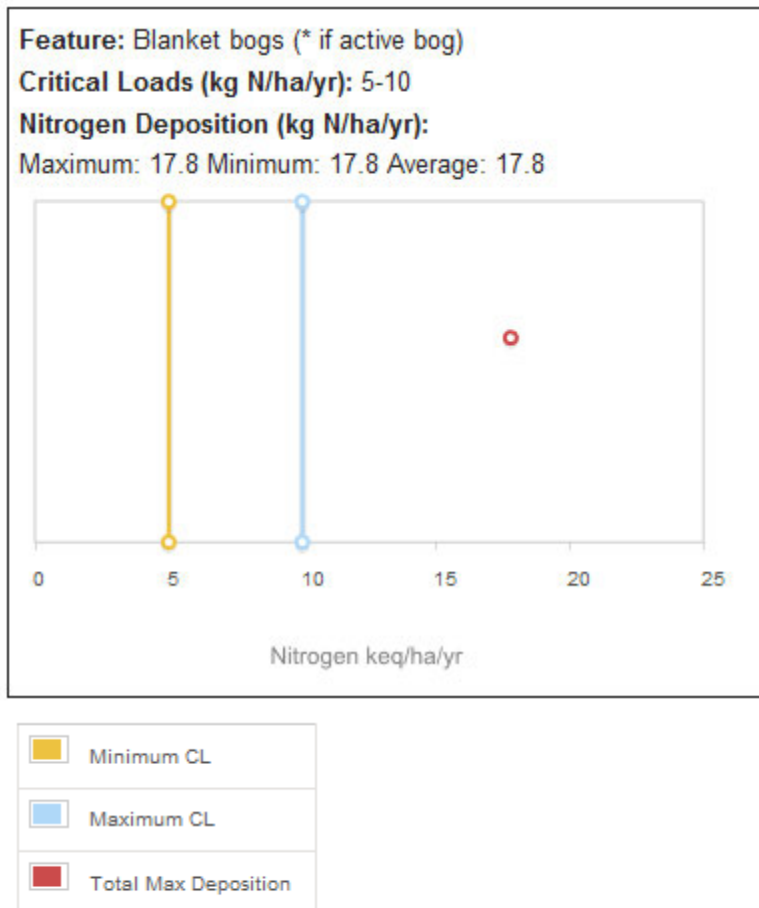
Afforestation

Trees cause hydrological and physiological changes to the peat and shading effects on heathland vegetation. Peatland subjected to afforestation has little potential to recover after tree harvesting, due both to the direct effect of the trees and the indirect effect of the operations involved.

ACTION: No tree planting within the SAC.

Nitrogen Deposition

Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the UK. Lower and upper critical loads have been calculated for Teal Lough SAC.



(Source: Air Pollution Information System (APIS) website- www.apis.ac.uk)

ACTION: Seek to maintain or where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant critical load.

Recreational activities

Regular use of any part of the area, by walking but especially by four-wheel drive vehicles, can cause local vegetation loss and structural damage to the peat which may lead to significant erosion, particularly on slopes. Wet moss hummocks are also vulnerable to more than occasional treading so over-use of the site should be avoided.

ACTION: Liase with local landowners to ensure minimal use of ATVs for checking and gathering livestock and no recreational use within the SAC. Maintain fences to prevent unauthorised vehicular access.

Fly-tipping

Due to the sites close proximity to a country road, there is always the threat of fly-tipping or the disposal of slurry onto part of the area, which could adversely affect its nutrient poor trophic status.

ACTION: Remove all waste materials in and around site regularly, and report any large-scale dumping to the local Council. Liase with local landowners in an effort to prevent dumping on or around the site.

Changes to surrounding land use

Any changes in local land-use e.g. drainage, road improvements, afforestation, agricultural intensification and development, may be detrimental to the SAC.

Action: Reduce the risk of surrounding agricultural intensification by encouraging the adjacent owner/occupiers to enter into agri-environment schemes. Use Habitats Regulations Assessments (HRAs), through the planning process, to minimise any development risks adjacent to the SAC.

Climate Change

Northern Ireland faces changes to its climate over the next century. Indications are that we will face hotter, drier summers, warmer winters and more frequent extreme weather events.

ACTION: When developing SAC management plans, the likely future impacts of climate change should be considered and appropriate changes made.

12. MONITORING

Monitoring of SACs takes place on using two monitoring techniques.

Site Integrity Monitoring (SIM) is carried out to ensure compliance with the ASSI/ SAC Schedule. The most likely processes of change will either be picked up by SIM (e.g. dumping, burning, turf cutting, grazing etc.) or will be comparatively slow (e.g. gradual degradation of the bog and associated habitats through desiccation).

These longer-term changes will be picked up by monitoring of the feature via **Site Condition Assessment** - this is carried out on a rolling basis to pick up subtle changes in the condition of the feature.

The method for Site Condition Assessment was agreed by the relevant JNCC-led Lead Co-ordination Network although the methodology has been modified to reflect individual site attributes in Northern Ireland.

12.1 MONITORING SUMMARY

1. Monitor the integrity of the site (SIM or Compliance Monitoring)

Complete boundary survey to ensure the fencing is still intact. Ensure there has been no moor gripping or other drainage activities, signs of excessive erosion, evidence of inappropriate grazing or burning, or unauthorised peat cutting, carried out within the SAC boundary. This SIM should be carried out once a year.

2. Monitor the condition of the site (Condition Assessment)

Monitor the key attributes for each of the SAC selection features. This will detect if the features are in favourable condition or not. See Annex I.

The favourable condition table provided in Annex 1 is intended to supplement the conservation objectives only in relation to management of established and ongoing activities and future reporting requirements on monitoring condition of the site and its features. It does not by itself provide a comprehensive basis on which to assess plans and projects, but it does provide a basis to inform the scope and nature of any Habitats Regulations Assessment (HRA) that may be needed. It should be noted that completion of a HRA is a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

13. REFERENCES

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ANNEX 1

Feature 1 (SAC) – Active blanket bog (Status B)

(* = primary attribute. One failure among primary attribute = unfavourable condition)

Attributes	Targets	Method of Assessment	Comments
* Area of blanket bog and upland raised mire (ha)	Maintain the extent of the intact bog surface at 196 ha. The blanket bog communities include M17 – <i>Scirpus cespitosus Eriophorum vaginatum</i> blanket mire, M18 – <i>Sphagnum papillosum</i> raised and blanket mire and M19 <i>Calluna vulgaris - Eriophorum vaginatum</i> blanket mire.	Visual estimate in 2x2 m plots <u>and</u> across the blanket bog using a combination of aerial photographs, SIM and Condition Assessment structured walk.	The blanket bog communities include M17 – <i>Scirpus cespitosus Eriophorum vaginatum</i> blanket mire, M18 – <i>Sphagnum papillosum</i> raised and blanket mire and M19 <i>Calluna vulgaris - Eriophorum vaginatum</i> blanket mire.
* Area of mosaic communities and associated habitats	Maintain associated mosaic communities and habitats (wet heath, dry heath, upland fen, etc)	Visual estimate across the SAC using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Repeat monitoring using condition assessment, SIM, and aerial photographs should indicate whether mosaics and associated habitats have changed or been lost.
* Pool/hummock system extent and complexity	The extent and complexity of pool and hummock systems at least maintained. Differentiation of <i>Sphagnum</i>	The extent of pool and hummock systems should be monitored using a	The extent of pool and hummock systems should be monitored using a combination of aerial photographs and Condition Assessment.

	species should be recorded with <i>S. cuspidatum</i> or <i>S. auriculatum</i> in the pools and <i>S. papillosum</i> and <i>S. capillifolium</i> forming the lawns and hummocks.	combination of aerial photographs and SIM.	
Dwarf-shrub Height (cm)	Average ericoid height should be 15-30cm.	Visual estimate in 2x2 m plots.	On some areas of blanket bog, the dwarf-shrub height will largely reflect recent management patterns. However, on largely undisturbed sites with minimal or no grazing, dwarf shrubs should display no apparent growth forms with a fairly uniform height between 15-30cm.
* Bare Peat, or ground covered by algal mats (%)	Bare peat etc should occupy less than 2% of the intact blanket bog surface overall.	Visual estimate in 2x2 m plots.	Bare peat, or bare ground carpeted by <i>Polytrichum</i> spp., <i>Campylopus</i> spp. crust forming lichens or algal mats can occur as a consequence of peat cutting or excessive burning and/or grazing. Bare ground here represents bare peat etc. within the blanket bog vegetation rather than naturally eroded surfaces where bare ground forms a natural part of the erosion feature.
* <i>Sphagnum</i> cover/abundance (% cover and frequency) Active Peat Formation (DAFOR)	<i>Sphagnum</i> moss species should have a minimum cover of 25% over at least 66% of the intact blanket bog surface. Thick, hummock forming species of sphagnum should be at least occasional.	Visual estimate in 2x2 m plots.	A constant <i>Sphagnum</i> moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. <i>Sphagnum</i> moss is therefore used to measure the hydrological integrity of the blanket bog surface.

	Species present should include a mixture of both thin species: - <i>S. capillifolium</i> and <i>S. tenellum</i> and the thick hummock forming species: - <i>S. papillosum</i> and <i>S. magellanicum</i> at least occasional over the surface.		
* Ericaceous Cover (%)	Ericoid cover frequent over the surface of the intact blanket bog. Dwarf-shrub cover greater than 33%. Less than 33% is only acceptable in wetter areas where <i>Narthecium ossifragum</i> or <i>Sphagnum</i> spp. are abundant and forming lawns.	Visual estimate in 2x2 m plots.	Ericoid (dwarf-shrub species) include <i>Calluna vulgaris</i> , <i>Erica tetralix</i> , <i>E. cinerea</i> , <i>Myrica gale</i> , <i>Vaccinium myrtillis</i> and <i>Empetrum nigrum</i> .
* Ericoid diversity (DAFOR)	At least two species of dwarf-shrub should be widespread and frequent. Where three or more species are present, but only one frequent and widespread, the abundance of the less abundant species may be combined and treated as if they are a single species.	Visual estimate in 2x2 m plots.	A mono-dominant sward of <i>Calluna vulgaris</i> may suggest that the surface of the intact bog is drying out – i.e. the water table is too low beneath the surface of the bog.
* Scrub/tree encroachment on any active peat surface	Scrub/tree encroachment should be no more than rare on the intact bog surface, or in	Visual estimate in 2x2 m plots.	Scrub encroachment should be checked using a combination of aerial photographs and Condition Assessment. Invasive exotic species such as

(DAFOR)	the actively regenerating cutover areas.		<i>Rhododendron ponticum</i> should be removed immediately.
* Erosion Features associated with human impacts (% and DAFOR)	No gully erosion or bare peat associated with more concentrated human impacts (eg drainage, peat extraction, ATV tracks or recreational activities). Man induced/enhanced erosion should occupy less than 2% of the total area of blanket bog other than very localised instances.	Visual estimate in 2x2 m plots.	The extent of man induced erosion should be monitored using a combination of aerial photographs and Condition Assessment. Erosion is a natural feature of blanket bog, particularly marginal fretting on breaks of slope. However, where natural erosion is exacerbated by human activity, the bog will not be in favourable condition, except where such erosion is very limited in nature.
* Graminoid Cover (%)	Total cover of graminoids should not exceed 50%, unless dominated by <i>Molinia caerulea</i> forming even swards over waterlogged areas with <i>Sphagnum</i> moss cover greater than 25%.	Visual estimate in 2x2 m plots.	Include true grasses, sedges, and rushes in this assessment. <i>Eriophorum vaginatum</i> , <i>Trichophorum cespitosum</i> , <i>Deschampsia flexuosa</i> , <i>Juncus squarrosus</i> or other graminoids (except <i>Molinia</i> in some instances) should not dominate over other species.
* Management – Peat extraction	No evidence of unconsented active peat extraction.	Visual estimate in 2x2 m plots.	In some instances areas of cut peat can re-vegetate with good blanket bog vegetation which meets the attributes for favourable condition.
* Management - Grazing (%)	Signs of moderate or heavy grazing by cattle or sheep should occupy less than 5% of the blanket bog vegetation within any grazing unit.	Visual estimate in 2x2 m plots.	The frequency of droppings, the extent of poaching and the presence of grazing induced <i>Calluna vulgaris</i> growth forms indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.

<i>Molinia caerulea</i> Cover (%)	Where <i>Molinia caerulea</i> cover is greater than 50%, it should form an even (not tussocky) sward in waterlogged conditions with <i>Sphagnum</i> moss cover greater than 25%.	Visual estimate in 2x2 m plots.	<i>Molinia caerulea</i> only occurs as a natural component of the bog vegetation in the extreme west of Northern Ireland where the climate is generally warmer and wetter i.e. more oceanic.
Presence of rare or scarce species specific to the site.	<i>Sphagnum imbricatum</i> and <i>Sphagnum fuscum</i>, where they have been recorded, should remain at least present along the length of each of the w-walks. If these species are not recorded on any one visit, it does not automatically make the SAC unfavourable.	Visual estimate in 2x2 m plots.	

Frequency -

1-20% = Rare

21-40% = Occasional

41- 60% = Frequent

> 60% = Constant

Ramsar Convention on Wetlands of Importance Especially as Waterfowl Habitat

Name: Teal Lough

Unitary Authority/County: Mid Ulster District Council / Counties Tyrone and Londonderry

Consultation proposal: Teal Lough has been selected for designation as a Ramsar site because of its important wetland habitats and associated species.

Site description: Teal Lough Bog lies some 10 km north-west of Cookstown beyond Lough Fea at an elevation of 220 m. This is one of the largest and least disturbed upland blanket peat and raised bog habitats in Northern Ireland. The features of interest are all hydrologically linked, with actively developing upland raised bog surrounded by active blanket peat, and with an oligotrophic lake to the north. Teal Lough has one of the finest hummock and pool complexes of any peatland complex in Northern Ireland.

The boundary of the Ramsar site is entirely coincident with the Teal Lough Special Area of Conservation (SAC) area, incorporating part of Teal Lough and Slaghtfreeden Bogs Area of Special Scientific Interest (ASSI) (Teal Lough part only), and all of Teal Lough Part II ASSI. The county boundary bisects the Ramsar site.

Size of Ramsar site: 198.22 ha.

International importance of Ramsar site: The Ramsar site is a Wetland of International Importance because (The Ramsar Sites Criteria, 2014):

(a) the site contains a representative, rare, or unique example of a natural or near-natural wetland type found within the Atlantic biogeographic region. (Ramsar site selection Criterion 1):

- Teal Lough contains one of the most extensive and least disturbed examples of upland blanket peat and raised bog habitats in Northern Ireland, including one of the finest hummock and pool complexes of any raised bog in Northern Ireland.

Status of Ramsar site:

Teal Lough Ramsar site was designated on date (day, month, year).

UPPER BALLINDERRY SPECIAL AREA OF CONSERVATION

Site Code: UK0030296

SITE CONSERVATION OBJECTIVES & Supporting advice

Version 3
6 September 2024

Sustainability at the heart of a living, working, active landscape valued by everyone.



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Document Details

Upper Ballinderry River SAC Conservation Objectives

V2 Published April 2015

Approved by [REDACTED]

V3 Revised supporting advice

Approved by [REDACTED]

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Contact: BCSGeneral@daera-ni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	[REDACTED]
V2	January 2015	Complete review	[REDACTED]
V3	July 2024	Complete review of supporting advice at Annex A - freshwater features, additional minor updates.	[REDACTED]

Site Relationships

The Upper Ballinderry SAC is hydrologically linked to the Lough Neagh and Lough Beg SPA and Ramsar.

1. INTRODUCTION

There is a clear responsibility under the Habitats and Birds Directives¹ and associated domestic legislation, namely the Conservation (Natural Habitats &c.) Regulations (Northern Ireland) 1995 (as amended)², hereafter referred to as the Habitats Regulations to ensure that all habitats and species listed in Annexes I and II of the Habitats Directive, are maintained or restored to Favourable Conservation Status (FCS).

Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) also contribute to meeting UK international legal obligations, such as the Bern Convention, the Oslo and Paris Conventions (OSPAR), Bonn and Ramsar Conventions.

The UK national site network of European sites, formerly known as Natura 2000 sites, have a crucial role to play in achieving the overall objective of FCS since they are the most important core sites for these species and habitats. Each site must therefore be managed in a way that ensures it contributes as effectively as possible to helping the species and habitats for which it has been designated reach a favourable conservation status within the UK.

To ensure that each site contributes fully to reaching this overall target of FCS, it is important to set clear conservation objectives for each individual site. These should define the desired state, within that particular site, of each of the species and habitat types for which the site was designated.

Once a site has been included in the national site network, countries are required to implement, on each site, the necessary conservation measures which correspond to the ecological requirements of the protected habitat types and species of Community Interest present, according to Article 6.1 of the Habitats Directive. They must also prevent any damaging activities that could significantly disturb those species and habitats (Article 6.2) and to protect the site from new potentially damaging plans and projects likely to have a significant effect on a Natura 2000 site (Article 6.3, 6.4).

Conservation measures can include both site-specific measures (i.e. management actions and/or management restrictions) and horizontal measures that apply to the national site network over a larger area (e.g. measures to reduce nitrate pollution or to regulate hunting or resource use).

In Northern Ireland, national site network sites are usually underpinned by the designation of an Area of Special Scientific Interest (ASSI) under the Environment (NI) Order 2002 (as amended).

¹ 92/43/EEC and 2009/147/EC (codified version of Directive 79/409/EEC as amended)

² Updated through the Conservation (Natural Habitats &c.) (Amendment)(Northern Ireland)(EU Exit) Regulations 2019.

2. ROLE OF CONSERVATION OBJECTIVES

Conservation Objectives have a role in:

- Conservation Planning and Management – guide management of sites, to maintain or restore the habitats and species in favourable condition
- Assessing Plans and Projects, as required under Article 6(3) of the Habitats Directive - Habitats Regulations Assessments (HRA) are required to assess proposed plans and projects in light of the site's conservation objectives.
- Monitoring and Reporting – Provide the basis for assessing the condition of a feature, the factors that affect it and the actions required.

The site-level conservation objectives, the supporting advice (at Annex A) and any case-specific advice given by NIEA Natural Environment Division, should be used when developing, proposing or assessing an activity, plan or project that may affect this site.

3. DEFINITION OF FAVOURABLE CONSERVATION STATUS

Favourable Conservation Status is defined in Articles 1(e) and 1(i) of the Habitats Directive:

The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

- Its natural range and areas 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 as defined in Article 1(i).

For species, favourable conservation status is defined in Article 1(i) as 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 population on a long term basis.

3.1 DEFINITION OF FAVOURABLE CONDITION

Favourable Condition is defined as “the target condition for an interest feature in terms of the abundance, distribution and/or quality of that feature within the site”.

The standards for favourable condition (Common Standards) have been developed by JNCC and are applied throughout the UK. Achieving Favourable Condition on individual sites will make an important contribution to achieving Favourable Conservation Status across the National Site Network.

4. SITE INFORMATION

SITE: Upper Ballinderry River SAC

COUNTY: TYRONE

GRID REFERENCE: IH 725794

Upper G.R.: IH 6617719

Lower G.R.: IH 804768

AREA: 58.8 ha

5. SUMMARY SITE DESCRIPTION

The SAC includes the river and its associated riverine flora and fauna and adjacent semi-natural vegetation, primarily woodland flora and fauna. This 24.1km of river rises at an altitude of 195m and flows through Cookstown at an altitude of 45m. It is a fast-flowing spate river, notable for the physical diversity and naturalness of the bank and channel, and the richness and naturalness of its plant and animal communities which includes White-clawed Crayfish *Austropotamobius pallipes*, beds of Stream Water Crowfoot *Ranunculus penicillatus* var. *penicillatus* and one of the largest Northern Ireland populations of the now rare Freshwater Pearl Mussel *Margaritifera margaritifera*. The adjacent semi-natural vegetation is typically Blanket Bog in the upper catchment and woodlands in the lower. However, the woodland is very fragmented and variable but includes Oak, Alluvial and Ash woodland types which contain notable species as Rough Horsetail *Equisetum hyemale* and Wood Fescue *Festuca altissima*, in addition to a rich fungi community.

Further details of the site are contained in the ASSI Citation and Views About Management statement, which are available on the DAERA website (<https://www.daera-ni.gov.uk/protected-areas>).

5.1 BOUNDARY RATIONALE

General

Selection of site boundaries is inconsistent throughout the proposed SAC River network with no standardised criteria currently in use. The criteria used vary between countries and even between sites within each country that has resulted in a wide discrepancy in the area included within the proposed SAC's. The four options currently in use are (1) whole catchments, (2) main river stem from source to mouth, tributaries and upland catchment, (3) main river stem from source to mouth and tributaries and (4) main river stem from source to mouth only. The option used is dependent on the qualifying features for that site and the current knowledge of distribution of that feature. In the case of the Upper Ballinderry River the SAC qualifying features are its population of *Margaritifera margaritifera* and its *Ranunculus* community which is confined to the main channel.

Specific

The upper river limits of this site is determined by the restricted size of the channel while the lower river limit is determined by Cookstown below which the river is severely degraded. The width of the lateral boundary beyond the river channel follows the same guidelines as that for all ASSI, which is dependent on the type of adjacent habitat. In the case of this site, there is limited adjacent habitat which can be justifiably included, so the lateral boundary is frequently restricted to the top of the riverbank.

The site boundary utilised permanent man-made boundary features wherever possible, however along some stretches of the river and woodland edge such boundaries were absent, and recognisable topographical or physical features such as break in bank top, slope, scrub or tree line were used.

6. SAC SELECTION FEATURES

Table 1. List of SAC selection features. Those with global status A-C will be referred to in ANNEX A.

Feature type	Feature	Global Status	Size/ extent/ pop~
Species	Freshwater Pearl Mussel <i>Margaritifera margaritifera</i>	B	1000
Habitat	Water courses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachion</i> vegetation	B	95% of channel length
Species	Otter <i>Lutra lutra</i>	C	C
Habitat	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	D	

Habitat	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnion incanae</i> , <i>Salicion alvae</i>)	D	<5%
Habitat	Blanket Bog	D	5
Species	White-clawed Crayfish <i>Austropotamobius pallipes</i>	D	P
Species	Atlantic Salmon <i>Salmo salar</i>	D	R

The global status is an expert judgement of the overall value of the site for the conservation of the relevant Annex A habitat. Sites have been graded A, B or C - in the UK these gradings have been interpreted as follows:

- A** - Sites holding outstanding examples of the habitat in a European context.
- B** - Sites holding excellent stands of the habitat, significantly above the threshold for SSSI/ASSI notification but of somewhat lower value than grade A sites.
- C** - Examples of the habitat which are of at least national interest (i.e. usually above the threshold for SSSI/ASSI notification on terrestrial sites) but not significantly above this. These habitats are not the primary reason for SACs being selected.
- D** - Habitat present but not of sufficient extent or quality to merit listing as SAC feature.

There is therefore a distinction between the principal features for which sites have been selected (those graded A or B) and those which are only of secondary interest (those graded C). This is a useful distinction but it is important to note that all three grades are qualifying SAC interest features.

Click [here](#) to go to the Natura 2000 Standard Data Form for Upper Ballinderry River SAC.

Guidance and literature: <https://www.daera-ni.gov.uk/protected-areas/upper-ballinderry-river-sac>

6.1 ASSI SELECTION FEATURES

Upper Ballinderry River ASSI

Table 2. List of ASSI features.

Feature Type	Feature	Size/ extent/ pop~
Habitat	Series of river types present with corresponding macrophyte assemblages, ranging from ultra-oligotrophic to mesotrophic types.	
Species	Freshwater Pearl Mussel <i>Margaritifera margaritifera</i>	
Species	Otter <i>Lutra lutra</i>	

7. CONSERVATION OBJECTIVES

The *Conservation Objective* for this site is:

To maintain (or restore where appropriate) the

- Fresh Water Pearl Mussel *Margaritifera margaritifera*
- Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitriche-Batrachion* vegetation
- Otter *Lutra lutra* to favourable condition.

For each SAC feature, there are a number of component objectives which are outlined in the table below. These include a series of attributes, measures and targets which form the basis of *Condition Assessment*. The results of this will determine whether the feature is in favourable condition or not. The feature attributes and measures are found in the attached annex.

8. SAC SELECTION FEATURE OBJECTIVE REQUIREMENTS

Feature	Grade	Objective
Freshwater Pearl Mussel <i>Margaritifera margaritifera</i>	B	Maintain and if feasible enhance population number through natural recruitment.
		Improve age structure of population.
		Improve water quality.
		Improve channel substrate quality by reducing siltation.
		Ensure host fish population is adequate for recruitment.
Water courses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachion</i> vegetation	B	Maintain and if feasible enhance extent and composition of community.
		Improve water quality
		Improve channel substrate quality by reducing siltation.
		Maintain and if feasible enhance the river morphology
Otter <i>Lutra lutra</i>	C	Population numbers and distribution to be maintained and if possible, expanded.
		Maintain the extent and quality of suitable Otter habitat, in particular the chemical and biological quality of the water, and all associated wetland habitats

9. ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Series of river types present with corresponding macrophyte assemblages, ranging from ultra-oligotrophic to mesotrophic types.	Maintain and if possible enhance extent and composition of communities.
	Improve water quality
	Improve channel substrate quality by reducing siltation.
	Maintain and if possible enhance the river morphology
	Maintain the diversity and quality of habitats associated with the river, e.g. bog, wet grasslands, scrub and oak woodland.
Freshwater Pearl Mussel <i>Margaritifera margaritifera</i>	See SAC Selection Feature Objective Requirements table.
Otter <i>Lutra lutra</i>	See SAC Selection Feature Objective Requirements table.

10. MANAGEMENT CONSIDERATIONS

Ownership

In total, there are 130 individuals or organisations with ownership or other rights associated with the site.

Adjoining Land Use

The upper reach of the river flows through a predominantly upland peatland landscape used for rough grazing with the river channel generally being un- enclosed. Along its mid-reach, the river runs through improved or semi-improved pasture used for silage and grazing and is generally fenced from the surrounding land at least along one bank top. In the lower reach, the main adjacent agricultural uses include tilled land and silage production as well as stock grazing. Here, a significant proportion of the river is bounded by woodland either as discrete woodland blocks along the valley side or as a thin bank top belt. The river channel or the adjacent woodlands are only partially fenced. Where the bank and channel of the river are accessible to stock their activities can be directly and indirectly damaging to both the *M. margaritifera* and the macrophyte community. The construction of weirs by fishing clubs as part of the Salmon Enhancement Scheme has locally altered the morphology of the river.

11. MAIN THREATS, PRESSURES AND ACTIVITIES WITH IMPACTS ON THE SITE

Both on-site and off-site activities can potentially affect SAC/ASSI features. The list below is not exhaustive but deals with the most likely factors that are either affecting Upper Ballinderry River or could affect it in the future.

Although Freshwater Pearl Mussel *Margaritifera margaritifera*, Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitriche-Batrachion* vegetation and Otter *Lutra lutra* are the qualifying SAC features, factors affecting ASSI features are also considered.

NOTE - Carrying out any of the Notifiable Operations listed in the ASSI schedule could affect the site.

Fish Farms

Fish farm installations usually abstract water from the watercourse then release effluent to the same course, the abstraction point is normally upstream of the release point. Where the abstraction is large relative to streamflow, the portion of channel between points of abstraction and release may have a much reduced discharge and water velocity. The effect can be so extreme that it obstructs the upstream movement of migrating fish and is also acting as a barrier to other water-born wildlife. Effluents from intensive fish farming units may differ from the natural stream water by having a modified temperature and pH and may be contaminated with toxic materials. It also carries waste and partly decomposed food and the metabolic products of the fish. This can lead to increased oxygen demand (and hence a low oxygen concentration in the water), increased suspended solids and enrichment of the

recipient stream. When fish-rearing facilities are being set up it is imperative to ensure there is always an adequate compensatory flow along the river and that the effluent is adequately treated.

ACTION: Proposals for any fish farms in the area will require very careful environmental assessment. In particular, it is imperative to ensure that an adequate compensatory flow is maintained and that the effluent is adequately treated.

Water Extraction

A business premises at Kildress Bridge is strongly impacting upon the river by diverting most of the water from the channel. This diversion of water has caused the river channel, between the abstraction point and discharge point, to be all but dry during the summer. Observations indicated that the diversion weir has been recently raised. This weir is likely to be having serious implications for migrating fish and is also acting as a barrier to other water-born wildlife. Fresh water pearl mussel are found above and below the weir and thus this already vulnerable population is being further fragmented by this structure.

ACTION: Lower weir height to a level which permits adequate compensation flow to replenish the river channel even in times of drought.

Water Quality/Eutrophication

Analysis of the results relating to both chemical and biological water quality monitoring from 1991 to 1996 indicates there has been a deterioration in water quality over this period. Water quality is the most important factor in the enhancement of the Ballinderry catchment and is affected from both point and diffuse source pollution.

Stock having open access to the channel in many sections has caused poaching of the river bank/channel, leading to soil erosion, which represents another possible source of enrichment.

ACTION: Minimise enrichment of the water column from point source pollution, such as fish farms. Reduce levels of diffuse pollution by encouraging a catchment-wide campaign to reduce excessive fertiliser inputs on land. Restrict stock access to specific watering points.

Channel & Bank Modification

The Ballinderry river has been extensively altered by man in the recent past, however the river continues to recover from the effects of resectioning etc. Several fisheries weirs have been recently created in the lower reach of the river. These modifications have changed the natural flow regime of the river.

ACTION: Future in-river works should be minimised as they remove diversity and threaten vulnerable shellfish populations. Due to the dynamic nature of rivers, work carried out at any point on the river may have a significant impact on the catchment as a whole. Initiate discussions with Rivers Agency to co-ordinate action.

Habitat enhancement schemes such as the 'Salmonid Enhancement Programme' should be thoughtfully planned. Enhancement work should be limited to areas of river that have been extensively modified by past drainage schemes and which have lost much of their natural dynamic character. Properly executed enhancement schemes can significantly improve the wildlife potential of rivers. It is important to effectively manage the installation

of structures such as weirs, as they may have a negative effect on species diversity by causing excessive damming of the channel. Initiate discussions with DAERA Marine & Fisheries Division to co-ordinated action.

Substrate siltation

Sand wash from a number of commercial sandpits in the upper reach of the river has resulted in siltation of the riverbed downstream of the access points.

Livestock have open access to the river channel in many sections and have caused poaching of the bank/channel, causing soil erosion, resulting in siltation of downstream river beds.

ACTION: Sediment levels in tributaries and immediately down stream of sandpit inputs should be closely monitored and controlled.

Restriction of stock access to drinking areas only.

Trampling

Stock trampling in the channel threatens pearl mussel populations. Stock trampling and poaching in adjacent woodlands has resulted in severe damage to the woodland flora and has prevented regeneration.

ACTION: Restrict stock access to drinking areas only. Exclude stock from woodlands or reduce stocking levels to sustainable grazing levels.

Fly-tipping

Small-scale fly tipping has occurred along the banks and in the river channel as well as in adjacent woodland.

ACTION: Remove dumped material from the river banks and channel and where practical the woodland, to prevent the buildup of debris and to discourage further fly-tipping.

Alien Species

Giant Hogweed *Heracleum mantegazzianum* is present along the riverbanks in the lower reach of the river, close to Cookstown.

ACTION: Ensure the immediate removal of invasive/alien species to prevent them spreading further along the river.

Nitrogen Deposition

Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the UK. Critical levels and critical loads have been calculated for protected site features.

Please refer to the UK Air Pollution Information System (APIS) for site relevant critical loads and levels at www.apis.ac.uk

ACTION: Seek to maintain, or where necessary restore, concentrations and deposition of air pollutants to at or below the site-relevant critical levels and loads.

Changes to surrounding land use

Any changes in local land-use e.g. agricultural intensification, drainage works and development) may be detrimental to the SAC.

ACTION: Reduce the risk of surrounding agricultural intensification by encouraging the adjacent owner/occupiers to enter into agri-environment schemes. Use Habitats Regulations Assessments (HRAs), through the planning process, to minimise any development risks adjacent to the SAC.

Climate Change

Northern Ireland faces changes to its climate over the next century. Indications are that we will face hotter, drier summers, warmer winters and more frequent extreme weather events.

ACTION: When developing SAC management plans, the likely future impacts of climate change should be considered and appropriate changes made.

12. CONSERVATION MANAGEMENT PLAN

A Conservation Management Plan for the Upper Ballinderry River SAC has not yet been published.

13. MONITORING

Monitoring of SACs takes place using two monitoring techniques.

Site Integrity Monitoring (SIM) is carried out to ensure compliance with the ASSI/ SAC Schedule. The most likely processes of change will either be picked up by SIM (e.g. dumping, burning, turf cutting, grazing etc.) or will be comparatively slow (e.g. gradual degradation of the habitat).

These longer-term changes will be picked up by monitoring of the feature via

Site Condition Assessment - this is carried out on a rolling basis to pick up subtle changes in the condition of the feature.

The method for Site Condition Assessment was agreed by the relevant JNCC-led Lead Co-ordination Network although the methodology has been modified to reflect individual site attributes in Northern Ireland.

13.1 MONITORING SUMMARY

1. Monitor the integrity of the site (SIM or Compliance Monitoring)

Complete boundary survey to ensure the boundary features, where present, are still intact. Ensure there has been no tree felling, ground and riverbed disturbance, dumping or inappropriate burning carried out within the SAC boundary. Evaluating stocking densities would also be desirable, while a check for feral goat damage should be carried out throughout the site. This SIM should be carried out once every 3 years. Inspection of river reaches with Pearl Mussel colonies should be undertaken once a year to insure there has not been any pearl fishing.

2. Monitor the condition of the site (Condition Assessment)

Monitor the key attributes for each of the SAC selection features. This will detect if the features are in favourable condition or not. See Annex A.

The favourable condition table provided in Annex A is intended to supplement the conservation objectives only in relation to management of established and ongoing activities and future reporting requirements on monitoring condition of the site and its features. It does not by itself provide a comprehensive basis on which to assess plans and projects, but it does provide a basis to inform the scope and nature of any Habitats Regulations Assessment (HRA) that may be needed. It should be noted that completion of a HRA is a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

14. REFERENCES

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ANNEX A – Supporting advice

Feature 1 (SAC) – Freshwater Pearl Mussel *Margaritifera margaritifera* (Status B) (* = primary attribute. One failure among primary attribute = unfavourable condition)

Attribute	Target	Method of Assessment	Comments
Population			
a. Spatial Extent	Should reflect distribution under near-natural conditions	Visual survey of riverbed	Population distribution should be close to that expected under near-natural conditions throughout the site, taking into account natural habitat conditions and allowing for natural fluctuations. The target is to secure a sustainable population of mussels that is able to utilise all naturally suitable habitat within the river
b. Population density	≥ 5 mussels per m ² within sample transects	Visual survey of riverbed.	The density data from all transects within each monitoring unit should be aggregated and the resulting figure assessed against the target. In smaller rivers where 50m transects have not been surveyed, density data from all quadrats should be aggregated and assessed against the target.
c. Age structure	i. At least 20% of population ≤65mm ii. At least 5% of population ≤ 30mm.	Length measurement of mussels recorded in quadrats within 50m transects.	Population profiles should not be attempted where mussel beds are vulnerable to damage. In this case, the target is to find at least one pearl mussel ≤65mm. This results in a lower degree of confidence that the population is reproductively viable but should protect it from potential adverse disturbance during survey. A threshold of at least one mussel

			is required in order to confirm recent recruitment and minimise disturbance of a population during survey.
d. Dead shells	<1% of population per year and scattered distribution.	Counting within 50m transects.	1% (based on a 100-year life span) considered to be indicative of natural losses for survey sites and for the entire river population per year. Where >1% dead shells are found, an investigation into the cause should be carried out to assess whether it may be an exceptional natural event or an indication of an unnatural kill. The dead shells should be examined for freshness (by checking the colour of the nacre) to help assess the likelihood of a problem.

Attribute	Target	Method of Assessment	Comments
Water Quality			
For freshwater pearl mussel, organic pollution, reactive phosphorous, acidification, and other nutrients are particularly important. Nutrient concentrations should be near natural.	See sub-attributes below. Targets included in the CSM guidance for Rivers should be used. These targets are intended to support a healthy, naturally functioning river ecosystem which protects the whole biological community and individual species to a degree characteristic of the river. Some more stringent chemical targets for pearl mussel are listed below.	Standard monitoring protocols in CSM Guidance for Rivers. (Data from NIEA).	Water quality should not be injurious to any life stage. All classified reaches within the designated site that contain, or should contain, freshwater pearl mussel should comply with targets given. Data from the last 3 years should be used. All water quality data should be available on request from NIEA.
a. Phosphorus	In locations where annual mean soluble reactive phosphorous (SRP) levels are $<5 \mu\text{g L}^{-1}$, the target should be $5 \mu\text{g L}^{-1}$. For	Standard monitoring protocols in CSM Guidance for Rivers. (Data from NIEA).	The SRP target value should not be set for a river without first checking the baseline P levels and any historical data available for

	rivers that exceed this, the target is the more stringent value of either: high status values for SRP under the WFD, or the SRP target for CSM river habitat.		the that river. Undetectable levels of SRP are not necessarily a guarantee of good health, particularly if the local analysis equipment is unable to perform at low concentrations. If all the available phosphorus is being transferred into filamentous algae, then it will not be detectable as SRP in open water. A combination of very low SRP with the absence of filamentous algae is considered to indicate nutrient levels conducive to <i>Margaritifera</i> populations in favourable condition.
b. Nitrogen	Nitrate annual median value of $<0.125 \text{ mg L}^{-1} \text{ N}$	Standard monitoring protocols in CSM guidance for Rivers (Data from NIEA).	This threshold is based on a study of 560 sites in 126 rivers: $0.125 \text{ mg L}^{-1} \text{ N}$ for Ireland (Moorkens, 2006). Like phosphorous, nitrate levels are a measure of the naturalness of the surrounding catchment, and limits should be set at those natural for that catchment. Where nutrient levels are too high to sustain pearl mussel populations, levels of all nutrients should be reduced until sustainability is achieved.
c. BOD	Mean BOD $<1.0 \text{ mg L}^{-1}$	Standard monitoring protocols in CSM Guidance for Rivers. (Data from NIEA).	Rivers with reproducing populations in the UK, Ireland and Spain have BOD levels consistently $<1.0 \text{ mg L}^{-1}$

Attribute	Target	Method of Assessment	Comments
Flow	Flow targets included in the CSM guidance for Rivers should be used, as these are intended to support a healthy naturally functioning river ecosystem which protects the whole biological community and individual species to a degree characteristic of the river. As a minimum, UKTAG standards for GES under the WFD should be met. River flow rates should be as natural as possible throughout the site, avoiding human induced high and low extremes.	Gauging stations (Data from DfI Rivers).	River flow affects a range of habitat factors of critical importance to FPM, including current velocity, water depth, wetted area, substrate quality, dissolved oxygen levels and water temperature. The maintenance of both flushing flows and base flows, based on natural hydrological processes, is vital. Detailed investigations of habitat-flow relationships may indicate that a more or less stringent threshold may be appropriate for a specified reach; however, a precautionary approach would need to be taken to the use of less stringent values. Naturalised flow is defined as the flow in the absence of abstractions and discharges. The availability and reliability of data is patchy – long term gauged data can be used until adequate naturalised data become available, although the impact of abstractions on historical flow records should be considered.

Attribute	Target	Method of Assessment	Comments
Habitat Structure In channel structures and morphology	Refer to River Habitat Assessment Tool (RHAT) guidance used in NI.	Assess using RHAT methodology for river habitat or species-specific methods if available and appropriate. River Hydromorphology Assessment Technique - Training Manual Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk)	The river's natural form and function should support all of the habitat features necessary for pearl mussels to thrive, in characteristic proportions. Widening or deepening of channels, and extensive artificial reinforcement of banks, are

			indicators of unfavourable condition. Further information on the importance of physical habitat to pearl mussels is available in published CEN guidance. Information on in-channel structures is available in CSM Guidance for Rivers.
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Attribute	Target	Method of Assessment	Comments
Other Attributes			
a. Fine sediment (redox)	There should be no pronounced difference in redox potential (typically <20%) between open water and interstitial water at 5cm depth.	Redox measurements collected in open water and riverbed, at or around population transect locations.	Excessive delivery of fine sediment, from the catchment or artificially enhanced bank erosion, may lead to a range of problems relating to surface siltation, the compaction or concretion of riverbeds and to the infilling of substrate interstices. This affects oxygen supply and exchange within the substrate as well as the ability of juvenile mussels to burrow. Infiltration by fine sediments is one of the main causes of decline in juvenile recruitment for pearl mussel populations. *Infiltration of high loads of fine sediment typically results in low oxygen supply to interstices of the substrate. Redox measurements provide a reliable estimate as a surrogate for the oxygen level within the interstices of the substrate compared with the open water.
b. Fine sediment (siltation) and Suspended Solids	No unnaturally high levels of siltation indicated by: 'silt on substrate' highlighted in section K of the RHAT form ('Bank	Field observations and site-specific information derived from RHAT.	Direct measurement of turbidity is not recommended, because values vary naturally in response to changes in flows with no clear

	and channel features') OR One-third or more of the total number of RHAT spot-checks in the assessment unit have silt (SI) as the predominant channel substrate where not expected from local geology. The continued use of the following Suspended Solids target is under further review by NIEA - Annual mean $<10\text{mg L}^{-1}$		understanding of a suitable reference value.
c. Filamentous algae	<5% cover across assessment units	Visual assessment during mussel survey and relevant metrics collected during LEAFPACS survey by NIEA.	Filamentous algal cover should be measured during the pearl mussel survey. In oligotrophic conditions nutrient levels should never be high enough to allow dense mats of filamentous algae growth. The persistence of filamentous algae is an indication that nutrient levels may be too high for sustainable <i>Margaritifera</i> populations but may also indicate low flow problems. Using the LEAFPACS method, with 3-5 sections per assessment unit surveyed depending on its size. More variable assessment units may require more surveys.
d. Fish host populations: native juvenile salmonid densities (0+ and 1+ year classes)	1. Should be abundant: >0.1 native juvenile host salmonids per m^2. 2. Should be able to find fish infected with glochidia between September and May.	Standard electrofishing protocols. Visual inspection of gills, particularly later in glochidia incubation period.	An abundant supply of native juvenile salmonids is vital to the survival of the larval stage. The relative importance of salmon and migratory and non-migratory brown trout populations to pearl mussels will vary between rivers. Physical and chemical conditions need to be suitable for the well-being of all life stages of salmonids, including free access up the river and conditions in the

			estuary and lower river where the juveniles of migratory salmonids are present. It is important to determine the species of host fish that a mussel population needs in a particular river as local pearl mussel populations can use salmon, trout or both species. Electrofishing should be carried out twice using standard methods, once in early autumn to establish the presence and density of suitable fish hosts as a proportion of the fish population just downstream of mussel beds, and again in late spring to establish the presence of 1+ fish in the vicinity of permanent mussel habitat. This does not adversely affect pearl mussels. The fish in the second survey should be checked for encystment of glochidia on the gills which are visible on the live fish. More detailed studies of fish numbers and glochidial encystment (e.g. number of glochidia per fish) can be undertaken but the above should be considered as a minimum requirement.
e. Alien/locally non-native species	No non-native species likely to cause impairment of freshwater pearl mussel populations	Survey data collected and analysed by NIEA.	Non-native species constitute a major threat to many river systems. Impacts may be on the river habitat itself (e.g. damage to banks and consequent siltation) or directly on characteristic biota (through predation, competition, and disease), or a combination of

			these. Assessment of non-native species is based on the principles used in assessing high ecological status under the WFD, and applies to species on the banks and in the riparian zone as well as species of the channel and the margins. alien species wfd uktag. Note: This document includes a separate list of alien species for Ecoregion 17 (in which Northern Ireland lies); this list contains only high-impact species.
f. Stocking transfers of other species	No inappropriate stocking/translocation of fish species.	Fishery stocking consents. Impact assessments of stocking consents on a catchment scale may be required to determine an acceptable level.	Rainbow trout and brook trout are resistant to glochidial infection and are not, therefore, suitable host species. Stocking of these species will create competition with native salmonids and is likely to reduce host opportunities for glochidia. Any stocking of native salmonids must take account of the genetic diversity of resident salmonids. The host fish/mussel relationship seems likely to have a genetic component, which could be affected by inappropriate stocking.
g. Introduction/transfers of freshwater pearl mussel	No introduction/transfers of freshwater pearl mussel unless agreed to be in the best interest of the population	Knowledge of site management	Translocation is not generally recommended as a conservation tool. It is a technique that has been little used and must still be considered experimental. Translocation (if feasible) should therefore be seen as a last resort. In GB and Northern Ireland, genetically distinct freshwater pearl mussel populations have

			been found to exist in separate catchments (Cauwelier, 2009). Any translocations or transfers of FPM must follow IUCN and other local guidelines.
h. Pearl Fishing	No evidence of pearl fishing	Standard survey protocol	Pearl mussel fishing is prohibited under the Wildlife (NI) Order 1985.
i. in-stream activities	No evidence of damage of existing mussel beds	NIEA monitoring/consenting programmes and standard survey protocol.	Engineering works that disturb riverbeds can be disastrous for mussel populations, so every effort needs to be made to leave them undisturbed. Other relevant activities include fishing (wading in the river) and canoeing (at access points to the river) particularly for vulnerable populations. As a minimum, existing areas should be safeguarded, whilst habitat lost through engineering works should be reinstated.

Feature 2 (SAC) – Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitriche-Batrachion* vegetation (Status B)

Attribute	Measure	Targets	Comments
Water quantity	Flow	The natural flow regime of the river should be protected. Daily flows should be close to what would be expected in the absence of abstractions and discharges (the naturalized flow). Flow targets for WFD high ecological status should be used to avoid deterioration and for restoration if this is technically feasible. These are: <5% deviation at <Qn95 and <10% at >Qn95 based on 'natural' water (i.e. water that has not been abstracted and returned). There should be no obvious problems with water availability within the assessment unit. Springs in aquifer-fed rivers should be maintained.	The principal flow targets given in Table 3 of CSM Guidance for Rivers should be taken as the minimum expected for an SAC river where appropriate and locally agreed targets are not already in place. Flow data is available at Search Data National River Flow Archive (ceh.ac.uk)
Water Quality	Organic pollution	Organic pollution is assessed using a combination of physico-chemical and biological attributes. Targets apply throughout the assessment unit, not just at sparsely distributed monitoring sites. Targets: 10%ile DO (% saturation) = 85 Mean BOD (mg L ⁻¹) = 1.5 90%ile total ammonia (NH ₃ -N, mg L ⁻¹) = 0.25 95%ile un-ionised ammonia (NH ₃ -N, mg L ⁻¹) = 0.025	Chemical data from all routine monitoring sites should be obtained from NIEA for the 3 years preceding the time of condition assessment. The statistics in the table should be calculated using all samples within that 3-year period.
	Reactive phosphorus	Compliance with these two targets is mandatory <u>as an annual mean and March-September growing season mean. See tables 5 and 6 of CSM Guidance for Rivers for targets.</u>	Table 5 of CSM Guidance for Rivers has targets for phosphorus (µg L ⁻¹ SRP) for near-natural examples of ASSI/SAC river habitat and Table 6 of CSM Guidance for Rivers has targets for maximum phosphorus concentrations (µg L ⁻¹ SRP) consistent with favourable condition of ASSI/SAC river habitat.
	Trophic Diatom Index	The target using the Trophic Diatom Index (TDI) Ecological Quality Ratio should be a normalized EQR of ≥ 0.8, equivalent to high ecological status (WFD-	Environment agencies typically take two or three diatom samples each year at routine monitoring sites. Any sample failing to comply with the relevant biological

	Acidification Other pollutants	UKTAG, 2014a). This target should be used as an adjunct to nutrient targets proposed in Tables 5 and 6 respectively. The targets proposed here are the same as the high/good boundary proposed for the WFD (WFD-UKTAG, 2012a). Targets: pH (Clear waters with DOC<10mg L⁻¹) : mean > 6.54 pH (Humic waters with DOC>10mg L⁻¹) : mean > 5.1 Good chemical status is the target for any pollutant listed on Annex X of the WFD and not specifically considered above.	target within the 3-year period at any sampling site in the assessment unit should be regarded as non-compliant. This target applies only to assessment units whose WFD water body type is classified as siliceous or peat. Other types have buffering capacity and are therefore will not be affected by acidification. Analysis of water chemistry data from NIEA. At least 3 years of data are required, which must include winter samples. Data on the chemical status of individual water bodies are available from NIEA.
Habitat Structure	Assess using River Habitat Assessment Tool (RHAT)	Refer to River Habitat Assessment Tool (RHAT) guidance used in NI - River Hydromorphology Assessment Technique - Training Manual Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk)	The minimum frequency should be a 10% coverage (i.e. 1 site every 5km), coincident with macrophyte monitoring sites where this is done. The location of each RHAT assessment unit (and macrophyte monitoring) should be marked on a map of the site. It is recommended that GPS and site photographs are used to facilitate accurate relocation of sites on future visits.

	Exploitation	Exploitation (e.g. netting or angling) should not interfere with the ability of the river to support self-sustaining populations of characteristic species.	Assessed through recorded exploitation and status of target species.
	Weed cutting	A sufficient proportion of all aquatic macrophytes should be allowed to reproduce in suitable habitat, unaffected by river management practices.	Field observations during macrophyte survey.

¹ <http://www.wfduk.org/tagged/alien-species#> Note: This document includes a separate list of alien species for Ecoregion 17 (in which Northern Ireland lies); this list contains only high-impact species.

Feature 3 (SAC) – Otter *Lutra lutra* (Status C)

Attribute	Measure	Target	Notes
Presence of otters	Presence of one or more of the following signs within the site: Positive identification of otter spraint, footprints, tracks, paths, lying-up sites or feeding signs.	Signs of otters found at least once per year	Use available data from other surveys or CeDAR.
	Sightings of otters.		
	Positive identification of holt(s).		
Bankside/ Waterside cover	Presence of cover: Mature trees, woodland, scrub, other tall bankside vegetation, reed and sedge beds.	No overall permanent decrease	Some change acceptable as long as it is appropriately mitigated
Water quality	WFD Chemical and Ecological status	Water quality should be at least 'Good' status, with no pollution incidents	Refer to NIEA Water Management Unit for data
Food Sources	Assessment of fish stocks and other food sources (e.g., amphibians)	Fish stocks appropriate to the nutrient status of the river, with no significant decline in fish biomass or species diversity	Refer to appropriate Loughs Agency/ AFBI for monitoring data where available. (This information may need to be inferred from the water quality category).
Disturbance	Extent of public access to river	No significant change to river or bankside usage; no significant development	

Flow rate	Mean annual flow rate	No reduction attributable to increased abstraction.	Refer to data from Rivers Agency/NIEA Water Management Unit if available
Site integrity	Total area	No reduction or fragmentation of area	