Annex A

Conservation Objectives for Northern Ireland and Ireland Designated Sites

Sites are in alphabetical order with Northern Ireland sites listed first.

BANAGHER GLEN SAC
UK0030083

CONSERVATION OBJECTIVES

Document Details

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V2	Dec 2014	Complete review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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: LONDONDERRY

GRID REFERENCE: C672045

AREA: 87.77 ha

5. SUMMARY SITE DESCRIPTION

The site consists of a complex system of river valleys with wooded areas surrounding the main Owenrigh River valley and its three tributary valleys all to the south. The site has a history of continuous woodland cover, with the present woodland being over 200 years old. Due to the underlying geology the site supports examples of both acid Oak woodland and a smaller component of base-rich Ash woodland.

The site hosts examples of the metamorphic Dart Formation, principally schists, and metamorphic basic intrusive igneous rocks. It also hosts an internationally important exposure of the Dungiven metamorphic limestones in Banagher Glen Quarry.

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 boundary has been drawn to include the best examples of Oak and Ash woodland, in addition to other semi-natural habitats that form part of the natural transition, such as to heath. The site boundary uses permanent features where possible. However, at the upper end of the three main valleys, man made boundaries were absent and so recognisable topographical or physical features such as break in slopes, tree lines were used.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ population
Habitat	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	B	60.4 ha
Habitat	Tilio-Acerion forests of slopes, screes and ravines	C	17.5 ha
Habitat	North Atlantic wet heath with *Erica tetralix*	D	4.6 ha
Species	Otter *Lutra lutra*	D	P

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 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 Banagher Glen SAC.

6.1 ASSI SELECTION FEATURES

Banagher Glen ASSI

Feature Type	Feature	Size/ extent/ population
Habitat	Oakwood	60.4 ha
Habitat	Mixed Ashwoods	17.5 ha
Species	Invertebrate assemblage - assemblage of woodland invertebrates; high diversity	
Species	Breeding Bird Assemblage	
Earth Science	Dalradian	

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The ***Conservation Objective*** for this site is:

To maintain (or restore where appropriate) the **Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles and *Tilio-Acerion* forests of slopes, screes and ravines 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

SAC Feature	Global Status	Component Objective
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	B	Maintain and where feasible expand the extent of existing oak woodland but not at the expense of other SAC (ABC) features. (There are area of degraded heath, 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.
Tilio-Acerion forests of slopes, screes and ravines	C	Maintain and where feasible expand the extent of existing ash woodland, but not at the expense of other SAC (ABC) features (There is an area of degraded bog, wetland and damp grassland which have the potential to develop into ash woodland.
		Maintain and enhance ash woodland species diversity and structural diversity.
		Maintain the diversity and quality of habitats associated with the ash woodland, e.g. scrub, especially where these exhibit natural transition.
		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.

9.1 ASSI FEATURE OBJECTIVE REQUIREMENTS

ASSI Feature	Component Objective
Oakwood	See SAC Selection Feature Objective Requirements table.
Mixed Ashwoods	See SAC Selection Feature Objective Requirements table.
Breeding Bird Assemblage	To be Finalised
Invertebrate assemblage	Establish the status of the most important species and map locations if feasible
	Maintain abundance and distribution and if feasible enhance populations.
	If necessary, draw up further conservation priorities for these species.
Dalradian	Maintain the extent of the site.
	Maintain the extent of the feature.
	Maintain the access to the feature including retaining the potential to expose the full geological series as required.

10. MANAGEMENT CONSIDERATIONS

Ownership

Around two thirds of the wood is in private ownership, the remainder is National Nature Reserve. In total there are seventeen individuals or organisations with ownership or other rights associated with the site. The Water Service installation located on the flat valley floor has been excluded while the access roads passing up the valley are included.

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 <u>likely</u> factors that are either affecting Banagher Glen, or could affect it in the future. Although Old sessile oak woods with *Ilex* and *Blechnum*, and *Tilio-Acerion* forests of slopes, screes and ravines are the qualifying SAC features, factors affecting ASSI features are also considered.

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

Grazing/Poaching/Tree barking and Browsing

Free access to some parts of the woodland by domestic stock and feral goats was causing damage to the ground flora at the time of designation. Grazing and bark-stripping could prevent regeneration and cause a detrimental change in the woodland structure and composition with time. Recent changes in management have resulted in stock exclusion, and the woodland is now recovering.

ACTION: Monitor the recovery of the woodland and if required, initiate appropriate habitat management to achieve favourable condition.

Invasion by exotics

Exotic species are localised. They vary in the degree of impact they have and the threat they pose. Very invasive species such as Sycamore *Acer pseudoplatanus* are seen as posing a current threat. Others are not seen as an immediate threat due to their limited occurrence (e.g. Horse Chestnut *Aesculus hippocastanum*) or slow rate of spread (e.g. Beech *Fagus sylvatic*a). Sycamore and Beech occur in the Mixed ashwood at the northern end of the Owenrigh Valley.

ACTION: A long-term programme for the selective, phased removal of Sycamore and Beech should be drawn up. A slow, phased compartment-based approach may be one mechanism to avoid any adverse impacts to the woodland ecology. Seed-bearing Sycamore trees should be selectively targeted to slow the spread of this species within the woodland. This may involve felling mature seed-bearing trees. Ring barking Sycamore trees as a control mechanism is generally not recommended as the species tends to seed more profusely before dying. Ring-barking of Beech on the other hand is more successful, and increases the amount of standing dead wood. It is important that seedlings and saplings are systematically removed as part of any management programme. Those species not posing a threat at present should be monitored and in the long-term controlled if required.

Slumping/Landslides/Erosion

Sudden accidental discharge of water down the valley sides from quarry sites adjacent to the valleys has resulted in a number of landslides and severe gully erosion in the past.

ACTION: Liaise with quarry owners to prevent as far as possible further accidental discharges of water that could cause erosion problems.

Dead Wood Removal

Dead wood should be left *in situ* if safe or practical to do so. This provides valuable habitat for fungi, invertebrates etc. Removal of wood for fire-wood should be discouraged.

ACTION: No removal of dead wood from the site.

Woodland Clearance/Felling

Any felling of native trees or shrubs is contrary to the ASSI schedule.

ACTION: No removal of native trees or shrubs.

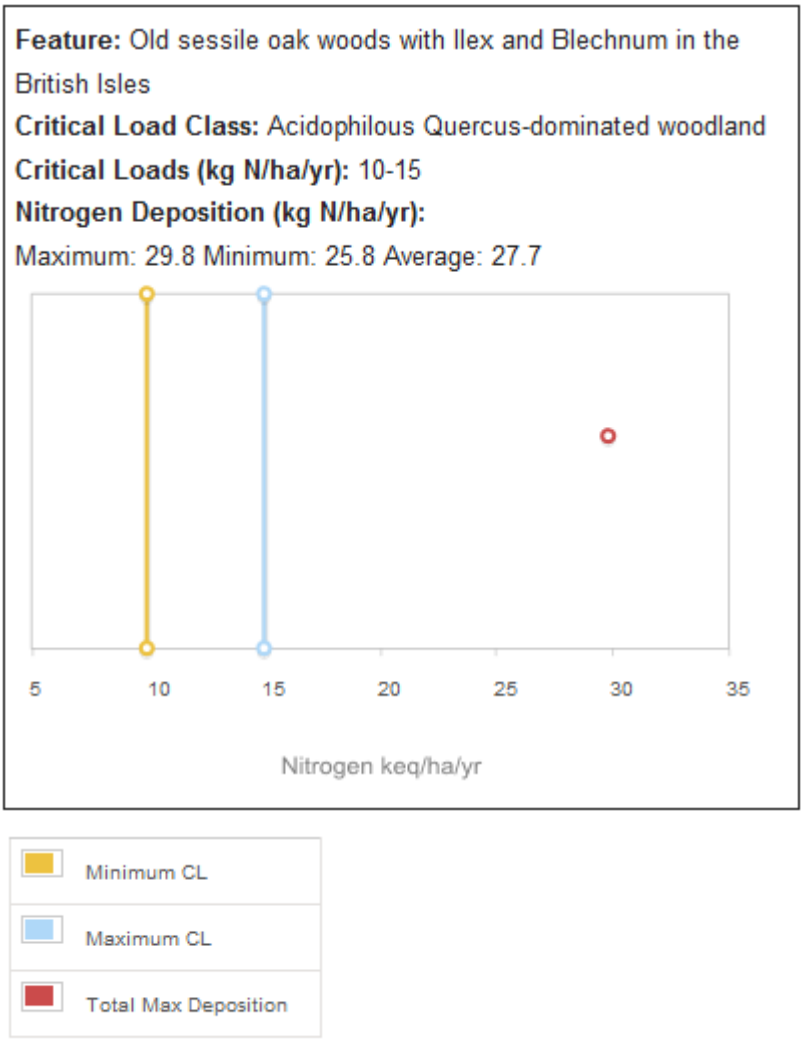
Fly-tipping

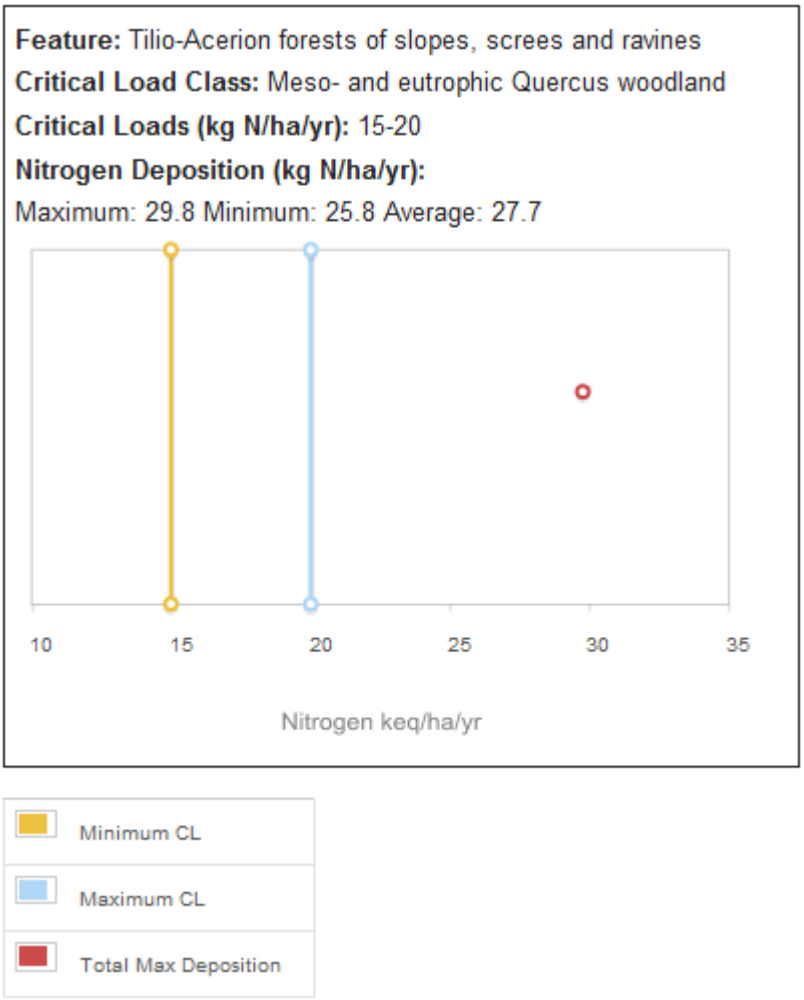
Localised fly-tipping occurs throughout the site but is extensive in a number of locations.

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

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 Banagher Glen 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
Activities occurring outside the site (e.g. agricultural intensification, drainage works, and development) may be detrimental to the site through remote affects.
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. woodland clearance, overwintering of stock, dumping etc), or will be comparatively slow. 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 that walls and fences are still intact. Ensure that there has been no tree felling, dumping or burning carried out within the ASSI. SIM should be carried out once a year.

2. Monitor the condition of the site (Condition Assessment)
Monitor the key attributes for each selection feature. This will detect if the features are in favourable condition or not.

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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Department of the Environment for Northern Ireland (2003). Northern Ireland Habitat Action Plan – Mixed Ashwoods.

Department of the Environment for Northern Ireland (2003). Northern Ireland Habitat Action Plan – Oakwood.

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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.

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

ANNEX 1

Feature 1 (SAC) - Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles (Status B)

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

Attribute	Targets	Method of Assessment	Comments
* Area of Oakwood	Maintain the extent of Oakwood at 60.4ha.	Visual estimate in 10x10m plots and 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 and 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 *Luzula sylvatica*.	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: *L. sylvatica* 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 -
	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.	

			recovering.
* 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	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
	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.	

of the Oak woodland.			be sufficient and/or extensive enough gaps in the canopy for oak to regenerate. This does not necessarily indicate unfavourable condition.
* 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. *Galium aparine, Urtica dioica, Heracleum spp, Epilobium spp. Rumex obtusifolius* No more than occasional is equivalent to less than 40% occurrence in recorded plots.	Visual estimate in 10x10m plots.	

* Cover of *Pteridium* (% cover)	The mean cover of *Pteridium* 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) (DAFOR)	There should be no felling or coppicing of native trees or shrubs.	Visual estimate in 10x10m plots and 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.
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:- *Vaccinium myrtillus,* *Blechnum spicant,* *Dicranum spp.,* *Luzula pilosa,* *Rhytidiadelphus loreus*	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:- *Sanicla europea,* *Geum urbanum,* *Polystichum setiferum,* *Aneomne nemorosa,* *Primula vulgaris.*	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:-	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.

	Carex remota, *Ranunculus repens,* *Chrysosplenium oppositifolium,* *Filipendula ulmaria,* *Lysimachia nemorum.*		
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 2 (SAC) - Tilio-Acerion forests of slopes, screes and ravines (Status C)

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

Attribute	Targets	Method of Assessment	Comments
* Area of Mixed ashwood	Maintain the extent of Mixed ashwood at 17.5ha.	Visual estimate in 10x10m plots and 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
Mixed ashwood community diversity	Maintain presence of woodland communities, W9, W7, W11 & W17 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 and 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 Mixed ashwood may be desirable in some instances.
*Structural variation (% cover)	Mean canopy cover greater than 60% Where Hazel predominates, take this as the canopy layer.	Estimate within the visual vicinity of the monitoring plots.	A well structured wood should have a well developed canopy and shrub layer. However, many Mixed ashwoods in County Antrim and on very shallow soils on limestone across Northern Ireland are dominated by Hazel with very few Ash standards. It is the current belief, that even if

			optimal management practices were to be adopted, these Hazel woods will never sustain an Ash canopy. Therefore in these Hazel woods, natural processes result in the canopy and the shrub layer merging together to give one structural layer. Therefore it is acceptable to have a mean shrub cover falling outside the specified limits for all other Mixed ashwoods.
	Mean shrub cover should be maintained between 20 - 50% Note: There are no set limits for mean shrub cover in Hazel woods.	Estimate within the visual vicinity of the monitoring plots.	
	Maintain current levels of standard variation within reasonable limits for field, herb and moss cover.	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.
		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 In the case of Hazel this refers to young vigorous “stools” with not to many stems.	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. 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 In the case of Hazel this refers to the normal Hazel bush, i.e.	Visual estimate in 10x10m plots.	

	not falling over and no large trunks.		
	Over-mature Trees (>75cm diameter) at least present in 10% of Plots In the case of Hazel this refers to large trunks and much dead standing timber; over-mature hazel may also be partially fallen over and regenerating.	Visual estimate in 10x10m 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	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

	30% of plots.		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 mixed Ash woodland.	Regeneration of Ash 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.
	Regeneration of Ash 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 mixed Ash woodland should be largely comprised of Ash trees with associated native species. 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. *Galium aparine, Urtica dioica, Heracleum spp, Epilobium spp. Rumex obtusifolius* No more than occasional is equivalent to less than 40% occurrence in recorded plots.	Visual estimate in 10x10m plots.	
* Cover of *Pteridium* (% cover)	The mean cover of *Pteridium* 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.
*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	Visual estimate in 10x10m plots.	

	plots and frequent or more in less than 10 % of 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 and 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.
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:- *Sanicla europea,* *Geum urbanum,* *Polystichum setiferum,* *Aneomne nemorosa,* *Primula vulgaris.*	Visual estimate in 10x10m plots.	Within any Mixed ashwood, there may be pockets of acid woodland and or flushed woodland within the boundaries of the ASSI/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 acid woodland indicators (W11 & W17 communities) listed below:-	Visual estimate in 10x10m plots.	Within any Mixed ashwood, there may be pockets of acid woodland and or flushed woodland within the boundaries of the ASSI/SAC. The diversity of these woodland communities should be

	Vaccinium myrtillus, *Blechnum spicant,* *Dicranum spp.,* *Luzula pilosa,* *Rhytidiadelphus loreus.*		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 flushed woodland indicators (W7 community) listed below:- *Carex remota,* *Ranunculus repens,* *Chrysosplenium oppositifolium,* *Filipendula ulmaria,* *Lysimachia nemorum.*	Visual estimate in 10x10m plots.	Within any Mixed ashwood, there may be pockets of acid woodland and or flushed woodland within the boundaries of the ASSI/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.	

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

BLACK BOG SAC
UK0016609

CONSERVATION OBJECTIVES

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BLACK BOG SAC
CONSERVATION OBJECTIVES

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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 *Rhynchosporion*	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.

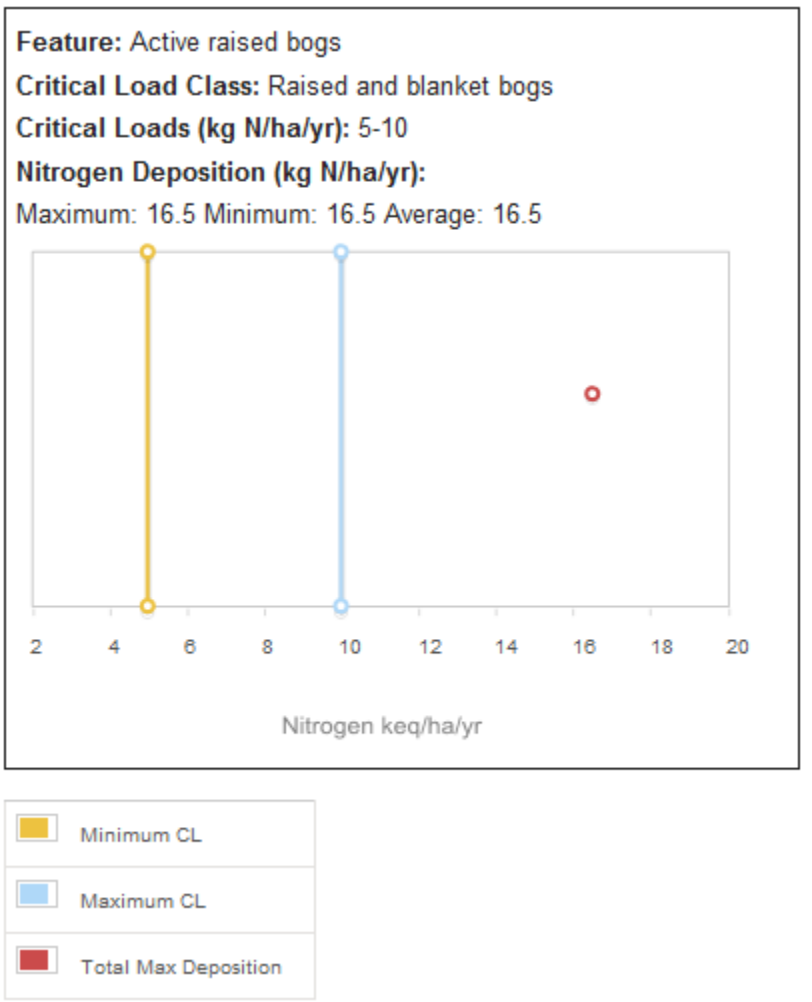
Drainage

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

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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 *Erica tetralix-Sphagnum papillosum* raised and blanket mire community and M2, the *Sphagnum cuspidatum/recurvum* bog pool community dominated by *S. cuspidatum*.
* 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. *S. cuspidatum* , S. *denticulatum* S. *magellanicum, Drosera, anglica, D. intermedia, Menyanthes trifoliata*.	Visual estimate within a 10m radius of plots and 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.

* *Sphagnum* cover/abundance (% cover and frequency) Active Peat Formation (DAFOR)	Ombrotrophic *Sphagnum* 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: - *S. capillifolium* and *S. tenellum* and the thick hummock forming species*:* - *S. papillosum* and *S. magellanicum* at least occasional over the surface.	Visual estimate in 2x2m plots. Visual estimate in 2x2m plots.	A constant *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to measure the hydrological integrity of the intact bog surface.
* Ericaceous cover (%) and frequency of *Erica tetralix* (DAFOR).	Ericoid cover should be maintained between 40% and 60% of the intact bog surface. *Erica tetralix* 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 *Calluna vulgaris* 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.
* *Rhynchospora alba* abundance (% cover)	*Rhynchospora alba* cover should be less than 10%.	Visual estimate in 2x2m plots	*Rhynchospora alba* 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.
* *Myrica gale* abundance (% cover)	*Myrica gale* 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 and 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 *Juncus squarrosus* etc. and the presence of grazing induced *Calluna vulgaris* 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. *Sphagnum austinii* *Sphagnum fuscum* *Sphagnum pulchrum* *Utricularia spp.* *Andromeda polifolia*	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

CARN-GLENSHANE PASS SAC

UK0030110

CONSERVATION OBJECTIVES

Document Details

Title	*Carn-Glenshane Pass SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
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Contact	cdp@daera-ni.gov.uk

Version	Date	Summary of Changes	Initials
V1.0	June 2013	Internal working document	PC
V2.0	2015	Complete review	RMK
V2.0	01.04.2015	Effective date of Version 2	PC
V2.1	11.10.2017	Removed wording '*excluding recently burnt areas*' from bare peat target in all relevant Annex tables	PMC

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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 Directive79/409/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: LONDONDERRY

GRID REFERENCE: IH788075

AREA: 1938.78 ha

5. SUMMARY SITE DESCRIPTION

Carn/Glenshane Pass extends over the uplands to the north-east of the Sperrin Mountains, between Maghera and Dungiven. It falls into Coleraine and Limavady Borough Councils and Magherafelt District Council. With an area of largely intact blanket bog, estimated to be just over 1650 ha, it is one of the few remaining examples of good quality blanket bog within this region of Northern Ireland.

The peatland complex is comprised of a series of raised and flushed peat bog units within an all encompassing mantle of blanket peat. The blanket bog is somewhat degraded in places with large blocks eroded, other sections drained and still other areas overgrazed. Nevertheless, the peatland supports good *Sphagnum*-rich blanket bog vegetation with high dwarf-shrub cover. The site also includes a well-patterned hummock, hollow and pool complex. Localised pockets of wet heath occur on the steeper slopes.

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 boundary of Carn/Glenshane Pass has been drawn to include all areas of high quality blanket bog and associated semi-natural habitats, including cutover bog, wet and dry heath, acid flushes, flushed and wet grassland and dry grassland, particularly along the streams that run through the area. It should be noted that although much of the peatland within the SAC has been modified to varying degrees, the semi-natural blanket bog vegetation remains in comparatively good condition.

The boundary around the entire SAC is defined as the edge of the high quality semi-natural blanket bog vegetation and associated habitats. However, there are no clearly defined boundaries distinguishing high quality blanket bog vegetation from degraded and semi-improved habitats. Instead there is a gradual transition from good quality blanket bog vegetation to degraded and highly impacted peatland communities on the lower slopes. Therefore it is sometimes quite difficult to find an appropriate physical boundary to mark the periphery of the interest features. Separation between areas included within the SAC boundary and those more degraded areas which are excluded depends upon the judgement of the surveyor. This separation was based on a variety of factors, such as *Sphagnum* moss cover, bare peat, grass:dwarf-shrub ratio, frequency of dung and poaching, burning and drainage.

The boundary of Carn/Glenshane Pass follows a series of ditches, banks, tracks, streams and fences which delineates the quality blanket bog and excludes severely degraded peatland vegetation and semi-improved lands. Although many of the boundaries are stock-proof fences, there are also numerous boundaries, that although clearly apparent on the ground are not completely stock proof. Note, in several instances, quite large expanses of fairly degraded wet and flushed grassland and degraded peatland has been included within the SAC boundary because there was absolutely no physical boundary with which to exclude them.

In the centre of the peatland complex an area of blanket peat has been planted with Sitka Spruce and is excluded from the SAC. This forestry plantation, estimated to cover an area of 88 ha, is excluded from the SAC using a series of fences and the Inver Burn. Note, it has been policy in Northern Ireland to exclude afforested blanket bog from all upland blanket bog ASSI/SACs.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ population
Habitat	**Blanket Bog**	**B**	**1651.4 ha**
Habitat	Northern Atlantic wet heaths with *Erica tetralix*	D	38.6 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 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 Carn-Glenshane Pass SAC.

6.1 ASSI SELECTION FEATURES

Carn-Glenshane Pass ASSI

Feature Type	Feature	Size/ extent/ population
Habitat	Blanket Bog	1651.4 ha

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The *Conservation Objective* for this site is:

To maintain (or restore where appropriate) the 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

SAC Feature	Global Status	Component Objective
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

ASSI Feature	Component Objective
Blanket Bog	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.

10. MANAGEMENT CONSIDERATIONS

Ownership

Carn-Glenshane Pass is a large site which is privately owned with over 30 individuals owning various sections of the bog. An additional 59 individuals have turbary rights to cut peat for fuel within some of the management units.

The complex ownership pattern within the bog makes a unified approach to site management more difficult.

Although the SAC is in multi-ownership, very little fencing had been carried out within the SAC boundary at the time of ASSI declaration. Therefore much of the land has been grazed in common. However, at the time of ASSI declaration in March 2000, there was evidence that new fencing was being erected across vast

expanses of the open blanket bog. The entire area of the Carn-Glenshane Pass SAC lies within the Sperrins Environmentally Sensitive Area (ESA) and it is assumed that additional fencing is taking place over the site as a consequence of ESA grants to individual landowners. This may have have implications for future grazing regimes and this is clearly the main management consideration for the blanket bog vegetation

Adjoining Land Use

The main adjoining land-use outside the ASSI is semi-improved sheep pasture, degraded blanket bog and wet grasslands. These areas are more intensively grazed by sheep and have 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 Carn-Glenshane Pass, or could affect it in the future. Although 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.

Peat Cutting.

There has been extensive hand peat cutting for many years around the periphery of the Carn-Glenshane SAC which has encroached significantly into the intact surface of the blanket bog. However, many of the old hand cuttings now support actively regenerating bog vegetation. In recent times mechanised peat cutting has taken place in some areas and has encroached onto the intact surface of the blanket bog. There is still some localised mechanical peat extraction taking place within the SAC boundary.

ACTION: No peat cutting within the SAC.

Burning

Burning of the vegetation is evident in places right across the site, although whether this is an agricultural management practice, or an incidental effect of turf cutting is often unknown. However, at Crockor, to the south of the site, there appears to be some form of burning trials being carried out within the site. 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 of the vegetation can be reduced. Landowners who have entered into an ESA agreement with DARD must not burn the vegetation without prior authorisation from the Department. Burning of peatland should only be carried out under controlled conditions.

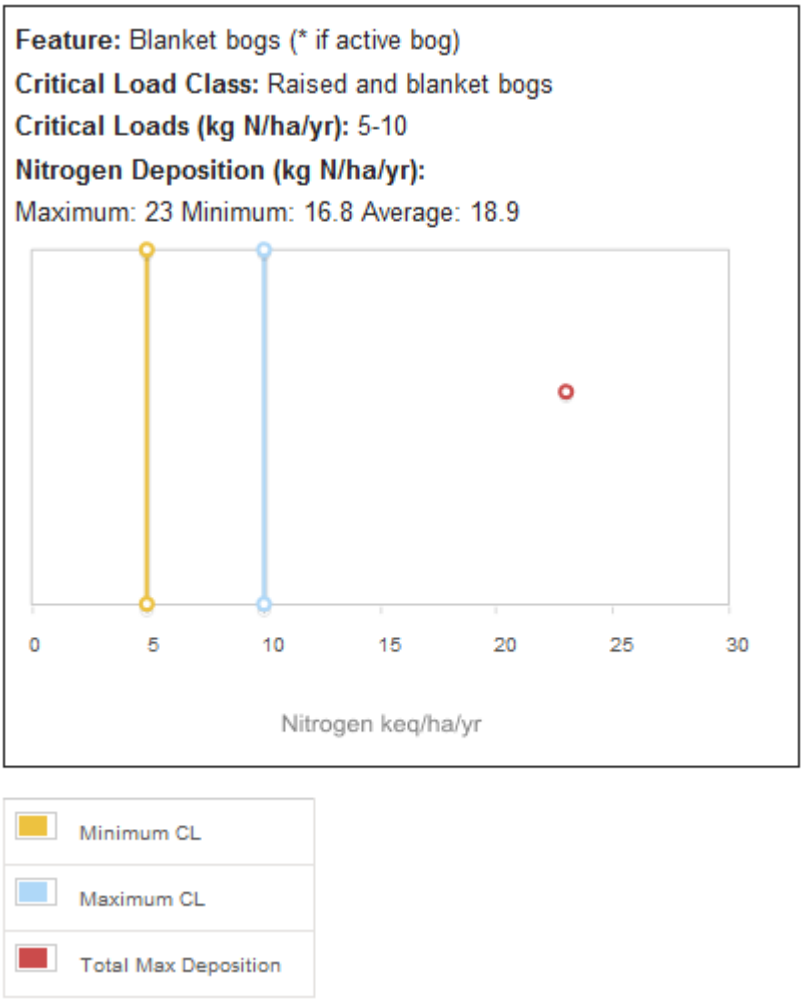
Blanket bog and wet heath should not be burnt and dry heath should not be burnt more than once every 12-20 years, and not at all in areas where the gradient is > 25^{o} as this may result in erosion.
ACTION : No burning within the SAC

Drainage
Many of the deeper blanket bog units throughout the SAC have been extensively drained or 'Moor-gripped'. This was a practice carried out under grant aid in the 1980s to try and improve the grazing potential of the dwarf-shrub vegetation. The shallow, often parallel drains may be widely spaced at 50 – 100 m, or close together at approximately 15 m intervals. Although there is some drying evident along each side of the drains, there is little evidence to suggest that grazing potential has been significantly enhanced. In fact many of the narrow drains have filled with water or collapsed. However, many do continue to carry water off the peat mass at an accelerated rate.

In addition, there are a series of drains associated with many of the peat cuttings around the periphery of the site. All of these drains show up on the aerial photograph and are clearly apparent on the ground. Any major 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.

Grazing
Stocking levels seem to be at a reasonable level whilst grazing pressure appears to be quite variable over much of the blanket bog with large areas retaining a good cover of dwarf-shrub species. However, other areas have suffered severe damage from poaching and overgrazing as the sheep tend to congregate and stay in these areas. This localised overgrazing, which leaves large areas of blanket bog ungrazed, could be prevented by appropriate shepherding.
ACTION: Where they are present, fences around the periphery of the SAC should be maintained to prevent sheep from outside the area straying into the site. Localised overgrazing should be addressed by setting appropriate grazing levels for each grazing unit and through the introduction of shepherding.

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 Carn-Glenshane Pass 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.

Fly-tipping

There are some very localised incidences of fly-tipping around the periphery of the site and associated with past peat cutting.

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

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 that the fencing, where present is still intact. Ensure that there has been no peat cutting, moor-gripping, dumping or inappropriate burning carried out within the SAC boundary. Evaluating stocking densities would also be desirable. This SIM should be carried out once a year.

2. Monitor the condition of the site (Condition Assessment)
Monitor the key attributes for the blanket bog. This will detect if the blanket bog is 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 attributes = 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 1651.4 ha.	Visual estimate in 2x2 m plots and across the blanket bog using a combination of aerial photographs, SIM and Condition Assessment structured walk.	The blanket bog communities include M17 – *Scirpus cespitosus Eriophorum vaginatum* blanket mire, M18 – *Sphagnum papillosum* raised and blanket mire and M19 *Calluna vulgaris - Eriophorum vaginatum* 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 *Sphagnum* species should be recorded with *S. cuspidatum* or *S.*	The extent of pool and hummock systems should be monitored using a combination of aerial photographs and	The extent of pool and hummock systems should be monitored using a combination of aerial photographs and Condition Assessment.

	auriculatum in the pools and *S. papillosum* and *S. capillifolium* forming the lawns and hummocks.	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 *Polytrichum* spp., *Campylopus* 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.
* *Sphagnum* cover/ abundance (% cover and frequency) Active Peat Formation (DAFOR)	*Sphagnum* 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. Species present should include a mixture of both thin species: - *S. capillifolium* and *S. tenellum* and the thick hummock	Visual estimate in 2x2 m plots.	A constant *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to measure the hydrological integrity of the blanket bog surface.

	forming species*: - S. papillosum* and *S. magellanicum* 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 *Narthecium ossifragum* or *Sphagnum* spp. are abundant and forming lawns.	Visual estimate in 2x2 m plots.	Ericoid (dwarf-shrub species) include *Calluna vulgaris*, *Erica tetralix*, *E. cinerea*, *Myrica gale*, *Vaccinium myrtillis and Empetrum nigrum*.
* 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 *Calluna vulgaris* 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 (DAFOR)	Scrub/tree encroachment should be no more than rare on the intact bog surface, or in the actively regenerating cutover areas.	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 *Rhododendron ponticum* 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,	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

	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.		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 *Molinia caerulea* forming even swards over waterlogged areas with *Sphagnum* moss cover greater than 25%.	Visual estimate in 2x2 m plots.	Include true grasses, sedges, and rushes in this assessment. *Eriophorum vaginatum*, *Trichophorum cespitosum*, *Deschampsia flexuosa*, *Juncus squarrosus* or other graminoids (except *Molinia* 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 *Calluna vulgaris* growth forms indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.
Molinia caerulea Cover (%)	Where *Molinia caerulea* cover is greater than 50%, it should form an even (not tussocky) sward in waterlogged conditions with *Sphagnum* moss cover greater than 25%.	Visual estimate in 2x2 m plots.	*Molinia caerulea* 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.	*Sphagnum imbricatum* and *Sphagnum fuscum*, where they have been recorded, should	Visual estimate in 2x2 m plots.	

	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.		

Frequency -
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CLADAGH (SWANLINBAR) RIVER SAC
UK0030116

CONSERVATION OBJECTIVES

Document Details

Title	*Cladagh (Swanlinbar) River SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
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Version Number	*V2*
Next Review Date	Nov 2020
Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	January 2015	Complete review	RMK

Site relationships

To fully understand the conservation requirements of this site, it is necessary to also refer to the Conservation Objectives for Upper Lough Erne SAC and Upper Lough Erne SPA.

Cladagh (Swanlinbar) River SAC boundary adjoins the boundary of Upper Lough Erne SAC/SPA.

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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.

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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: FERMANAGH

GRID REFERENCE: IH 242300

LOWER GR: IH 264325 **UPPER GR:** IH 203281

AREA: 28.30 ha

5. SUMMARY SITE DESCRIPTION

The Cladagh River rises in Cuilcagh Mountain and flows through County Cavan before crossing the border into Co. Fermanagh, where it widens and then enters Upper Lough Erne. Within County Fermanagh, the 14.88km length of river has two distinct forms. The upper half is typical of fast-flowing dynamic rivers with beds of Stream Water Crowfoot *Ranunculus penicillatus* var*. penicillatus*, whilst the lower half of the river is slow-flowing and very deeply dredged as it nears Upper Lough Erne. The river is of particular importance for its associated fauna, as it is one of the few rivers in Northern Ireland that still retains a significant and viable population of the Fresh Water Pearl Mussel *Margaritifera margaritifera*.

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

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 and 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 Cladagh River, the SAC qualifying feature is the population of *Margaritifera margaritifera* which is confined to the main channel.

Specific

The upper and lower river limits of this site are determined by the international border and Upper Lough Erne respectively. The width of the lateral boundary beyond the river channel follows the same guidelines as that for all river ASSIs, which is dependent on the type of adjacent habitat. In the case of this site there is very limited adjacent habitat which can be justifiability included, so the lateral boundary is typically restricted to the top of the riverbank.

The site boundary utilised permanent man-made boundary features whenever possible, however along some stretches of the river 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

Feature Type	Feature	Global Status	Size/ extent/ pop~
Species	**Freshwater Pearl Mussel *Margaritifera margaritifera***	**B**	**8,000**
Habitat	**Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation**	**C**	**60% of channel length.**
Species	Otter *Lutra lutra*	D	P
Species	Brook Lamprey *Lampetra planeri*	D	P
Species	Atlantic Salmon *Salmo salar*	D	R

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 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 Cladagh (Swanlinbar) River SAC.

6.1 ASSI SELECTION FEATURES

Cladagh (Swanlinbar) River ASSI

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 *Margaritifera margaritifera*	

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The *Conservation Objective* for this site is:

To maintain (or restore where appropriate) the

- Freshwater Pearl Mussel *Margaritifera margaritifera*
- Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation

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 *Margaritifera margartifera*	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 *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation.	C	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

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 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. wet grasslands.
Freshwater Pearl Mussel *Margaritifera margartifera*	See SAC Selection Feature Objective Requirements table.

10. MANAGEMENT CONSIDERATIONS

Ownership

In total there are 67 individuals or organisations with ownership or other rights associated with the river SAC.

Adjoining Land Use

Internal man-induced factors: Along its lower reach the river runs through improved or semi-improved pasture used for silage and grazing. Here the bank and channel of the river are generally accessible to stock whose activities can be directly and indirectly damaging to both the *M. margaritifera* and the macrophyte community.

External factors: Water quality is dependent on the human activity throughout the 1197ha catchment, however in the upper reach the river rises and flows through Co Cavan and thus the river and 698ha of the catchment is outside Northern Irelands jurisdiction and control. The designation confined to Northern Ireland has only included the main channel of the Cladagh and has excluded the 6 minor tributaries. These tributaries at time of survey all appeared to have moderate to good water quality, however they all have the potential to have a significant detrimental impact on the main river channel. The recent colonisation of the Erne System by Zebra Mussels could endanger the *M. margaritifera* population if they are accidentally introduced into the river.

Factors arising from legislation or tradition: Pearl fishing still occurs annually on this river and as *M. margaritifera* are not at time of this drafting fully protected under the current Wildlife and Countryside (NI) Order, the continuation of this

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

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 Cladagh (Swanlinbar) River, or could affect it in the future.

Although **Fresh Water Pearl Mussel *Margaritifera margaritifera and* Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation** 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

These installations usually abstract water from the watercourse then release effluent to the same course. The abstraction point is normally upstream of the release point, and 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 also acts 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. They also 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.

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

Water Quality/Eutrophication

Analysis of the results relating to biological water quality monitoring from 1996 onwards, indicates that there has been deterioration in water quality over this period. Water quality is the most important factor in the enhancement of the Cladagh (Swanlinbar) River Catchment and is influenced from both point and diffuse source pollution.

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

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

Channel & Bank Modification

The Cladagh (Swanlinbar) River has been extensively altered by man in the recent past, however the river continues to recover from the effects of resectioning etc.

ACTION: Future in-river works, such as dredging, should be minimised as they reduce 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. Initiate discussions with Rivers Agency to co-ordinate action.

Habitat enhancement schemes such as '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.

Substrate siltation

Stock have open access to the channel in many sections and have caused poaching of the river bank and channel, so causing erosion. This erosion results in siltation of riverbed down stream of access point.

ACTION: Restrict live-stock access to drinking areas only.

Grazing

Stock trampling in the channel threatens pearl mussel populations.

ACTION: Restrict live-stock access to drinking areas only.

Fly-tipping

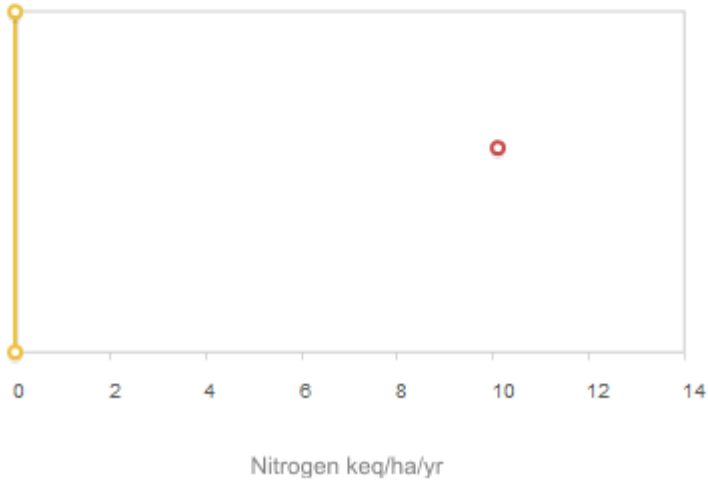
Small-scale fly tipping has occurred along the banks and in the river channel.

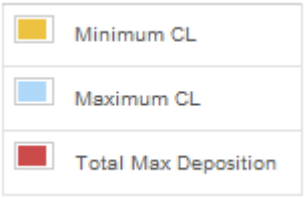
ACTION: Remove any dumped material as soon as possible from the river banks and channel and where practical remove any rubbish from the woodland, to prevent the build up of debris and to discourage further fly-tipping.

Nitrogen Deposition

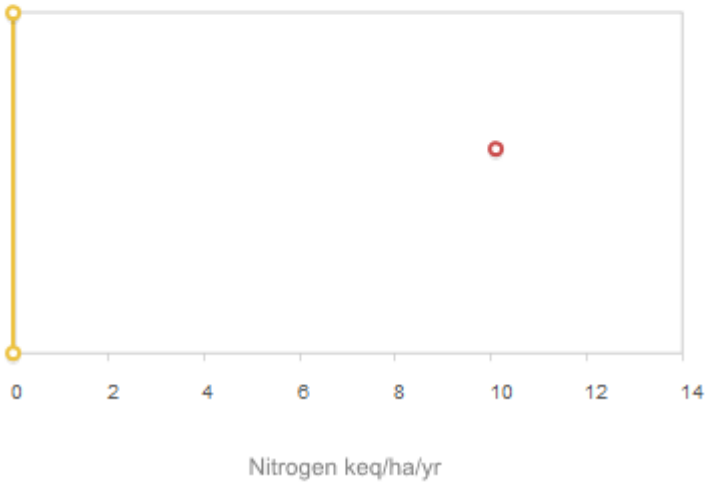
Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the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

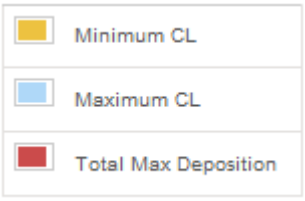
Feature: Margaritifera margaritifera - Freshwater pearl mussel
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 10.1 Minimum: 6.6 Average: 7.9





Feature: Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 10.1 Minimum: 6.6 Average: 7.9





(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. 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. 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.

12.1 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. The SIM should be carried out once every 3 years. Inspection of river reaches with Pearl Mussel colonies should be undertaken once a year to ensure 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 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

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

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

ANNEX I

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

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

Attribute	Measure	Targets	Comments
*Population dynamics	Number	Stable or increasing	
	Age structure	20% of population <20 years old with aged individuals (>60 years) also present	A least-cost methodology for monitoring this attribute is being investigated, involving the sampling of representative reaches within an SAC. An abundant supply of 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 mussel 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.
	Maximum age	80-110 years	
	Mortality rate	No more than 10% of the population in 10 years	
	Fish host populations: Juvenile salmonid densities (0+ and 1+ year classes)	Should be abundant (to be refined following the results of LIFE project on pearl mussel/fish host relationships)	

	Biological disturbance: Introductions	No stocking/translocation of pearl mussel unless agreed to be in the best interests of the population	Little work has been undertaken on pearl mussel genetics. However, given the sedentary nature of the pearl mussel, genetically discrete populations are likely.
		Absence of rainbow trout and brook trout and any other non-native species that may impair juvenile densities of salmon and brown/sea trout.	Rainbow trout and brook trout are resistant to glochidial infection and are, therefore, not suitable host species. Stocking of these species will create competition with native salmonids and is likely to reduce host opportunities for glochidia.
	Exploitation	No fishing for pearl mussels	
*Physical integrity	Disturbance of habitat	No disturbance of existing mussel beds by in-river activities	Relevant activities include fishing and watering stock (wading in the river) and canoeing (at access points to the river).
	River morphology	Maintain and where necessary restore to an extent characteristic of the river/reach	

	River Substrate	<10% fines in top 30cm of substrates hosting juvenile & adult mussels.	Elevated levels of fines can clog substrates used by juvenile mussels and can impair adult feeding/respiration. The target for salmon has been used for pearl mussels in the absence of species-specific information Sources of fines include; run-off from arable land, land (especially banks) trampled by livestock, sewage and industrial discharges.
*Water quantity	Flow	Flow regime should be characteristic of the river. As a guideline, at least 90% of the natural daily mean flow should remain in the river throughout the year	
*Water quality:	Biological class. Environment Protection's General Quality Assessment scheme. Assess every years.	'a'	
	Ecosystem Class. Environment Protection's General Quality Assessment scheme. Assess every years	"a"	
	Pollution	No Sheep dip	

	Minimal Algae cover	Should be <5% coverage over mussel beds and potentially suitable areas of coarse substrate	Extent of filamentous algal growth: Algal mats can impair respiration, feeding, fertilisation and the release of glochidia.
	Suspended solids	Annual mean <10mg L-1	

ANNEX 1

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

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

Attribute	Measure	Targets	Comments
*Population dynamics	Extent	Coverage should be characteristic of river type.	High cover of *Ranunculus spp* is not necessarily indicative of favourable condition.
	Reproduction *(only applies where control measures are implemented)*	*Ranunculus* should be able to flower and set seed, in suitable habitat.	Flowering outside the normal period and weed cutting or other activities that do not leave patches (at least 25% in every 100 metres of river) to flower and set seed are indicators of unfavourable condition. Use of herbicides should be avoided.
*Macrophyte assemblage	Composition	Characteristic plant species should dominate the assemblage. Indicators of unfavourable condition should be rare	The absence of *Ranunculus* and high frequency of occurrence of blanketweed and other algae, or dominance of *Potamogeton pectinatus* are signs of unfavourable condition.

Water quantity	Flow	Flow regime should be characteristic of the river. As a guideline, at least 90% of the naturalised daily mean flow should remain in the river throughout the year	
Physical integrity	River morphology	Maintain and where necessary restore to an extent characteristic of the river/reach	
Physical integrity	River substrate	Channels should be dominated by clean gravels. Maximum fines content should not be too great to prevent the establishment of new plants.	Siltation of riverine sediments, caused by high particulate loads and/or reduced scour within the channel, is a major threat to interest features. Elevated fines levels can interfere with the establishment of *Ranunculus* plants. Sources of fines include; run-off from arable land, land (especially banks) trampled by livestock, sewage and industrial discharges.

*Water quality:	Biological class. Environment Protection's General Quality Assessment scheme. Assess every years.	'A class'	
	Ecosystem Class. Environment Protection's General Quality Assessment scheme. Assess every years	'A class'	
	Suspended solids	Annual mean <10mg L-1	
	Soluble Reactive Phosphorus	*Targets should be set in relation to river/reach types (and should be near background levels)* <0.02mg/l - upland watercourses <0.06mg/l mid-altitude watercourses on hard substrates	

CRANNY BOGS SAC
UK0030321

CONSERVATION OBJECTIVES

Document Details

Title	*Cranny Bogs SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
Date Effective From	*01/04/2015*
Version Number	*V2*
Next Review Date	Nov 2020
Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	Nov 2014	Complete Review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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).

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- Conservation Planning and Management – guide management of sites, to maintain or restore the habitats and species in favourable condition

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- Monitoring and Reporting – Provide the basis for assessing the condition of a feature, the factors that affect it and the actions required.

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

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- Its natural range and areas it covers within that range are stable or increasing, and
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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

GRID REFERENCE: H 425641

AREA: 78.9 ha

FALLAGHEARN BOG	H 422645
KILLYMOONAN BOG	H 428643
CAVAN BOG	H 413636

5. SUMMARY SITE DESCRIPTION

Cranny Bogs is made up of three inter-drumlin, lowland raised bogs - Fallaghearn Bog, Killymoonan Bog and Cavan Bog. They are typical of western bogs within the drumlin belt of Northern Ireland, being elongated and/or very irregular in shape. Generally, dome structure is poorly defined. The two eastern bogs are linked together around a small drumlin, the third lies to the south-west but in close proximity. The bogs vary considerably in their microtopography, with Fallaghearn in particular displaying relatively well-developed hummock (including *Sphagnum imbricatum* and *S. fuscum*) and lawn complexes. Hummocks on Killymoonan and Cavan Bogs are generally more subdued. Shallow, temporary pools are scattered over the three bogs.

Notable species include *Sphagnum imbricatum, S. fuscum* and *S. pulchrum*, with *Vaccinium oxycoccus* and *Pleurozia purpurea*.

Disturbance to the bogs has been confined to cutting and occasional burning on both the intact core and cutover margins.

5.1 BOUNDARY RATIONALE

The boundary uses permanent man-made features where present around the periphery. The boundary has been drawn to include all areas of intact lowland raised bog and associated semi-natural habitats, including cutover bog and Birch scrub and mature woodland.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ population
Habitat	**Active raised bog**	**B**	**69.12 ha**
Habitat	Degraded raised bog still capable of regeneration	D	9.724 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 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 Cranny Bogs SAC.

6.1 ASSI SELECTION FEATURES

Cranny Bogs ASSI

Feature Type	Feature	Size/ extent/ population
Habitat	Lowland Raised Bog	69.37 ha

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

SAC 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

ASSI 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.

10. MANAGEMENT CONSIDERATIONS

Ownership
The site is owned by 23 owner/occupiers.

Adjoining Land Use
The main adjoining land-use outside the ASSI is intensively managed agricultural land in silage and grazing.

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 Cranny Bogs, 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 extensive hand cutting for many years around the periphery. This has encroached significantly into the intact surface of the raised bog. Along the edge of the intact area, the cut peat face can be as much as 2.5m high in places, resulting in local desiccation to the adjacent intact surface, most notable to the eastern half of Cavan, southern margin of Killymoon and northwest margin of Fallaghearn. Although the old hand cuttings now support either actively regenerating bog vegetation or birch wood, there has been some mechanised peat cutting carried out within the former in recent years.

In a number of instances, mechanised cutting had encroached onto the remaining intact surface of the bog, in some cases quite extensive and recent, as in the middle of both the south-east boundary of Cavan Bog and Fallaghearn's southern edge. Peat cutting at the time of designation was problematical. It is not known whether there are any extant consents for turf cutting.
ACTION: No peat cutting within the SAC.

Burning
All three bogs have been burnt – with extensive burning recorded for Fallaghearn and Killymoonan (HST survey 1995). 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.

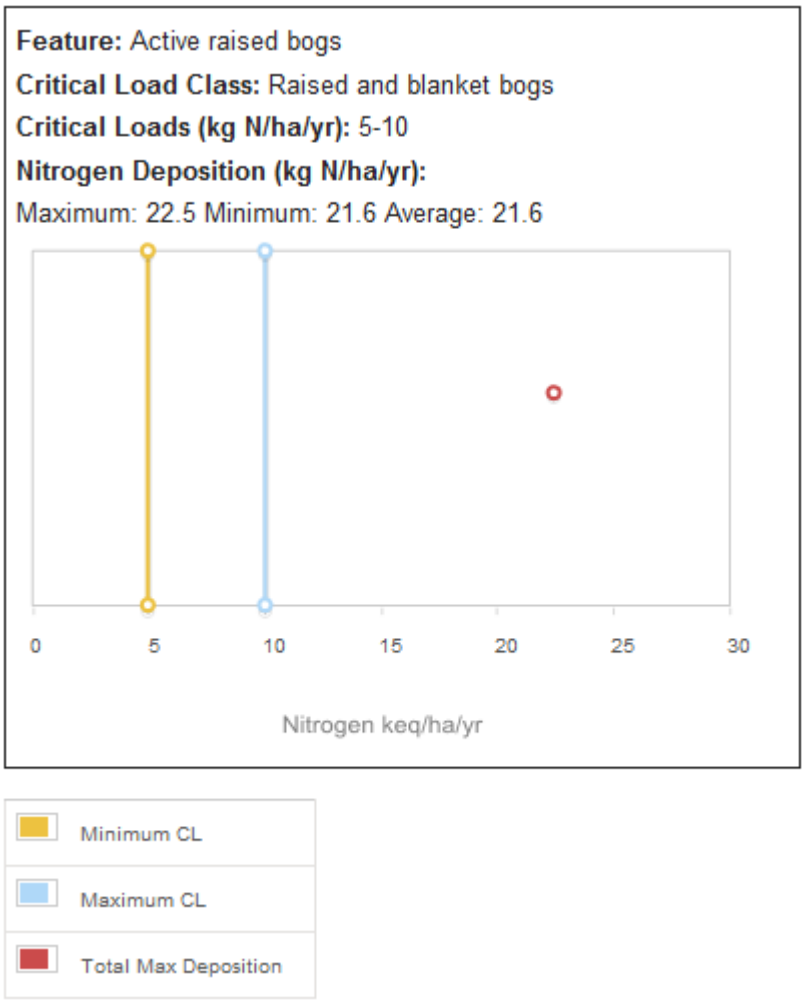
Drainage

The intact dome remains largely intact with only one active drain dissecting it. However, there are a few old drains associated with the cuttings around the periphery. 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 Cranny Bogs 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

Tree and scrub growth is locally extensive within the cutover bog but set back from the periphery of the intact. 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. Grazing appears to be restricted to a small patch that is fenced off and lies to the north of the drumlin around which Fallaghearn and Killymoonan Bogs are connected. There is no evidence of any current grazing within the intact area.

ACTION: Fences around the periphery of the bog should be maintained to prevent grazing occurring on the site.

Fly-tipping

There was previouslyone localised incident of fly-tipping in the cutover area of the bog, but generally there is no dumping problem associated with the site.

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

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

- *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

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ANNEX 1

Feature 1 SAC - Active raised bog

(* = 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 48.45ha.	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 *Erica tetralix-Sphagnum papillosum* raised and blanket mire community and M2, the *Sphagnum cuspidatum/recurvum* bog pool community dominated by *S. cuspidatum*.
* Area of actively regenerating cutover bog (ha)	Maintain the current extent of actively regenerating cutover bog at 20.67ha. 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. *S. cuspidatum* , *S. denticulatum S. magellanicum, Drosera, anglica, D. intermedia, Menyanthes trifoliata*.	Visual estimate within a 10m radius of plots and 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.

* *Sphagnum* cover/abundance (% cover and frequency) Active Peat Formation (DAFOR)	Ombrotrophic *Sphagnum* 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: - *S. capillifolium* and *S. tenellum* and the thick hummock forming species*: - S. papillosum* and *S. magellanicum* at least occasional over the surface.	Visual estimate in 2x2m plots. Visual estimate in 2x2m plots.	A constant *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to measure the hydrological integrity of the intact bog surface.
* Ericaceous cover (%) and frequency of *Erica tetralix* (DAFOR).	Ericoid cover should be maintained between 40% and 60% of the intact bog surface. *Erica tetralix* 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 *Calluna vulgaris* 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.
* *Rhynchospora alba* abundance (% cover)	*Rhynchospora alba* cover should be less than 10%.	Visual estimate in 2x2m plots	*Rhynchospora alba* 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.
* *Myrica gale* abundance (% cover)	*Myrica gale* 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 and 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 *Juncus squarrosus* etc. and the presence of grazing induced *Calluna vulgaris* 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. *Sphagnum austinii* *Sphagnum fuscum* *Sphagnum pulchrum* *Utricularia spp.* *Andromeda polifolia*	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

CUILCAGH MOUNTAIN SAC
UK0016603

CONSERVATION OBJECTIVES

Document Details

Title	*Cuilcagh Mountain SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
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Version Number	*V2.1*
Next Review Date	Nov 2020
Contact	cdp@daera-ni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1.0	June 2013	Internal working document	PC
V2.0	2015	Complete review	RMK
V2.0	01.04.2015	Effective date of Version 2	PC
V2.1	18.10.2017	Removed wording '*excluding recently burnt areas*' from bare peat target in all relevant Annex tables	PMC

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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 9/409/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: FERMANAGH

GRID REFERENCE: H087275

AREA: 2744.45 ha

5. SUMMARY SITE DESCRIPTION

Cuilcagh Mountain SAC occurs in the south-west of Fermanagh and north-west of Cavan and extends to an altitude of 665m. It is an important upland area with a wide variety of interests, including habitats, species and geology. The area is the second largest expanse of intact blanket bog in Northern Ireland, with a wide range of characteristic structural features and vegetation communities. The bog itself has several pool systems which, in conjunction with Lough Atona, represent one of the best examples of dystrophic lakes and ponds in NI. On the summit ridge, there is an expanse of the scarce *Racomitrium* alpine heath. The diverse mosaic of habitats includes scattered wet and dry heath, the steep north-facing siliceous scarp slope with its scree and boulderfield, and occasional *Sesleria caerulea* dominated limestone grassland and pavement on the lower slopes.

The SAC contains important geological and physiographical Earth Science features, including the only Gritstone edge and pavement in Northern Ireland. The complete Carboniferous Leitrim Group is represented, with its inherent stratigraphy including important fossiliferous sequences; this extended stratigraphy is of international significance. There are numerous examples of active weathering, pseudo-karst processes within the peat and of karst geomorphology.

The list of rare and notable species includes bryophytes (e.g. *Bazzania tricrenata*, *Dicranum scottianum*, and *Marsupella sphacelata*) and higher plants (e.g. *Salix herbacea*, *Diphasiastrum alpinum*, *Carex bigelowii* and *Asplenium viride*). Lough

Atona contains notable invertebrates (e.g. *Gyrinus natator* and *Glaenocorisa propinqua*). The site is also important for breeding birds, especially Golden Plover *Pluvialis apricaria* and Merlin *Falco columbarius*.

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/ASSI boundary was drawn to encompass the intact blanket bog (and any land deemed to be essential to the hydrological integrity of this), in addition to transitions to semi-natural habitats. The most intensively cut-over land has generally been excluded. Most of the SAC/ASSI area is bounded by natural or man-made features (streams, gullies, actively cut-over bog and farm fences) with the border to the west and south.

6. SAC SELECTION FEATURES

Feature Type	Feature	Global Status	Size/ extent/ pop
Habitat	Active blanket bog	B	1339.5ha
Habitat	Natural dystrophic lakes and ponds	C	3.5ha
Habitat	Northern Atlantic wet heath with *Erica tetralix*	C	500.1ha
Habitat	European dry heaths	C	236.74ha
Habitat	Alpine and Boreal heaths	C	20.87ha
Habitat	Siliceous scree of the montane to snow levels (*Androsacetalia alpinae and Caleopsietalia ladani*)	C	25.94ha
Habitat	Siliceous rocky slopes with chasmophytic vegetation	C	9ha
Habitat	Limestone pavements	D	5ha
Habitat	Semi-natural dry grasslands and scrubland facies:on calcareous substrates (*Festuco-Brometalia*)	D	3ha

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 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 Cuilcagh Mountain SAC.

6.1 ASSI SELECTION FEATURES

Cuilcagh Mountain ASSI

Feature Type	Feature	Size/ extent/ pop
Habitat	Blanket Bog	1339.5 ha
Habitat	Dystrophic Lakes	3.5 ha
Habitat	Wet Heath	500.1 ha
Habitat	Dry Heath	236.74 ha
Habitat	Montane Heath	20.87 ha
Habitat	Inland Rock	34.8 ha
Earth science	Carboniferous stratigraphy - Cuilcagh Mountain – 9 sub-sites defined	
Earth science	Carboniferous stratigraphy – Carrickmacsparrow	
Earth science	Carboniferous stratigraphy – Aghatirourke	
Earth science	Karst geomorphology - Dooneen Karren	
Earth science	Karst geomorphology - Legacurragh Karren	
Earth science	Karst geomorphology - Polltullyard-Tullynakeeragh	
Species	Higher Plant and Bryophyte assemblages	
Species	Breeding Golden Plover	
Species	Invertebrate 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 Blanket Bog
- Natural dystrophic lakes and ponds
- Northern Atlantic wet heath with *Erica tetralix*
- European dry heaths
- Alpine and Boreal heaths
- Siliceous scree of the montane to snow levels (*Androsacetalia alpinae and Caleopsietalia ladani*)
- Siliceous rocky slopes with chasmophytic vegetation

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 blanket bog	B	Maintain the extent of intact blanket bog and actively regenerating blanket bog vegetation.
		Maintain the hydrology of the intact blanket bog peat mass.
		Maintain and enhance the quality of the blanket bog vegetation, including its structure and the presence of notable species.
		Seek to expand the extent of actively regenerating blanket bog vegetation into degraded (non-active) areas of cut-over bog.
		Maintain the diversity and quality of other habitats of conservation interest, especially where these exhibit natural transition to the blanket bog.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be the potential for blanket bog rehabilitation.
Natural dystrophic lakes and ponds	B	Maintain the extent of naturally dystrophic lakes and ponds – i.e. pool complexes within the blanket bog and Loughs Atona and Aleim.
		Maintain the open water area of ponds and lakes.
		Maintain the water chemistry and water levels – i.e. water poor in plant nutrients and levels not to fluctuate outside normal limits.
		Maintain characteristic aquatic vegetation (mainly *Sphagnum* species)
Northern Atlantic wet heath with *Erica tetralix*	C	Maintain the extent of Northern Atlantic wet heath vegetation.
		Maintain and enhance the quality of the existing wet heathland.
		Seek to expand the extent of the wet heath communities into degraded areas of species poor, wet acid grassland.
		Maintain the diversity and quality of other habitats of conservation interest, especially where these exhibit natural transition to the Northern Atlantic wet heath.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be the potential for wet heath rehabilitation.

European dry heaths	C	Maintain the extent of European dry heath vegetation.
		Maintain and enhance the quality of the European dry heath community types.
		Seek to expand the extent of the dry heath communities into degraded areas of species poor, dry acid grassland.
		Maintain the diversity and quality of other habitats of conservation interest, especially where these exhibit natural transition to the dry heath.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be the potential for dry heath rehabilitation.
Alpine and Boreal heaths	C	Maintain the extent of alpine and boreal heath vegetation.
		Maintain and enhance the quality of the existing alpine and boreal heaths.
		Seek to expand the extent of the alpine and boreal heath communities into degraded areas of species poor acid grassland.
		Maintain the diversity and quality of other habitats of conservation interest, especially where these exhibit natural transition to the alpine and boreal heaths.
Siliceous scree of the montane to snow levels (*Androsacetalia alpinae and Caleopsietalia ladani*)	C	Maintain the extent of siliceous scree (partially vegetated siliceous scree).
		Maintain and enhance the quality of the siliceous scree community types.
		Maintain the diversity and quality of other habitats of conservation interest, especially where these exhibit natural transition to the siliceous scree.
Siliceous rocky slopes with chasmophytic vegetation	C	Maintain the extent of the siliceous rocky slopes with chasmophytic vegetation.
		Maintain the diversity and quality of other habitats of conservation interest, especially where these exhibit natural transition to the siliceous rocky slopes.

9. ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Blanket Bog	See SAC Selection Feature Objective Requirements table.
Dystrophic Lakes	See SAC Selection Feature Objective Requirements table.
Wet Heath	See SAC Selection Feature Objective Requirements table.
Dry Heath	See SAC Selection Feature Objective Requirements table.
Montane Heath	See SAC Selection Feature Objective Requirements table.
Inland Rock	See SAC Selection Feature Objective Requirements table.
Carboniferous stratigraphy	Maintain extent and quality of exposure, together with access to the feature subject to natural processes – Cuilcagh (9 sub-sites), Carrickmacsparrow, Aghatirourke
Karst geomorphology	Maintain extent and quality of features, together with the active processes influencing their development - Dooneen Karren, Legacurragh Karren, Polltullyard-Tullynakeeragh
Higher plant and Bryophyte assemblages	Maintain and where possible enhance the populations of notable plants and bryophytes.
Breeding Golden Plover	Maintain and where possible enhance the populations of breeding Golden Plovers
Invertebrate Assemblage	To be Finalised.

10. MANAGEMENT CONSIDERATIONS

Ownership

The whole SAC is within DARD's West Fermanagh and Erne Lakelands ESA. Forest Service owns several hundred hectares at Aghatirourke Forest Nature Reserve (695ha), which stretches from the Florencecourt National Trust property to the summit of Cuilcagh Mountain, and includes a stretch of the Ulster Way. Fermanagh District Council leases land in the north of the SAC, which forms part of the Cuilcagh Mountain Park. Grazing here is generally let to the owners. Over the area as a whole, there are more than 20 private owners/occupiers in addition to a number of turbary rights holders. Some parts of the site are grazed as common land.

Because of the range of habitat types within the Cuilcagh Mountain SAC there is some potential for a conflict of interest between objectives. It may not be possible to maintain <u>all</u> habitats in favourable condition (e.g. potential conflict between blanket bog and Golden Plover). Priority should be given to SAC features.

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 <u>likely</u> factors that are either affecting Cuilcagh Mountain, or could affect it in the future.

Although Active Blanket Bog, Natural dystrophic lakes and ponds, Northern Atlantic wet heath with *Erica tetralix,* European dry heaths, Alpine and Boreal heaths, Siliceous scree of the montane to snow levels (*Androsacetalia alpinae and Caleopsietalia ladani*) and Siliceous rocky slopes with chasmophytic vegetation are the qualifying SAC features, factors affecting ASSI features are also considered.

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

Peat Cutting

The blanket bog on Cuilcagh has been extensively hand cut for turf. Many of the old hand cuttings now support actively regenerating bog vegetation. More recently, mechanised peat cutting has encroached onto the intact surface in some areas. Peat cutting by any method is a particularly damaging activity, and extrusion cutting can have profound effects upon peat ecology and hydrology. Extensive peat extraction and associated drainage results in increased runoff of water and sediments along the channels and the local water catchments, which in

turn can lead to blockages, changes in flow patterns and damage to underground drainage systems.

The most severely drained and cutover blanket peats around the periphery of Cuilcagh Mountain have been excluded from the SAC. Although mechanised peat extraction has now been stopped, occasional small incidents of illegal encroachment by mechanical peat extraction have taken place. The aim should be for no peat cutting within the SAC.
ACTION: No peat cutting within the SAC.

Burning
There is evidence of regular burning over much of the site. Whether this is an agricultural management practice or an incidental effect of turf cutting is unknown. Excessive burning of bog and heath tends to reduce the cover of *Sphagnum* mosses and ericaceous species, and increase the proportion of graminoids especially *Molinia caerulea* and *Trichophorum cespitosum*. In addition, structural diversity is reduced.

Blanket bog and wet heath should generally not be burnt under any circumstances. In some circumstances it is appropriate to burn dry heath. This should not be carried out more than once every 12-20 years, not at all in areas where the gradient is > 25^{o}, as this may result in erosion, and should only be carried out under controlled conditions. On Cuilcagh any proposal to burn dry heath should be carefully scrutinised to avoid its potential spread onto blanket bog.
ACTION : No burning within the SAC

Drainage
Drains are associated with many of the peat cuttings around the periphery of the SAC and many continue to carry water off the peat mass at an accelerated rate. These drains are clear both on the ground and on aerial photographs.

Hydrological surveys have been carried out on Cuilcagh Mountain to establish water movement over, under and through the peat. The main aim of this work has been to predict water flow through the Marble Arch Show Caves, where the increased risk of flash flooding must be controlled for the health and safety of visitors to the cave system.

In addition to drainage associated with peat cutting, recent " moor gripping" has taken place in one of the land-holdings. All major drains should be identified and blocked where it is feasible and safe to do so.

Note that drainage works outside of the site's boundaries could potentially impact upon the bog's hydrology.
ACTION: Block active drains where appropriate.

Grazing

Over-grazing can result in changes in the range and proportions of plant species, particularly a decline in dwarf shrubs. Severe overgrazing leads to trampling and poaching. The resultant bare areas of peat are then exposed to erosion. The timing of grazing and the type of stock and are also important factors. Winter grazing is most likely to result in erosion effects, whilst autumn grazing can cause great damage to *Calluna vulgaris*.

Sheep are generally more selective grazers than cattle, and can cause more significant changes in vegetation composition and structure. However, because they are lighter, they tend to cause less physical damage, particularly on wet, peaty soils. Some areas of blanket bog to the east of the SAC are grazed by cattle, with localised poaching. The bulk of the area is grazed by sheep, however, and the pattern and intensity of grazing within different management units appears to be quite variable. Although some of the blanket bog and heath communities retain a high cover of dwarf-shrub species and appear to be stocked at a reasonable level, other areas have suffered severe damage from poaching and over-grazing by sheep.

Under-grazing, or the cessation of grazing, can result in vegetation change on heathland, leading to a prevalence of over-mature and degenerate *Calluna vulgaris* and the encroachment of scrub. This is not currently an issue on Cuilcagh.

ACTION: Where they are present, fences around the periphery of the SAC should be maintained to prevent sheep outside the area straying into the SAC. Current grazing levels should be identified for each management unit. Liaise with local landowners and DARD to set appropriate grazing levels for habitat types within the SAC.

Supplementary feeding

This can cause localised overgrazing and poaching damage. It should never take place on blanket bog and ideally should be avoided throughout the SAC. If this not a practical option, stock-feeding should be confined to less sensitive areas, e.g. hard-standings and tracks.

ACTION: Ensure any supplementary feeding is restricted to field units outside the boundary of the site, if at all possible. If supplementary feeding does take place within the site it should be carefully controlled and monitored.

Vehicle use and Recreational activities

Regular use of any part of the area could lead to local vegetation loss and structural damage to the fragile peat soils, which may result in significant erosion, particularly on slopes. The use of four-wheel drive vehicles along regular routes is clearly apparent, both on the ground and on aerial photographs. Some control of this activity is needed.

The Ulster Way crosses the site, and part of the SAC has recently been designated as 'Cuilcagh Mountain Park'. The resultant increase in public access also has the potential to cause damage. Wetter peats and *Sphagnum* hummocks are vulnerable to treading by both livestock and hikers, while the summit heaths dominated by *Racomitrium* are particularly fragile. Other recreational activities such as climbing and caving could affect cliffs, screes, rocky slopes and underground features. Recreational use should be monitored to ensure that features are not affected.

ACTION: Liaise 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. Liaise with local Council to ensure that footpaths are clearly sign-posted and avoid sensitive areas, especially within the designated Park area.

Fly-tipping.

Fly-tipping is unsightly and although it is generally a localised problem that is unlikely to have a major impact on the area as a whole, it should be discouraged. Dumping of waste and dead animals into cave systems is a more serious issue. There have been some very localised incidences of fly-tipping around the periphery of the site and associated with past peat cutting. There is also a potential litter problem from public access.

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

Application of fertiliser/slurry/manure/sewage sludge

The SAC contains a variety of habitats, most of which are nutrient-poor and vulnerable to nutrient enrichment. The application of <u>any</u> fertiliser, manure or slurry to these habitats would be very damaging, but is unlikely, given the remote nature of the area.

Action: Although unlikely, ensure there are no nutrient applications of any kind, especially near water-bodies. Liaise with local landowners to prevent the discharge of any slurries onto the site.

Afforestation

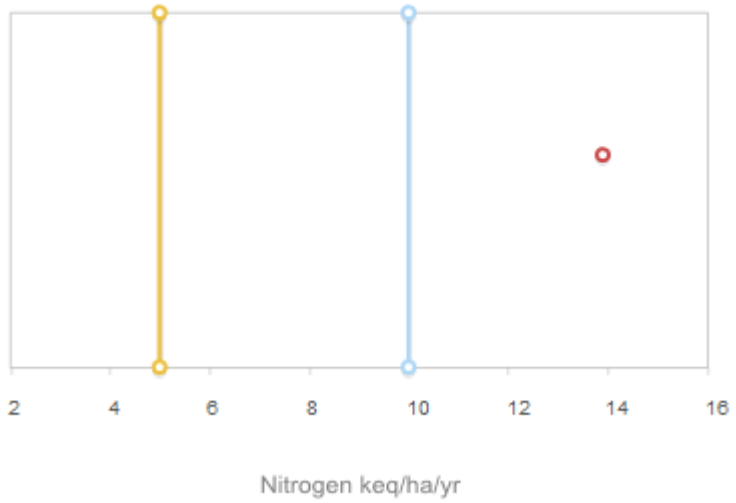
Trees cause hydrological and physiological changes to soils and the resultant shading can severely affect the vegetation. Tree planting should be avoided.

Action: Afforestation is highly unlikely as FS guidelines would preclude direct planting or grant-aid for planting within the SAC.

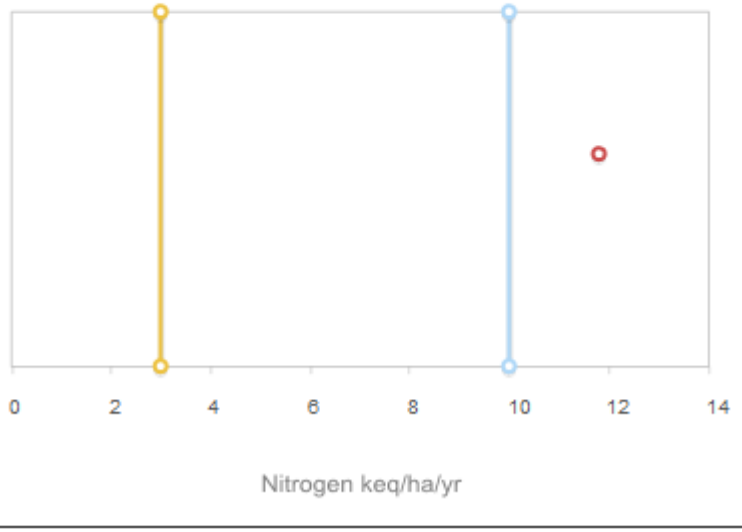
Nitrogen Deposition

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 Cuilcagh Mountain SAC habitats.

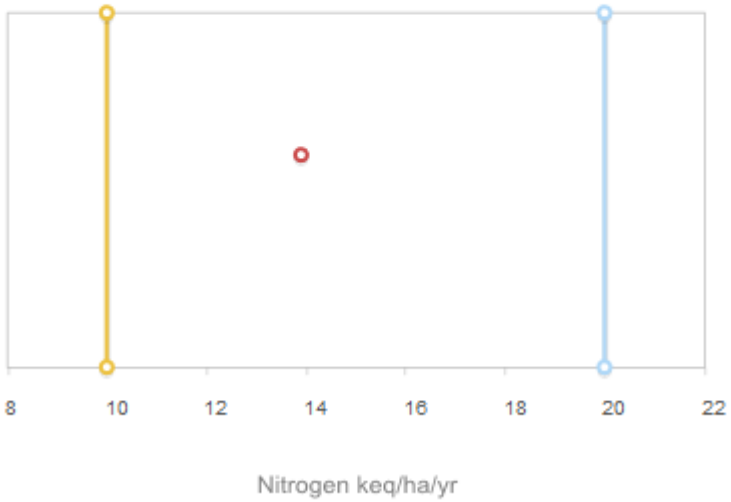
Feature: Blanket bogs (* if active bog)
Critical Load Class: Raised and blanket bogs
Critical Loads (kg N/ha/yr): 5-10
Nitrogen Deposition (kg N/ha/yr):
Maximum: 13.9 Minimum: 8.7 Average: 10.9



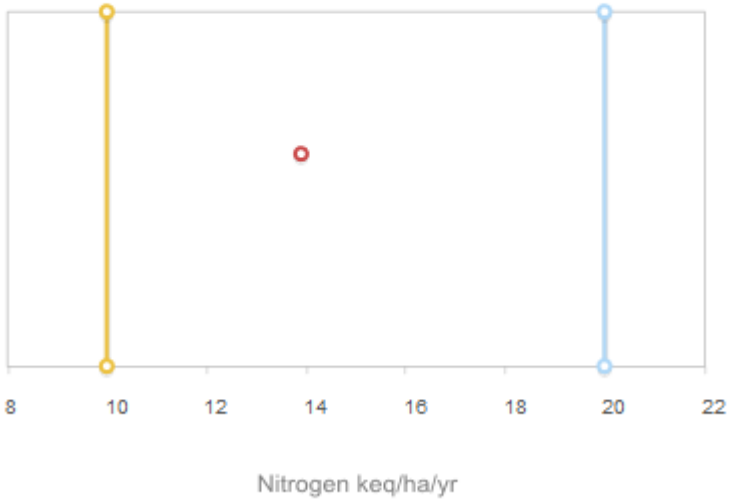
Feature: Natural dystrophic lakes and ponds
Critical Load Class: Permanent dystrophic lakes, ponds and pools
Critical Loads (kg N/ha/yr): 3-10
Nitrogen Deposition (kg N/ha/yr):
Maximum: 11.8 Minimum: 6.7 Average: 10.7



Feature: Northern Atlantic wet heaths with Erica tetralix
Critical Load Class: Northern wet heath: Erica tetralix dominated wet heath
Critical Loads (kg N/ha/yr): 10-20
Nitrogen Deposition (kg N/ha/yr):
Maximum: 13.9 Minimum: 8.7 Average: 10.9



Feature: European dry heaths
Critical Load Class: Dry heaths
Critical Loads (kg N/ha/yr): 10-20
Nitrogen Deposition (kg N/ha/yr):
Maximum: 13.9 Minimum: 8.7 Average: 10.9



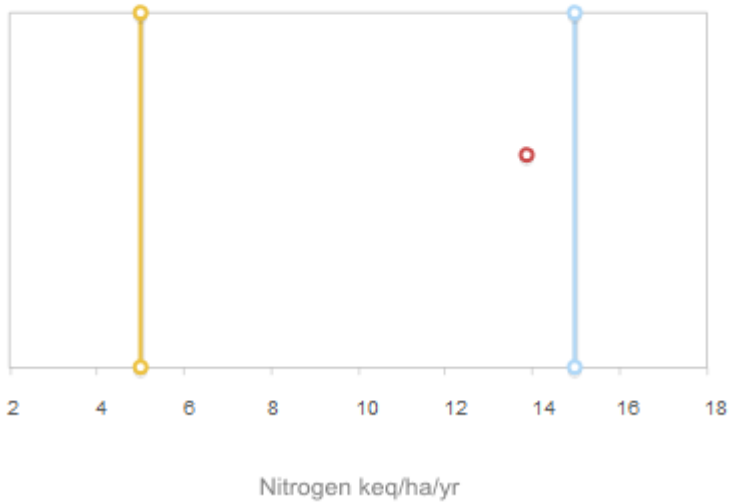
Feature: Alpine and Boreal heaths

Critical Load Class: Arctic, alpine and subalpine scrub habitats

Critical Loads (kg N/ha/yr): 5-15

Nitrogen Deposition (kg N/ha/yr):

Maximum: 13.9 Minimum: 8.7 Average: 10.9



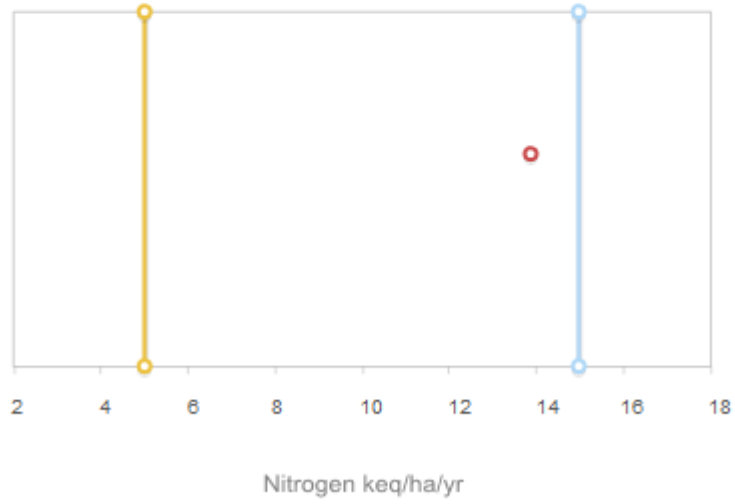
Feature: Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)

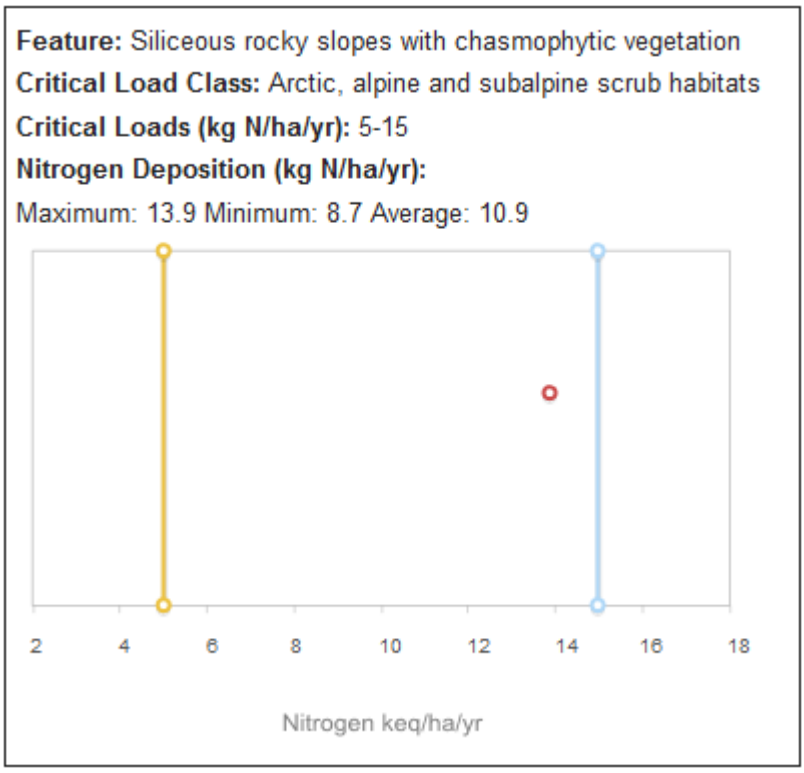
Critical Load Class: Arctic, alpine and subalpine scrub habitats

Critical Loads (kg N/ha/yr): 5-15

Nitrogen Deposition (kg N/ha/yr):

Maximum: 13.9 Minimum: 8.7 Average: 10.9





(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.

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 that the fencing, where present is still intact. Ensure that there has been no peat cutting, moor-gripping, dumping or inappropriate burning carried out within the SAC boundary. Evaluating stocking densities would also be desirable. This SIM should be carried out once a year.

2. Monitor the condition of the site (Condition Assessment)
Monitor the key attributes for all the SAC 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 attributes = 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 1339.5ha.	Visual estimate in 2x2 m plots and across the blanket bog using a combination of aerial photographs, SIM and Condition Assessment structured walk.	The blanket bog communities include M17 – *Scirpus cespitosus Eriophorum vaginatum* blanket mire, M18 – *Sphagnum papillosum* raised and blanket mire and M19 *Calluna vulgaris - Eriophorum vaginatum* 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 *Sphagnum* species should be recorded with *S. cuspidatum* or *S. auriculatum* in the pools and *S.*	The extent of pool and hummock systems should be monitored using a combination of aerial photographs and SIM.	The extent of pool and hummock systems should be monitored using a combination of aerial photographs and Condition Assessment.

	papillosum and S. *capillifolium* forming the lawns and hummocks.		
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 *Polytrichum* spp., *Campylopus* 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.
* *Sphagnum* cover/ abundance (% cover and frequency) Active Peat Formation (DAFOR)	*Sphagnum* 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. Species present should include a mixture of both thin species: - *S. capillifolium* and *S. tenellum* and the thick hummock forming species*:* - *S.*	Visual estimate in 2x2 m plots.	A constant *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to measure the hydrological integrity of the blanket bog surface.

	papillosum and *S. magellanicum* 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 *Narthecium ossifragum* or *Sphagnum* spp. are abundant and forming lawns.	Visual estimate in 2x2 m plots.	Ericoid (dwarf-shrub species) include *Calluna vulgaris*, *Erica tetralix*, *E. cinerea*, *Myrica gale*, *Vaccinium myrtillis and Empetrum nigrum*.
* 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 *Calluna vulgaris* 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 (DAFOR)	Scrub/tree encroachment should be no more than rare on the intact bog surface, or in the actively regenerating cutover areas.	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 *Rhododendron ponticum* 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,	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

	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.		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 *Molinia caerulea* forming even swards over waterlogged areas with *Sphagnum* moss cover greater than 25%.	Visual estimate in 2x2 m plots.	Include true grasses, sedges, and rushes in this assessment. *Eriophorum vaginatum*, *Trichophorum cespitosum*, *Deschampsia flexuosa*, *Juncus squarrosus* or other graminoids (except *Molinia* 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 *Calluna vulgaris* growth forms indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.
Molinia caerulea Cover (%)	Where *Molinia caerulea* cover is greater than 50%, it should form an even (not tussocky) sward in waterlogged conditions with *Sphagnum* moss cover greater than 25%.	Visual estimate in 2x2 m plots.	*Molinia caerulea* 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.	*Sphagnum imbricatum* and *Sphagnum fuscum*, where they have been recorded, should	Visual estimate in 2x2 m plots.	If these species are not recorded on any one visit, it does not automatically make the SAC unfavourable.

	remain at least present along the length of each of the w-walks.		

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

ANNEX I

Feature 2 (SAC) – Natural Dystrophic Lakes and Pools (Status C)

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

Attributes	Measure	Target	Comment
Extent	Assessment against baseline map. Aerial photographs may be used.	No loss of extent of standing water	This attribute is to assess changes caused by active management, such as infilling or channel diversion. Changes due to drying out or successional change are covered under other attributes.
*Composition of macrophyte community	Characteristic species composition	i). No loss of characteristic species present at the site (see Box 5)	In the UK dystrophic lakes are widespread in the north west and scarce in the south. These systems most often occur on blanket bog and may include isolated seasonal pools, random collections of irregularly shaped waters and ordered linear or concentric arrays of pools and small lochs. Dystrophic pools may also be found on raised bogs situated mainly on plains and valley bottoms. The water usually has a high humic acid content and is usually stained brown through exposure to peat. Some dystrophic lakes are completely devoid of all macrophytes, while others may be completely dominated by bryophytes. This does not necessarily indicate unfavourable condition. With increasing diversity the characteristic species are usually *Drepanocladus fluitans* and/or *Juncus bulbosus* as submerged macrophytes, with *Sphagnum* communities present around the edge or in the littoral zone. *Menyanthes trifoliata, Potamogeton polygonifolius* and *Nymphaea alba* may also be present and at richer sites, *Utricularia minor* and *Nuphar lutea.*

Attributes	Measure	Target	Comment
			There may be valid reasons why a characteristic species is not present at a site (such as biogeographic range or isolation from source populations) which need to be considered when applying targets to an individual site. As this interest feature covers a floristic range it is essential to establish which community type represents the feature for the site in question. If algal growth is excessive, check for inputs of point or diffuse sources of pollution. If mire communities surround the site, the mire vegetation will turn green in the presence of fertilisers. Increased growth of *Sphagnum* may indicate the occurrence of artificial acidification. Turbid water conditions can also give blue-green algae a competitive advantage in the phytoplankton, where artificial nutrient enrichment is taking place. *Juncus bulbosus* var. *fluitans* can naturally grow as the dominant plant i.e. > 40% cover in depths up to 1.75 m, and is not necessarily an indicator of a site in unfavourable condition.
	Negative indicator species	Non-native species should be absent or present at low frequency	Introduced species should be identified. A number of non-natives have such invasive potential that they should be assessed separately. Species of particular concern are: *Crassula helmsii*, *Hydrocotyle ranunculoides*, *Myriophyllum aquaticum* and *Azolla filiculoides*. If any of these species are present, a water body should be considered as being in unfavourable condition. **This list is not exhaustive and should be updated as new threats become**

Attributes	Measure	Target	Comment
			apparent. Colonisation since the previous field visit by *Elodea nuttallii* or *Elodea canadensis* at >5% frequency is indicative of unfavourable condition, as is dominance of naturalised non-native species, such as *E. canadensis*. Occurrence of such species, at >40% frequency in unproductive waters, is indicative of unfavourable condition. Excessive growths of filamentous algae on lake substrate or macrophytes are indicative of nutrient enrichment. Increased filamentous green algae may also indicate the occurrence of artificial acidification.
***Macrophyte community structure**	Distribution Extent Structure	Characteristic zones of vegetation should be present. Maximum depth distribution should be maintained. Maintain at least the present structure.	Zonation , depth distribution and structure will be site specific. Colonisation at depth may be limited by poor light penetration or unsuitable sediment type. Where present, well defined hydroseres should be maintained.
***Water quality**	Water Chemistry	Maintain dystrophic conditions The pH/ANC, and nutrient levels (P and N)	As a guide Stable nutrient levels: TP target/limit: Dystrophic = 10 $\mu g\ L^{-1}$ Stable pH values: pH < 5.0 Adequate dissolved O_2 (>5 $\mu g\ L^{-1}$)

Attributes	Measure	Target	Comment
		should be stable and appropriate to the lake type Adequate dissolved oxygen levels for health of characteristic fauna. No excessive growth of cyanobacteria or green algae.	Water should be acid and poor in available nutrients. It should be stained by dissolved humic material, and will usually be visibly brown. As there is a wide clinal range of community types embraced by this feature, the acceptable range of chemical conditions (especially total P, other P fractions, pH/ANC, and where appropriate NO_3-N,) should be set for individual SAC lakes, from recent or historical water chemistry data. Acceptable ranges of values for each variable should be established. See main text. Mean annual TP concentrations (based on at least quarterly measurements), or spring TP levels, should meet the targets appropriate for the lake type documented in the guidance, unless site-specific targets are available. If palaeolimnological techniques or hindcast modelling have been employed to reconstruct natural background TP concentrations for a particular lake these can be used to set targets, although it may be necessary to accept a small deviation from these background conditions. Alternatively, historical water chemistry data may exist for individual lakes. Where existing, site-specific TP concentrations are consistently lower than the standard appropriate for the habitat type, a lower target should be applied to prevent deterioration from current status.

Attributes	Measure	Target	Comment
			Phosphorus and nitrogen values can be very variable, P is often in excess and plant development is limited by unavailability of N in the peat. Check for changes in catchment land-use in catchment causing diffuse pollution and/or siltation and check point sources of pollution. Aerially applied agro-chemicals have a high potential to change plant communities, and move them out of favourable condition. Other methodologies involving trophic scoring can contribute to the assessment of favourable condition. As a guide, pH < 5.00. Note that where water column pH is 4.5 or less, alkalinity will be 0. Levels of dissolved oxygen should support the invertebrate and vertebrate taxa associated with this lake type. There should be no evidence of excessive blue-green or green algal blooms.
Hydrology	Hydrological regime	No deterioration in hydrological regime compared to the baseline.	Natural flushing rate and seasonal pattern of fluctuation need to be considered. Maintain flushing rate of system.

Attributes	Measure	Target	Comment
			Modifications of inflows and outlets (where present), the creation of outlets, or changes in hydrology from flood control regimes, abstraction, peat harvesting and gravel removal, can lead to unnatural changes in lake levels.
Lake substrate character	Shore line and substrate	Maintain the natural shoreline of the lake. Maintain natural and characteristic substrate for lake type.	Sediment quality and quantity when enriched can cause excessive growths of *Juncus bulbosus* var. *fluitans* or growths of algae.
Sediment	Sediment Load	Maintain natural sediment load	Increases in siltation could result from increased lake productivity, changes in catchment land-use (particularly over-grazing, peat harvesting), lake level fluctuations, climatic fluctuations or changes in sewage treatment.
Indicators of local distinctiveness	Maintain distinctive elements (e.g. rare plant or invertebrate species, habitat features) at current extent/levels and/or in current locations.		This attribute is intended to cover any site-specific aspects of this habitat feature (forming part of the reason for notification) which are not covered adequately by the previous attributes, or by separate guidance (e.g. for notified species features). For species of local distinctiveness, which are documented on citations, or for which records are held for individual lakes, references such as LACON (Palmer, in prep.) should be consulted for current lists of species rare in the constituent countries of GB, and in EA and SEPA areas. For "notable" species (e.g. nationally scarce plants), it is not intended that a target is set for detailed species monitoring. It is intended that a rapid indication of presence/absence and /or approximate extent should be provided. Allowing for natural

Attributes	Measure	Target	Comment
			fluctuations in population size. The same approach applies to "notable" habitats.

Aspects of environmental disturbance to be noted as an accompaniment to assessing condition: Natural dystrophic lakes and ponds

Objective	Specified assessment method (if appropriate)	Comment
No introduction of non-native plants Minimal negative impact from artificial structures No peat cutting within the vicinity of the water body Direct application of lime to the water column as an acidification amelioration strategy should not be carried out		Artificial structures could include dams. Catchment area changes affecting the lake, such as land drainage and infrastructure schemes, should be considered. Efforts should be directed towards reducing atmospheric emissions and implementing catchment management strategies, especially in relation to coniferous forestry

Box 5. Characteristic species of natural dystrophic lakes and ponds

Characteristic species	Associates
Utricularia spp.	*Sparganium angustifolium*
Sphagnum spp.	*Eleogiton fluitans*
Juncus bulbosus	*Drepanocladus spp.*
Nymphaea alba	
Menyanthes trifoliata	
Potamogeton polygonifolius	

ANNEX I

Feature 3 (SAC) – Northern Atlantic wet heath with *Erica tetralix* (Status C)

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

Attributes	Targets	Method of Assessment	Comments
* Area of wet heath	Maintain the extent of wet heath at 500.1ha.	Visual estimate in 2x2 m plots and across the wet heath using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Any loss of wet heath, or fragmentation of this habitat is unacceptable. Note that it may be possible to extend wet heath communities, provided this is into degraded areas and does not encroach into other habitats of scientific interest.
* Heath community diversity	Maintain the presence of the wet heath community M15 as established at base line survey.	Visual estimate in 2x2 m plots.	Repeat monitoring of plots using GPS should indicate whether wet heath communities have changed or been lost.
* Area of mosaic communities and associated semi-natural habitats	Maintain associated mosaic communities and semi-natural habitats.	Visual estimate in 2x2 m plots and across 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.

Dwarf-shrub height	Average ericoid height should be 15–35cm with at least 25% of the wet heath in the late mature/degenerate growth phase (greater than 35cm).	Visual estimate in 2x2 m plots.	On some areas of wet heath (especially on gentle slopes), the ericoid age structure will largely reflect recent burning patterns. However, in wet heath, burning should only be carried out in exceptional circumstances. Heather height reflects the age structure of the Heather.
* Bare peat, or ground covered by algal mats (% cover)	Bare peat etc. should occupy less than 2% of the wet heath surface overall.	Visual estimate in 2x2 m plots.	Bare peat or peat carpeted by *Polytrichum* spp., *Campylopus* spp. crust forming lichens or algal mats can occur as a consequence of excessive burning and/or grazing. Bare peat here represents bare peat etc. within the wet heath vegetation.
* Ericaceous cover (% cover)	Dwarf-shrub cover should be maintained between 50–75%	Visual estimate in 2x2 m plots.	Although dominated by dwarf shrubs, the sward should be composed of a variety of higher plants and bryophytes.
* Ericoid diversity	At least two species of dwarf-shrub at least present in 90% of plots.	Visual estimate in 2x2 m plots.	Ericoid (dwarf-shrub species) include *Calluna vulgaris*, *Erica tetralix*, *Empetrum nigrum* and *Myrica gale*.
* Cover of graminoids (% cover)	Total graminoid cover should be less than 50%.	Visual estimate in 2x2 m plots.	Include true grasses, sedges, and rushes in this assessment. *Molionia caerulea, Trichophorum cespitosum, Deschampsia flexuosa*, *Juncus squarrosus* or other graminoids should not dominate over other species. Localised *Schoenus nigricans* flushes should not be included in this habitat assessment.
* Bryophyte cover and frequency of *Sphagnum* mosses (%	Mean bryophyte cover (excluding *Polytrichum* spp. and *Campylopus* spp. on bare	Visual estimate in 2x2 m plots.	Bryophytes should include a range of pleurocarpus species forming patches below, or in more open swards beneath the dwarf-shrubs as well as

cover and DAFOR)	ground) should be at least 25%. *Sphagnum* moss species should be at least frequent throughout the moss layer. At least frequent is equivalent to greater than 41% occurrence in recorded plots.		*Sphagnum* moss species.
* Frequency and % cover of scrub/tree encroachment on wet heath communities (DAFOR and % cover)	Scrub/tree encroachment should be no more than rare over the wet heath community. Mean cover should be less than 2%. No more than rare is equivalent to less than 20% occurrence in recorded plots.	Visual estimate within a 10 m radius of plots and across the feature using a combination of aerial photographs and Condition Assessment structured walk.	Scrub encroachment should be checked using a combination of aerial photographs and Condition Assessment. Invasive exotic species such as *Rhododendron ponticum* should be removed immediately.
* Frequency and cover of undesirable agricultural grasses and weeds (DAFOR and % cover)	None of the following should be more than rare: *Cirsium arvense, C. vulgare, Senecio jacobaea, Urtica dioica, Plantago major, Phleum pratense, Trifolium repens, Holcus lanatus* and *Lolium perenne*. No more than rare is equivalent to less than 20% occurrence in recorded plots.	Visual estimate in 2x2 m plot.	

	Combined mean cover of agricultural grasses and weeds less than 1%.		
* Management - Grazing (% cover)	Signs of moderate or heavy grazing should occupy less than 5% of the wet heath vegetation. The frequency of droppings, the extent of poaching, uprooting of dwarf shrubs and invasion by *Juncus squarrosus* etc. indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.	Visual estimate in 2x2 m plots.	
* Management - Burning (% cover)	Signs of recent burning should occupy less than 5% of the wet heath vegetation. Recent burning is represented by areas burnt within the last two years.	Visual estimate in 2x2 m plots and across the feature using a combination of aerial photographs, SIM and Condition Assessment structured walk.	

Frequency and cover of erosion features associated with human impacts (DAFOR and % cover)	No gully erosion, bare peat or rock associated with more concentrated human impacts (ATV tracks or recreational activities). Man induced/enhanced erosion should occupy less than 2% of the total area of wet heath 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 high mountain slopes. However, where natural erosion is exacerbated by human activity, mainly hill walking, the heath will not be in favourable condition, except where such erosion is very limited in nature.
Herb diversity	Herbs (excluding negative indicators) at least frequent. At least frequent is equivalent to greater than 41% occurrence in recorded plots.	Visual estimate in 2x2 m plots.	Wet heaths tend to be dominated by dwarf-shrubs and graminoids; however, some herbs should be present in most plots (albeit at a low cover).

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

ANNEX I

Feature 4 (SAC) – European dry heaths (Status C)

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

Attributes	Targets	Method of Assessment	Comments
* Area of dry heath	Maintain the extent of dry heath at 236.74ha.	Visual estimate in 2x2 m plots and across the dry heath using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Note that it may be possible to extend dry heath communities, provided this is into degraded areas and does not encroach into other habitats of scientific interest.
* Heath community diversity	Maintain the presence of the dry heath communities H7, H8, H10 etc. as established at base line survey.	Visual estimate in 2x2 m plots.	Repeat monitoring of plots using GPS should indicate whether dry heath communities have changed or been lost.
* Area of mosaic communities and associated semi-natural habitats	Maintain associated mosaic communities and semi-natural habitats.	Visual estimate in 2x2 m plots and across 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.
Dwarf-shrub height	Average ericoid height should be 15–35cm with at least 25% of the dry heath in the	Visual estimate in 2x2 m plots.	On some areas of dry heath (especially on gentle slopes), the ericoid age structure will largely reflect recent burning patterns. However, in dry heath,

	late mature/degenerate growth phase (greater than 35cm).		burning should only be carried out occasionally under carefully controlled and monitored circumstances. A varied heather age structure is reflected in the height of heather.
* Bare peat, or ground covered by algal mats (% cover)	Bare peat etc. should occupy less than 2% of the dry heath surface overall.	Visual estimate in 2x2 m plots.	Bare peat (NOT exposed rock) or peat carpeted by *Polytrichum* spp., *Campylopus* spp. crust forming lichens or algal mats can occur as a consequence of constant burning and/or grazing. Bare peat here represents bare peat etc. within the dry vegetation rather than naturally eroded surfaces where exposed rock can form a natural part of the dry heath community.
* Ericaceous cover (% cover)	Dwarf-shrub cover should be greater than 75% over at least 75% of the dry heath community; and Mean dwarf-shrub cover should be greater than 75%	Visual estimate in 2x2 m plots.	
* Ericoid diversity	At least two species of dwarf-shrub at least present in 90% of plots.	Visual estimate in 2x2 m plots.	Ericoid (dwarf-shrub species) include *Calluna vulgaris*, *E. cinerea*, *Vaccinium myrtillis*, *Erica tetralix*, *Ulex gallii*, *Empetrum nigrum* and *Myrica gale*.
* Cover of *Ulex gallii* (% cover)	*Ulex gallii* cover should be less than 50% in plots within H8 stands.	Visual estimate in 2x2 m plots.	Mean percentage cover should be assessed for stands of H8 only – i.e. exclude plots in other heath communities from the calculations. Stands of H8 are generally restricted to the south-east of Northern Ireland.
* Cover of graminoids (% cover)	Total graminoid cover should be less than 33%.	Visual estimate in 2x2 m plots.	Include true grasses, sedges, and rushes in this assessment. *Nardus stricta, Deschampsia flexuosa*, *Juncus squarrosus* or other graminoids should not

			dominate over other species.
* Frequency and % cover of bryophytes and bushy lichens (esp *Cladonia* spp.) (DAFOR and % cover)	Bryophytes (excluding *Polytrichum* spp. and *Campylopus* spp. on bare ground) and/or Cladonia species should be at least frequent. At least frequent is equivalent to greater than 41% occurrence in recorded plots. Combined mean cover should be greater than 5%.	Visual estimate in 2x2 m plots.	Generally only bryophytes (mosses and liverworts) figure in this assessment, but occasionally bushy lichens can also be a prominent feature of the dry heath vegetation.
* Frequency and % cover of scrub/tree encroachment on dry heath communities (DAFOR and % cover)	Scrub/tree encroachment should be no more than occasional over the dry heath community. No more than occasional is equivalent to less than 40% occurrence in recoded plots Mean cover should be less than 5%.	Visual estimate within a 10 m radius of plots and across the feature using a combination of aerial photographs and Condition Assessment structured walk.	Scrub encroachment should be checked using a combination of aerial photographs and Condition Assessment. Include invasive alien species in addition to *Betula pubescens, Prunus spinosa, Rubus* spp. Invasive exotic species such as *Rhododendron ponticum* should be removed immediately. Exclude *Ulex europaeus* (see below)
* Cover of Gorse *Ulex europaeus* (% cover)	Gorse (*Ulex europaeus)* cover should be less than 5%.	Visual estimate in 2x2 m plots and across the feature using a	Although a natural component of heath communities, Gorse can become invasive under both low and high grazing pressures.

	During repeat surveys, Gorse cover should not exceed that of the baseline survey.	combination of aerial photographs and Condition Assessment structured walk.	It is important to assess whether the relative quantities present in the site are increasing.
* Cover of Bracken (*Pteridium aquilinum*) encroachment (% cover)	Bracken cover less than 10% in dense canopy. During repeat surveys, Bracken cover should not exceed that of the baseline survey.	Visual estimate in 2x2 m plots and across the feature using a combination of aerial photographs and Condition Assessment structured walk.	Although a natural component of heath communities, Bracken can become invasive under both low and high grazing pressures. It is important to assess whether the relative quantities present in the site are increasing.
* Frequency and cover of undesirable agricultural grasses and weeds (DAFOR and % cover)	None of the following should be more than rare: *Cirsium arvense, C. vulgare, Senecio jacobaea, Urtica dioica, Plantago major, Phleum pratense, Trifolium repens, Holcus lanatus* and *Lolium perenne* No more than rare is equivalent to less than 20% occurrence in recorded plots. Combined mean cover of agricultural grasses and weeds less than 1%.	Visual estimate in 2x2 m plot.	

* Management - Grazing (% cover)	Signs of moderate or heavy grazing should occupy less than 5% of the dry heath vegetation. The frequency of droppings, the extent of poaching, uprooting of dwarf shrubs and invasion by *Juncus squarrosus* etc. indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.	Visual estimate in 2x2 m plots.	
* Management - Burning (% cover)	Signs of recent burning should occupy less than 5% of the dry heath vegetation. Recent burning is represented by areas burnt within the last two years.	Visual estimate in 2x2 m plots and across feature using a combination of aerial photographs, SIM and Condition Assessment structured walk.	
Frequency and cover of erosion features associated with human impacts. (DAFOR and % cover)	No gully erosion or bare rock associated with more concentrated human impacts (ATV tracks or recreational activities). Man induced/enhanced erosion	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 high mountain slopes. However, where natural erosion is exacerbated by human activity, mainly hill walking, the heath will not be in favourable condition,

	should occupy less than 2% of the total area of dry heath other than very localised instances.		except where such erosion is very limited in nature.
Herb diversity	Herbs (excluding negative indicators) at least frequent. At least frequent is equivalent to greater than 41% occurrence in recorded plots.	Visual estimate in 2x2 m plots.	

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

ANNEX I

Feature 5 (SAC) – Alpine and Boreal heaths (Status C)

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

Attributes	Targets	Method of Assessment	Comments
Area of montane heath (ha)	Maintain the extent of montane heath communities at a minimum of 20.87ha. These communities include H14 – *Calluna vulgaris-Racomitrium lanuginosum* heath and wind-pruned H10b - *Calluna vulgaris-Erica tetralix* heath (*Racomitrium* sub-community).	Visual estimate in 2x2 m plots and across the montane heath using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Difficult to measure exactly; summit ridge is c. 30 ha in extent, but includes significant area of eroding blanket bog. Some higher level heath communities on slopes below summit may also conform to the type. Any loss or fragmentation of this habitat is unacceptable. It is probably not possible to extend montane heath communities beyond their current range at Cuilcagh – i.e. no obvious areas where the habitat has been lost through damaging activities.
Ericoid Height (cm)	Average ericoid height should be 5 –10 cm.	Visual estimate in 2x2 m plots.	Dwarf-shrubs should be low growing (usually prostrate or semi-prostrate.
Bare Peat, or ground covered by algal mats (% and DAFOR)	Patches of bare ground greater than 10cm across in sheltered areas should be more or less absent.	Visual estimate in 2x2 m plots.	Bare peat or peat carpeted by *Polytrichum* spp., *Campylopus* spp. crust forming lichens or algal mats can occur as a consequence of excessive grazing.
Ericaceous Cover (%)	Dwarf-shrub cover should be greater than 60%.	Visual estimate in 2x2 m plots.	The sward should be composed of a low growing (and usually prostrate or semi-prostrate) dwarf-shrub in combination with abundant mosses and lichens.

Mean Cover of dwarf-shrubs/ *Racomitrium lanuginosum* and robust lichens. (%)	The collective cover of dwarf-shrubs, *Racomitrium lanuginosum* and robust lichens should compose at least 90% of total vegetation cover.	Visual estimate in 2x2 m plots.	Characteristic species include a dominance of dwarf-shrubs with mosses, mainly *Racomitrium lanuginosum,* and robust lichens. The low-growing dwarf-shrub mat is dominated by *Calluna vulgaris* with *Erica tetralix*, *E. cinerea*, *Vaccinium myrtillis*, *Empetrum nigrum*, *V. vitis-idea*, etc.
Racomitrium lanuginosum (DAFOR)	*Racomitrium lanuginosum* to be constant and forming patches below, or in more open swards beneath the dwarf-shrubs.	Visual estimate in 2x2 m plots.	*Racomitrium lanuginosum* should form a major part of the ground cover for the vegetation to be in favourable condition.
Fine-leaved grass/*Galium saxatile/Potentilla erecta* Cover (%)	The collective cover of fine-leaved grasses, *Galium saxatile* and *Potentilla erecta* should not exceed 10%.	Visual estimate in 2x2 m plots.	Grasses to include *Deschampsia flexuosa* and *Festuca ovina/vivipara*.
Management - Grazing (% cover)	Signs of moderate or heavy grazing should occupy less than 5% of the montane heath vegetation.	Visual estimate in 2x2 m plots.	The frequency of droppings, the extent of poaching, uprooting of dwarf shrubs and invasion by *Juncus squarrosus* etc. indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.
Management - Burning (% cover)	Signs of recent burning should occupy less than 5% of the montane heath vegetation.	Visual estimate in 2x2 m plots and within wider vicinity of the plot; in addition, across feature using a combination of aerial photographs,	Recent burning is represented by areas burnt within the last two years.

		SIM and Condition Assessment structured walk.	
Erosion Features associated with human impacts (% and DAFOR)	No bare rock or bare peat associated with more concentrated human impacts (ATV tracks or recreational activities). Man induced/enhanced erosion should occupy less than 2% of the total area of montane heath, other than very localised instances.	Visual estimate in 2x2 m plots and within wider vicinity of the plot; in addition, across feature using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Erosion is a natural feature of high mountain slopes. However, where natural erosion is exacerbated by human activity, mainly hill walking, the heath will not be in favourable condition, except where such erosion is very limited in nature.

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

ANNEX I

Feature 6 (SAC) – Siliceous scree of the montane to snow levels (*Androsacetalia alpinae and Caleopsietalia ladani*) (Status C)

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

Attributes	Targets	Method of Assessment	Comments
Area of siliceous scree	Maintain the extent of siliceous scree at 25.94ha. The montane acid scree communities include U21 - (*Cryptogramma crispa-Deschampsia flexuosa* community).	Visual estimate in 2x2 m plots and across the siliceous scree using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Note that it may be possible to extend siliceous scree communities, provided this is into degraded areas and does not encroach into other habitats of scientific interest.
Indicators of current grazing	At least 33% of ground cover should be free from overgrowth by vascular plants Less than 50% of live leaves (forbs) and/or the shoots (dwarf-shrubs) should show signs of having been grazed or browsed.	Targets assessed against visual estimate for as much of the feature as is visible while standing at a sample location.	
Non-native species	Less than 1% of vegetation cover should be made up of	Target assessed against visual	

	non-native species.	estimate for as much of the feature as is visible while standing at a sample location.	
Cover of Bracken, tress and scrub	Less than 25% of the ground cover should be made up of bracken, trees and shrubs.	Target assessed against visual estimate for as much of the feature as is visible while standing at a sample location.	
Cover of agricultural weeds	Less than 1% of vegetation cover should consist of, collectively, *Cirsium arvense, Cirsium vulgare, Pteridium aquilinum,* large docks (excluding *Rumex acetosa*), *Rubus fruticosus, Senecio jacobaea, Urtica dioica*	Target assessed against visual estimate for as much of the feature as is visible while standing at a sample location.	
Physical structure — indicators of ground disturbance due to herbivore and human activity.	Less than 10% of the *ground* cover should be disturbed by human or animal paths, scree running, or vehicles.	Target assessed against visual estimate for as much of the feature as is visible while standing at a sample location.	The nature of the scree – i.e. large, block scree – more or less precludes recreational use, and appears to discourage most of the grazing animals.

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

ANNEX I

Feature 7 (SAC) – Siliceous rocky slopes with chasmophytic vegetation (Status C)

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

Attributes	Targets	Method of Assessment	Comments
Area of siliceous rocky slopes	Maintain the extent of siliceous rocky slopes at 9ha.These cliff face communities include U21 - (*Cryptogramma crispa-Deschampsia flexuosa* community).	Visual estimate in 2x2 m plots and across the siliceous rocky slopes using a combination of aerial photographs, SIM and Condition Assessment structured walk.	
Indicators of current grazing	Less than 50% of live leaves (forbs) or the shoots (dwarf-shrubs) should show signs of having been grazed or browsed.	Target assessed against visual estimate for as much of the feature as is visible while standing at a sample location.	
Non-native species	Less than 1% of vegetation cover should be made up of non-native species.	Target assessed against visual estimate for as much of the feature as is visible while standing at a sample location.	

Cover of Bracken, tress and scrub	Less than 25% of the ground cover should be made up of bracken, trees and shrubs.	Target assessed against visual estimate for as much of the feature as is visible while standing at a sample location.	

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

DERORAN BOG SAC
UK0030324

CONSERVATION OBJECTIVES

Document Details

Title	*Deroran Bog SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
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Contact	cdp@doeni.gov.uk

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Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	Nov 2014	Complete review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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

GRID REFERENCE: H525714

AREA: 75 ha

5. SUMMARY SITE DESCRIPTION

Deroran Bog is typical of the western bogs within the drumlin belt of Northern Ireland, being rather irregular in shape. The bog displays the classic convex domed profile typical of lowland raised bogs but has a relatively subdued microtopography with occasional small pools, and a few large hummocks. The surface, which supports a good *Sphagnum* moss cover, is characterised by low moss carpets interspersed with lawn and occasional shallow pools, with a large soakway in the centre. Notable species include *S. fuscum* and *S. imbricatum* (although both are poorly represented on the bog). In addition, there is a soak in the north-eastern corner with a high *Sphagnum* cover. Next to this there is an area of scrub possibly indicating a shallower peat layer over a submerged drumlin.

At the eastern boundary there is a rocky knoll known as Seefinn (possibly a human artefact, registered on the archaeological record).

Disturbance to the bogs had been confined to machine cutting and occasional burning on both the intact core and cutover margins. The south-west portion of the bog has been cut-over as far as a drainage ditch that runs north-west to south-east across the bog. North-east of this the dome is predominantly intact. Areas of scrub are present, including some *Rhododendron ponticum*. Within the ASSI boundary there is a small conifer plantation.

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 boundary of the area uses permanent man-made boundary features. The boundary has been drawn to include all areas of intact lowland raised bog and associated semi-natural habitats, including cutover bog and Birch Scrub.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ population
Habitat	**Active raised bog**	**B**	**53.19 ha**
Habitat	Degraded raised bog still capable of regeneration	D	21.81 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 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 Deroran Bog SAC.

6.1 ASSI SELECTION FEATURES

Deroran Bog ASSI

Feature Type	Feature	Size/ extent/ population
Habitat	Lowland Raised Bog	75 ha

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

SAC 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

ASSI 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.

10. MANAGEMENT CONSIDERATIONS

Ownership
The site is owned by 22 owner/occupiers - four owners and DETI hold mineral interests, six owners and DARD hold sporting interests and 16 owners hold turbary rights

Adjoining Land Use
The land surrounding the site is intensively managed agricultural land in silage and grazing.

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 Deroran 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 extensive hand cutting for many years around the periphery of the bog. This has encroached significantly into the intact surface of the raised bog. Along the edge of the intact the cut peat face can be as much as 2m high in places, resulting in local desiccation to the adjacent intact surface. Although the old hand cuttings now support either actively regenerating bog vegetation or birch wood, there has been extensive mechanised peat cutting carried out within the former in recent years, primarily in the south-west part of the site. In places, mechanised cutting had encroached onto the intact surface of the bog. Peat cutting at the time of designation was very problematical.

It is not known whether there are any extant consents for turf cutting.
ACTION: No peat cutting within the SAC.

Burning
Burning of the vegetation has taken place occasionally, with some localised 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.

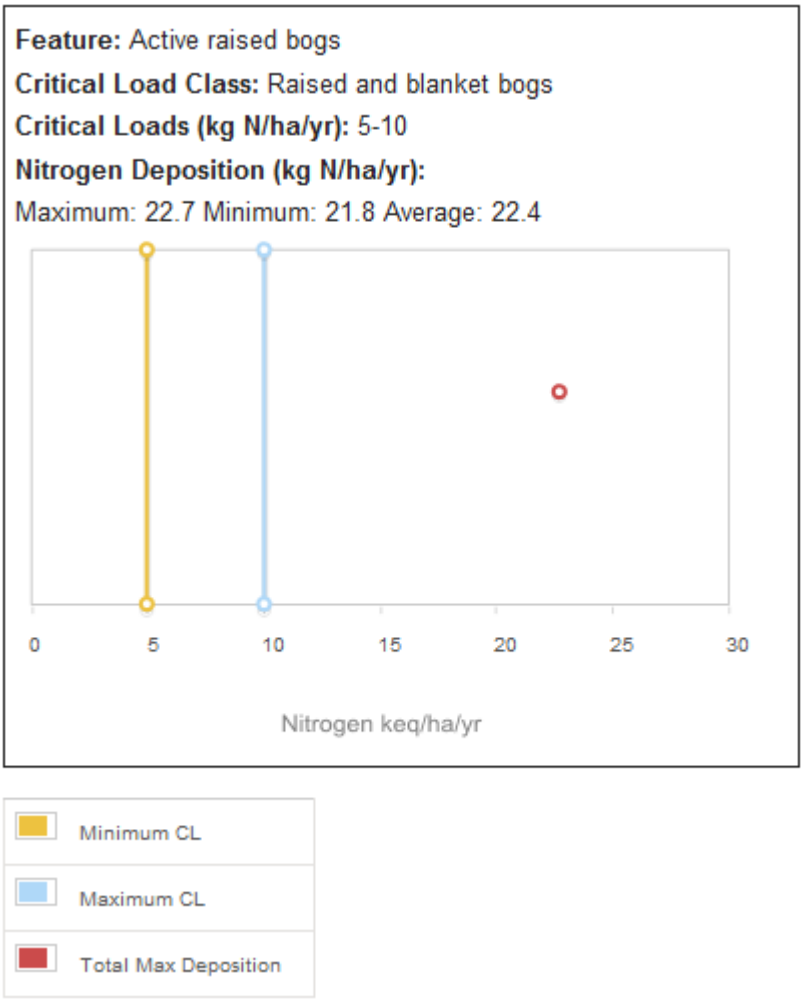
Drainage

The intact dome remains intact with no active drains dissecting it. However, there are a few old drains associated with the cuttings around the periphery. 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 Deroran 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

Some of the cutover surface and a very small part of the intact surface were excluded from the site in an effort to rationalise the boundary (to the south of the shelterbelt). It would be desirable to bring any suitable habitat here into favourable management, with a view to including within the SAC at a future date.

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

Trees and scrub growth is locally extensive within the cutover bog but set back from the periphery of the intact. 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.

Tree Planting/Afforestation

Conifers have been planted on the bog surface as a shelter belt (along part of the southern boundary). It is unlikely that these will threaten the bog, as the surface is generally too wet. However, their growth should be monitored and it would be preferable to have them removed.
ACTION:Remove conifers if required.

Grazing

Lowland raised bogs are not suitable for grazing, as the surface is fragile and easily damaged by poaching.
ACTION: Fences around the periphery of the bog should be maintained to prevent grazing occurring on the site.

Fly-tipping

There were a few localised incidents of fly-tipping in the cutover area of the bog, but generally there is no dumping problem associated with the site.
ACTION: Remove all evidence of past fly-tipping. If localised fly-tipping does occur, it should be removed as soon as possible to help prevent any further incidences of dumping.

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

- *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 <u>not by itself</u> 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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Department of the Environment for Northern Ireland (1993a). Conserving Peatland in Northern Ireland – A Statement of Policy.

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ANNEX 1

Feature 1 SAC - Active raised bog

(* = 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 53.19 ha.	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 *Erica tetralix-Sphagnum papillosum* raised and blanket mire community and M2, the *Sphagnum cuspidatum/recurvum* bog pool community dominated by *S. cuspidatum*.
* 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. *S. cuspidatum* , *S. denticulatum S. magellanicum, Drosera, anglica, D. intermedia, Menyanthes trifoliata*.	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.

* *Sphagnum* cover/abundance (% cover and frequency) Active Peat Formation (DAFOR)	Ombrotrophic *Sphagnum* 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: - *S. capillifolium* and *S. tenellum* and the thick hummock forming species*:* - *S. papillosum* and *S. magellanicum* at least occasional over the surface.	Visual estimate in 2x2m plots. Visual estimate in 2x2m plots.	A constant *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to measure the hydrological integrity of the intact bog surface.
* Ericaceous cover (%) and frequency of *Erica tetralix* (DAFOR).	Ericoid cover should be maintained between 40% and 60% of the intact bog surface. *Erica tetralix* 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 *Calluna vulgaris* 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.
* *Rhynchospora alba* abundance (% cover)	*Rhynchospora alba* cover should be less than 10%.	Visual estimate in 2x2m plots	*Rhynchospora alba* 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.
* *Myrica gale* abundance (% cover)	*Myrica gale* 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 and 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.	Visual estimate in 2x2 m plots.	The frequency of droppings, the extent of poaching, uprooting of dwarf shrubs, invasion by *Juncus squarrosus* etc. and the presence of grazing induced *Calluna vulgaris* growth forms indicate moderate and heavy grazing.
Indicators of Local Distinctiveness			
* Presence of rare or scarce species specific to the site. *Sphagnum austinii* *Sphagnum fuscum* *Sphagnum pulchrum* *Utricularia spp.* *Andromeda polifolia*	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

FAIRY WATER BOGS SAC
UK0016611

CONSERVATION OBJECTIVES

Document Details

Title	*Fairy Water Bogs SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
Date Effective From	*01/04/2015*
Version Number	*V2*
Next Review Date	Nov 2020
Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	Nov 2014	Complete review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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

GRID REFERENCE: IH340770

AREA: 223.7 ha

5. SUMMARY SITE DESCRIPTION

Fairy Water Bogs are located at an elevation below 80m in the former floodplains of the Fairy Water valley to the north of Drumquin. They are considered to be the most important concentration of lowland raised bogs in Northern Ireland. Although there has been a long history of peat extraction in the area, a large extent of intact bog remains amongst the drumlins that are generally improved farmland. The SAC is made up of three separate active raised bogs with classic dome structure – Bomackatall and North Drumnafallow, Claragh and Kilmore Robinson. Bomackatall Bog surrounds an agriculturally improved drumlin top, which is excluded from the SAC. Claragh was the subject of a study in the late 1950s of the ecology of a raised bog (Morrison, 1959).

Hummocks and hollows, with widespread bryophyte communities, are generally well developed on all four bogs and contain some notable species, including *Sphagnum fuscum* and *Sphagnum imbricatum*. At North Drumnafallow there is still some evidence of mire development over the site of an old pond.

The site has a detailed Holocene pollen record with radiocarbon dates providing a detailed vegetational history. Recent work shows this site also has a good tephra record.

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 area, particularly the drumlins, has been much developed over time for agriculture and hence the bog sites have now been interspersed with agricultural land. The boundaries are thus drawn and fenced separately for each bog.
The eastern edge of Claragh is flanked by a road, whilst the rest is generally the boundary between the semi-improved agricultural lands and the bog, excluding an area of heavily machine cut heath to the west. Some areas of peat cuttings are included to maintain the integrity of the whole unit.

Kilmore Robinson is bounded to the north and east by the Fairy Water River flood plain. The rest of the SAC boundary encloses the peat area, including the cut-over parts and some scrub woodland to maintain the integrity of the bog hydrology. Bomackatall boundary includes old cut-over areas which will recover with time whilst excluding the improved ground on the drumlin to the northwest that lies within the bog. The boundary is the river flood plain to the north and elsewhere a road and lane, with exclusions round farm buildings and improved agricultural ground.

North Drumnafallow is a small area with only 3 private owners. Its boundary follows the natural features edging the bog and a small wooded area to the northwest.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ population
Habitat	**Active raised bog**	**B**	**188 ha**
Habitat	Degraded raised bog still capable of regeneration	D	35 ha
Habitat	Depressions on peat substrates	D	0.1 ha
Habitat	Transition mires and fens	D	0.5 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 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 Fairy Water Bogs SAC.

6.1 ASSI SELECTION FEATURES

Fairy Water Bogs ASSI

Feature Type	Feature	Size/ extent/ population
Habitat	Lowland Raised Bog	223 ha
Earth Science	Peat and related stratigraphy	50.85 ha ie the entire raised bog unit including cutover areas at Claragh Bog.

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

SAC 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

ASSI 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.
Peat & Related Stratigraphy	Component Objective
	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.

10. MANAGEMENT CONSIDERATIONS

Ownership
Fairy Water Bogs are privately owned with over 70 individuals owning sections and some with turbary rights.

Adjoining Land Use
The land surrounding the site is intensively managed agricultural land in silage and grazing.

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 <u>likely</u> factors that are either affecting Fairy Water Bogs, 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 <u>any</u> of the Notifiable Operations listed in the ASSI schedule could affect the site.

Peat Cutting
Any method of peat extraction is a particularly damaging activity, having very profound effects upon its ecology and hydrology. Peat cutting continues around the area of the SAC and a few consents have been issued for continued hand cutting of turf from small, specified areas within the ASSI.

ACTION: No unauthorised peat cutting within the SAC.

Burning

There has been occasional burning in the past. Excessive burning will reduce the cover of *Sphagnum* mosses and Ericaceous species, increasing the proportion of *Molinea caerulea* and *Trichophorum cespitosum*. Structural diversity will also be reduced.

ACTION: No burning within the SAC.

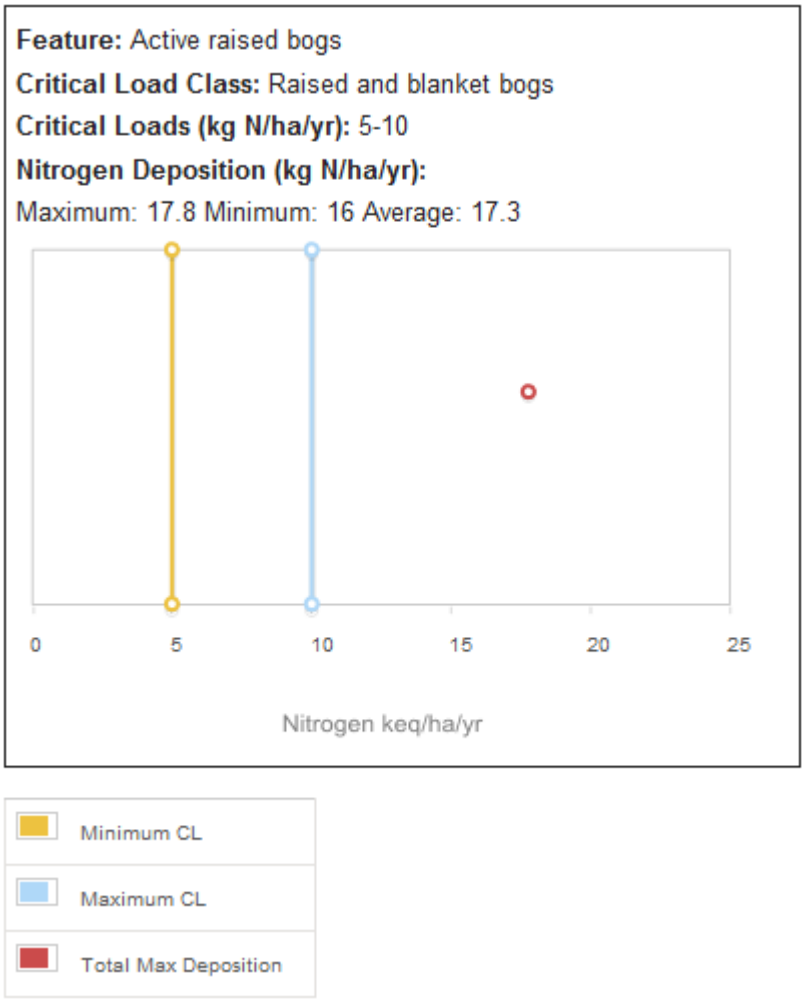
Drainage

The bogs need a relatively high water table to maintain their interest and structure. Drains that allow water to run off the bog from old cuttings should be 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 Fairy Water Bogs 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 Fairy Water Bogs. Any further scrub encroachment into the actively regenerating cut-over 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.

Tree Planting/Afforestation

Trees cause shading effects on bog vegetation and hydrological and physiological changes to the peat, such that it is not possible to reinstate a raised bog. A couple of consents have been issued for the felling and removal of timber from small parts of the edge of the ASSI.

ACTION: No unauthorised tree removal and no tree planting.

Grazing

Lowland raised bogs are not suitable for grazing, as the surface is fragile and easily damaged by poaching.

ACTION: Fences around the periphery of the bog should be maintained to prevent grazing occurring on the site.

Fly-tipping

Because of its widely dispersed nature and isolated location, there is always the threat of fly-tipping which is unsightly and could encourage further dumping if not removed.

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

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. 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

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

Annex 1

Feature 1 (SAC) – Active raised bogs (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.	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 *Erica tetralix-Sphagnum papillosum* raised and blanket mire community and M2, the *Sphagnum cuspidatum/recurvum* bog pool community dominated by *S. cuspidatum*.
* 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. *S. cuspidatum* , *S. denticulatum S. magellanicum, Drosera, anglica, D. intermedia, Menyanthes trifoliata*.	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.

* *Sphagnum* cover/abundance (% cover and frequency) Active Peat Formation (DAFOR)	Ombrotrophic *Sphagnum* 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: - *S. capillifolium* and *S. tenellum* and the thick hummock forming species*:* - *S. papillosum* and *S. magellanicum* at least occasional over the surface.	Visual estimate in 2x2m plots. Visual estimate in 2x2m plots.	A constant *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to measure the hydrological integrity of the intact bog surface.
* Ericaceous cover (%) and frequency of *Erica tetralix* (DAFOR).	Ericoid cover should be maintained between 40% and 60% of the intact bog surface. *Erica tetralix* 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 *Calluna vulgaris* 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.
* *Rhynchospora alba* abundance (% cover)	*Rhynchospora alba* cover should be less than 10%.	Visual estimate in 2x2m plots	*Rhynchospora alba* 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.
* *Myrica gale* abundance (% cover)	*Myrica gale* 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 and 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.	Visual estimate in 2x2 m plots.	The frequency of droppings, the extent of poaching, uprooting of dwarf shrubs, invasion by *Juncus squarrosus* etc. and the presence of grazing induced *Calluna vulgaris* growth forms indicate moderate and heavy grazing.
Indicators of Local Distinctiveness			
* Presence of rare or scarce species specific to the site. *Sphagnum austinii* *Sphagnum fuscum* *Sphagnum pulchrum* *Utricularia spp.* *Andromeda polifolia*	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

FARDRUM & ROOSKY TURLOUGHS SAC
UK0030068

CONSERVATION OBJECTIVES

Document Details

Title	*Fardrum & Roosky Turloughs SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
Date Effective From	*01/04/2015*
Version Number	*V2*
Next Review Date	Nov 2020
Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	January 2015	Complete review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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 Directive79/409/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: FERMANAGH

GRID REFERENCE: H1 80502

AREA: 43.1 ha

5. SUMMARY SITE DESCRIPTION

Roosky turlough, the southernmost sub-site, is dominated by inundation grassland, with little residual water when the site dries out. The source of water has been identified by dye tracing; the main resurgence being in the north-west of the site. Semi-natural scrub dominates the northern and western margins, while extensive blackthorn scrub occurs to the east – the latter prone to winter flooding. The site usually holds a small suckler herd through the summer. Fardrum and Green Lough are set in intensively managed partially reseeded grassland, used for pasture but still retaining some semi-natural scrub. Water sources have not been conclusively identified for these latter sub-sites.

Recent site investigations indicate that historical and recent quarrying has impacted on the wider hydrological system within which the turloughs sit. It appears that the turloughs continue to operate as a functional biological system.

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 boundary at Roosky contains the full extent of the turlough and all the semi-natural vegetation – this includes the main slopes above the turlough. At Fardrum and Green Lough, the boundary contains the active turlough units together with all adjoining lands that could feed them directly by surface/sub-surface water flow. At none of the sites has an attempt been made to include lands adjoining the source sinks. A review of this may become necessary if degraded site water quality becomes an issue.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ pop~
Habitat	Turloughs	B	6.5 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 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 Fardrum & Roosky Turloughs SAC.

6.1 ASSI SELECTION FEATURES

Fardrum & Roosky Turloughs ASSI

Feature Type	Feature	Size/ extent/ pop~
Habitat	Turloughs	6.5 ha
Earth science	Karst	43.1ha

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The ***Conservation Objective*** for this site is:

To maintain (or restore where appropriate) the Turloughs 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
Turloughs	B	Maintain, or restore if necessary, the extent of the turlough community.
		Maintain hydrological system relating to the turloughs
		Maintain and enhance species diversity within Turlough community, including presence of the rare plant species e.g. Fen Violet *Viola persicifolia* and notable invertebrates e.g. the beetles *Blethisa multipunctata* and *Pelophila borealis*.

		Maintain the diversity and quality of habitats associated with the Turloughs, e.g. wet grasslands, swamp, neutral grasslands and scrub, especially where these exhibit natural transitions to the Turlough communities.

9. ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Turloughs	See SAC Selection Feature Objective Requirements table.
Karst	To maintain the component parts of the turlough, including risings, sinks, outflows and the fluctuating condition of the waterbodies.

10. MANAGEMENT CONSIDERATIONS

Ownership

Sympathetic agricultural management of the site by the two landowners is vital to maintain the biological interest in favourable condition.

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 <u>likely</u> factors that are either affecting Fardrum & Roosky Turloughs, or could affect it in the future. Although Turloughs is the qualifying SAC feature, factors affecting ASSI features are also considered.

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

Quarrying

This activity relates to adjoining lands but is a significant consideration. The quarries resulting from both historical and recent extraction on lands south of Fardrum Lough have been shown to capture some water that would have been directed to both Roosky turlough and Roosky rising (the latter appears to be the natural hydrological resurgence to which all flow would have been directed prior

to quarrying activity). New quarries together with lateral extension and deepening of the existing quarries would be unacceptable.
ACTION: Address through planning system

Fertiliser and Slurry dressing
There is zero fertiliser input at Roosky, but a major problem at Fardrum and Green Loughs associated with intensively managed pasture. As a minimum, applications should be restricted to ground outside the limit of the inundation zone. Ideally, all lands within the site should be treated as calcareous species-rich grassland, and managed appropriately.
ACTION: Address the fertiliser enrichment threat through ESA and/or management agreements.

Supplementary Feeding
The supplementary feeding has resulted from the high grazing levels for Fardrum and Green Loughs and should be ended as part of the move towards a less intensively managed grassland system.
ACTION: Address through ESA and/or management agreements.

Grazing
Grazing intensity is too high at Fardrum and Green Loughs, associated with the intensively managed pasture. As a minimum, stocking levels should be managed separately within the inundation zone through fencing, with a reduction in intensity. Ideally, grazing levels of all lands within the site should be treated as calcareous species-rich grassland, and managed appropriately.
Grazing pressure at Roosky is somewhat low leading to an increasing rankness of grass and density of thatch at the expense of species rich inundation grassland. This appears to have come about by the ESA classification of the site as woodland. This has been resolved for the present by letting stock from an adjoining field to have access, but must be monitored.
ACTION: Ensure sustainable grazing levels to maintain the conservation interest features, through ESA and/or management agreements and monitoring.

Turlough Hydrology
Identification of remaining resurgences and sinks at Fardrum and Green Loughs would be beneficial. Prof. John Gunn, University of Huddersfield, has undertaken intensive dye tracing work which has provided a better understanding of the system (2003-03).
ACTION: Liaise with Prof. Gunn.

Site Hydrology
Partial or complete infilling of the channel at the southern end of Fardrum, which has been deepened, would allow restoration of the natural extent of inundation grassland.
ACTION: Address through ESA and/or management agreements.

Water Quality

To be addressed through site grassland management. Assessment of wider water quality issues, associated with land use adjoining the feeder sinks, should be reviewed if water quality has not been improved by site management. Note that biannual sampling of waters associated with the turloughs is undertaken and reported to NIEA.

ACTION: Review wider area in the light of dye tracing work and water quality results

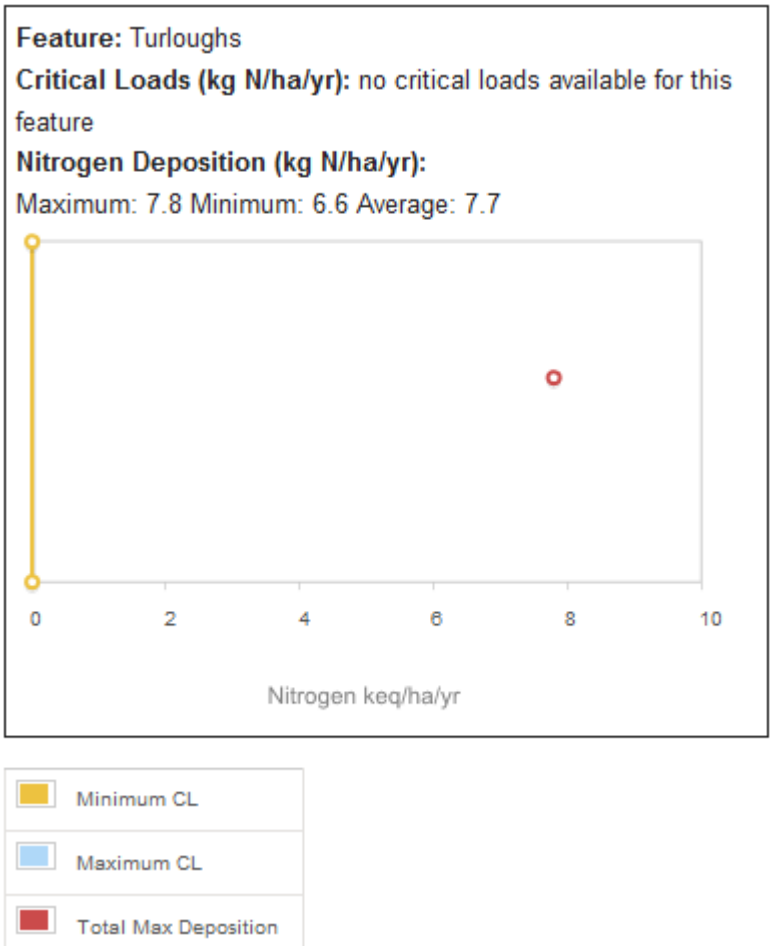
Fly-Tipping

Historical dumping in a doline south of Green Lough may have implications for water quality. No new fly-tipping to be permitted and existing material to be removed to deter further dumping.

ACTION: Address the fly-tipping issue through Site Integrity Monitoring .

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 habitats and species present on Fardrum & Roosky Turloughs 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.

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 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.

12.1 MONITORING SUMMARY

1. *Monitor the integrity of the site (SIM or Compliance Monitoring)*
Check that there is no obvious signs of eutrophication e.g. slurry spreading or obvious overgrazing of the turloughs or dumping within the site. 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 <u>not by itself</u> 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

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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 I

Feature 1 (SAC) - Turloughs (Status B)

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

Attribute	Targets/Limits	Method of Assessment	Comments
* Area of inundation zone (maximum extent of inundation) (ha)	Maintain the extent of inundation zone.	Visual estimate in 2x2 plots and across the intact raised bog using a combination of aerial photographs, SIM and Condition Assessment structured walk.	
Sward height	Average sward height should be 5–20cm. (Suggest raising upper limit to 30 cm)	Visual estimate in 2x2 m plots.	
Bare ground (%)	Bare ground should occupy < 10%.	Visual estimate in 2x2m plots	

* Vegetation zones	The following vegetation types should be present in at least one of the turloughs - Open water macrophytes, fen/swamp, lower inundation grasslands, drier inundation grasslands, calcareous grassland, scrub/woodland.	General assessment across the site as a whole.	
Water quality	Develop a water-sampling regime and set targets for water chemistry, etc. – i.e. - Water clarity, pH, TP, N Water quality targets for phosphorus and nitrogen need to be defined.		It should be noted that remote effects can have a significant impact on this site, through effects on water quality and on hydrology.
* Hydrology	Hydrological regime including sinks, risings etc.	Develop a hydrological model and sampling regime.	

* Frequency of community character species	Frequency of community character species. At least four of the following frequent and two at least occasional throughout the sward. *Myosotis scorpioides, Alisma plantago-aquatica, Potentilla anserina, Ranunculus aquatilis, Rorippa sp, Sparganium sp, Chara sp, Fontinalis antipyretica, Calliergon gigantea, Cinclidotus fontinaloides, Menyanthes trifoliata, Hippuris vulgaris, Mentha aquatica.*	Visual estimate in 2x2m plots.	This attribute refers to the inundation areas of the turlough, treated here as a grassland type.
* Presence of Fen Violet (DAFOR)	Fen Violet *Viola persicifolia* – should be at least rare. Note this species forms hybrids with *V. canina*.	Known locations for the species should be checked.	Fen violet is a Schedule 8 species. It occurs at Green Lough. A reassessment of the status of this population will be required before setting particular objectives for this species.

Invertebrate assemblage	Presence of typical turlough invertebrate assemblage. The following should be present at appropriate times of the year: - *Blethisa multipunctata, Pelophila borealis and Rhantus frontalis*.		Precise monitoring methods for inverts still need to be developed. Invert specialists will be required to set objectives for these populations and devise monitoring methodologies.
* Frequency of negative indicators (DAFOR)	No more than two of the following more than occasional: *Alopecurus geniculatus, Juncus effusus, J. bufonius, large Rumex spp (*excluding *Rumex hydrolapathum),* large *Cirsium spp, Senecio jacobaea, Lolium perenne, Phalaris arundinacea, Filipendula ulmaria*	Visual estimate in 2x2m plots	

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

LARGALINNY SAC
UK0030045

CONSERVATION OBJECTIVES

Document Details

Title	*Largalinny SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
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Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	Dec 2014	Complete review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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: FERMANAGH

GRID REFERENCE: H073537

AREA: 244.87 ha

5. SUMMARY SITE DESCRIPTION

Largalinny is a complex site with a variety of interests. Geological interest relates to the Upper Visean Glenade Sandstone Formations and Upper Visean Limestone Formations with rich silicified fossil fauna (the latter around Carrick Lough). Physiographical interest relates to the scarp and dip control of slope.

Botanical interest relates to the complex mosaic of habitats present, including heathland, oligotrophic and mesotrophic waterbodies and in particular, broad-leaved semi-natural woodland. Rare species include rare higher plants, and notable lichen and bryophyte communities. In addition, there are notable assemblages of Odonata and Lepidoptera.

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 boundary has been drawn to include all of the oak woodland and adjoining semi natural transitions to heath and lakeshore vegetation (fen, swamp and open water). The site extends eastwards to meet with the adjoining Monawilkin cSAC around Carrick Lough. To the west and south, the boundary is formed by

adjoining coniferous plantation, with the public road forming the boundary to the north.

6. SAC SELECTION FEATURES

Feature Type	Feature	Global Status	Size/ extent/ pop~
Habitat	**Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles**	**B**	39.6 ha
Habitat	Blanket bog (active only)	D	52 ha
Habitat	Northern Atlantic wet heaths with *Erica tetralix*	D	50 ha
Habitat	European dry heaths	D	39 ha
Habitat	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion alvae*)	D	4.5 ha
Habitat	Bog Woodland	D	0.5 ha
Habitat	Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Caleopsietalia ladani*)	D	0.1 ha
Species	*Austropotamobius pallipes* (Freshwater Crayfish)	D	

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 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 Largalinny SAC.

6.1 ASSI SELECTION FEATURES

Largalinny ASSI

Feature Type	Feature	Size/ extent/ pop~
Habitat	Oakwood	39.6 ha
Habitat	Upland mosaic	141 ha
Species	Plant Assemblage – Higher and Lower Plants (Liverworts and Lichens)	A, B, C D species
Species	Dragonfly Assemblage	14 recorded species
Species	Lepidoptera Assemblage	Includes Purple Hairstreak, etc.
Earth Science	Upper Palaeozoic Palaeontology	

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The ***Conservation Objective*** for this site is:

To maintain (or restore where appropriate) the Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles 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

SAC Feature	Global Status	Component Objective
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	B	Maintain the extent of existing 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.

9. ASSI FEATURE OBJECTIVE REQUIREMENTS

ASSI Feature	Component Objective
Oakwood	See SAC Selection Feature Objective Requirements table.
Upland mosaic	To maintain (and if feasible enhance) the diversity of the habitat assemblage, including dry heath, wet heath and blanket bog.
Higher plant assemblage	To maintain (and if feasible enhance) the populations of notable species, including their abundance and distribution: Higher plants (RNP Score 16) - *Neottia nidus-avis*(D)*, Pyrola minor*(C)*, Orthilia secunda*(A)*, Equisetum hyemale*(C)*, Hymenophyllum tunbrigense*(C)*, Scirpus sylvaticus*(C) and *Festuca altissima*(C). The gametophyte form of *Trichomanes speciosum.* The liverworts *Plagiochila punctata, Lepidozia cupressina* and *Leptoscyphus cuneifolius.* The lichens *Lobaria scrobiculata, Sticta fuliginosa, Pannaria rubiginosa* and *Gyalideopsis muscicola.*
Lower plant assemblage	To maintain (and if feasible enhance) the populations of notable species, including their abundance and distribution: The gametophyte form of *Trichomanes speciosum.* The liverworts *Plagiochila punctata, Lepidozia cupressina* and *Leptoscyphus cuneifolius.* The lichens *Lobaria scrobiculata, Sticta fuliginosa, Pannaria*

	rubiginosa and *Gyalideopsis muscicola.*
Invertebrate assemblage	To maintain (and if feasible enhance) the diversity of the Lepidoptera populations, including their abundance and distribution i.e. Holly Blue *Celastrina argiolus*, Purple Hairstreak *Quercusia quercus*, Pale Eggar moth *Trichiura crataegi* and *Biselachista serricornis* (a small micro-moth).
Dragonfly Assemblage	To maintain (and if feasible enhance) the diversity of the Dragonfly populations, including their abundance and distribution (14 species recorded).
Upper Palaeozoic palaeontology	To be Finalised.

10. MANAGEMENT CONSIDERATIONS

Ownership

Forest Service owns a large part of the area, some of which is jointly managed with NIEA as Correl Glen National Nature Reserve. Much of the remainder (predominantly the heathland) is designated as Forest Nature Reserve. The remaining part of the site is privately owned.

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 <u>likely</u> factors that are either affecting Largalinny, or could affect it in the future. Although Old sessile oak woods with *Ilex* and *Blechnum* is the qualifying SAC feature, factors affecting ASSI features are also considered.

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

Woodland Clearance/Timber Removal

Clearance should be avoided, with the woodland encouraged to extend its range naturally. From the nature conservation viewpoint, the site does not appear to require the creation of canopy "gaps", as there seems to be sufficient active "edge" for natural regeneration. This is particularly apparent in areas of heath along the upper edges of the scarps, where there is an advancing woodland edge of Birch and to a lesser extent, Rowan. These species appear to act as precursors for Oak. Outside the Nature Reserve, there have been some small pockets of woodland clearance, although none of these are recent.

Dead wood should be left *in situ* unless posing a serious threat to public safety. This provides valuable habitat for fungi, invertebrates, etc. For the same reason, removal of wood for firewood should be discouraged. There is some evidence of timber removal in parts of the wood, although quantities of both standing and dead wood are generally frequent to abundant.

ACTION: There are unlikely to be any major conflicts of interest in this area, except in relation to public safety along existing footpaths.

Invasion by Exotics

Exotic species recorded for the wood include Sycamore *Acer pseudoplatanus* and conifers, at very low frequency (most of the Sycamore are confined to the vicinity of the river). These invasives do not appear to be posing a serious threat at present, but their presence should be monitored. As far as Sycamore is concerned, it should be removed as soon as possible, particularly any mature trees, which tend to produce large quantities of seed.

For other exotics, the long-term aim should generally be removal, although this will be dependent upon an assessment of other potential nature conservation benefits - e.g. Beech is important for ectomycorrhizal fungi and associated invertebrates.

ACTION: NIEA and Forest Service to agree a programme for the control of exotic species within the NNR as part of the NNR management plan. NIEA to discuss similar arrangements with other landowners as appropriate.

Grazing/Browsing

Most recent research indicates very light levels of grazing can be beneficial for woodlands. However, heavy grazing should be avoided as this can prevent regeneration and destroy grazing-sensitive woodland plants. There is evidence of grazing by domestic livestock in the NNR. The privately-owned part of the wood also shows some signs of grazing activity. Some goat damage (barking of tress and shrubs) is apparent throughout the wood, but again appears to be light at present.

ACTION: Grazing needs to be monitored (using the appropriate indicators in Annex 1) to ensure that current grazing levels are not increased. Consideration should be given to fencing off the woodland from the surrounding area outside the ASSI.

Burning

Although the heathland is not a feature in its own right, it does make up a large part of the SAC by area and is a fundamental component of the Upland mosaic (selection feature). The functional relationship between the heath and the wood is particularly important, as Largalinny represents one of the few examples of a comparatively natural (i.e. unfenced and comparatively unmanaged) upland oak/heath transition.

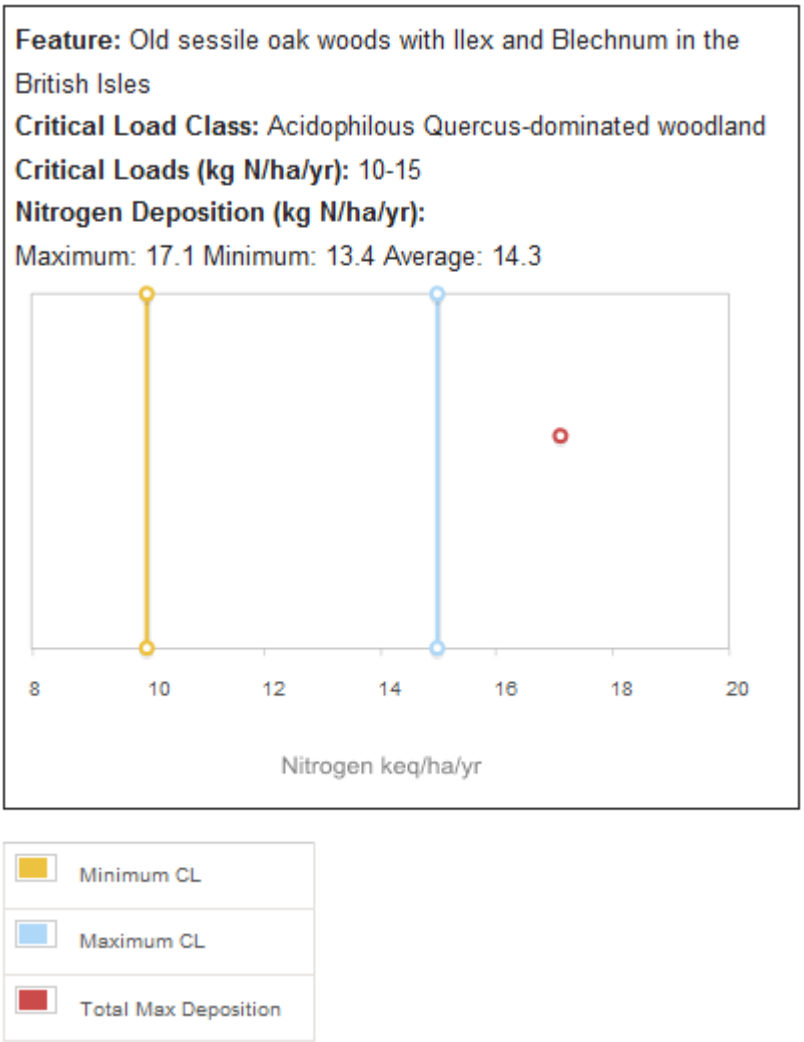
ACTION: Ensure uncontrolled burning of the heath is avoided, as this could spread to other valuable habitats and cause damage to them and species interests.

Drainage and eutrophication of waterbodies

Unlikely to be a problem, as it is largely an upland area with low intensity agriculture.

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 Largalinny 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
Activities occurring outside the site (e.g. agricultural intensification, drainage works, and development) may be detrimental to the site through remote affects.
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. woodland clearance, overwintering of stock, dumping etc), or will be comparatively slow. 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 that walls and fences are still intact. Check woodland particularly for felling, heavy grazing (especially overwintering of stock), goat damage and fly-tipping (the latter along the public road). In addition, check heathland for burning. SIM should be carried out once a year.

2. *Monitor the condition of the site (Condition Assessment)*
   Monitor the key attributes for each selection feature. This will detect if the features are in favourable condition or not.

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) – **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 39.6ha.	Visual estimate in 10x10m plots and 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 and across the extent of the ASSI using a combination of aerial photographs, SIM and Condition Assessment	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.

		structured walk.	
* 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 *Luzula sylvatica*.	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: *L. sylvatica* 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
	Mature trees (20 - 75cm	Estimate within the	

	diameter) at least frequent in 75% of plots	visual vicinity of the monitoring plots.	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.
	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. *Galium aparine, Urtica dioica, Heracleum spp, Epilobium spp. Rumex obtusifolius* No more than occasional is equivalent to less than 40% occurrence in recorded plots.	Visual estimate in 10x10m plots.	
* Cover of *Pteridium* (% cover)	The mean cover of *Pteridium* 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) (DAFOR)	There should be no felling or coppicing of native trees or shrubs.	Visual estimate in 10x10m plots and 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.

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:- *Vaccinium myrtillus,* *Blechnum spicant,* *Dicranum spp.,* *Luzula pilosa,* *Rhytidiadelphus loreus*	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:- *Sanicla europea,* *Geum urbanum,* *Polystichum setiferum,* *Aneomne nemorosa,* *Primula vulgaris.*	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:- *Carex remota,* *Ranunculus repens,* *Chrysosplenium oppositifolium,* *Filipendula ulmaria,* *Lysimachia nemorum.*	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.	

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

LOUGH FOYLE-
SPECIAL PROTECTION AREA (SPA)

UK9020031

CONSERVATION OBJECTIVES

Document Details

Title	Lough Foyle SPA Conservation Objectives
Prepared By	*Ian Enlander*
Approved By	*Mark Wright*
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Next Review Date	January 2020
Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials	Changes Marked
V1	02/02/1999	Internal working document	IE	
V1.1	August 2013	Review	IE	
V2.0	February 2015	Draft	IE	Complete review

Site relationship

To fully understand the site conservation requirements for this site it may be necessary to also refer to other site Conservation Objectives

This SPA partially overlaps or adjoins with the following SACs
Magilligan
River Roe and Tributaries
River Faughan and Tributaries

The SPA also matches the boundary of the Lough Foyle Ramsar site.

See also Boundary Rationale

The SPA is also close to, or adjoins, European designations in the Republic of Ireland. This is Lough Foyle SPA

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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, terrestrial/inter-tidal 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).

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.

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

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 GENERAL INFORMATION

COUNTY: Londonderry

G.R. C621 273 AREA: 2204.36 ha.

5 SUMMARY SITE DESCRIPTION

This major sea lough is remarkably shallow, with extensive mud and sand flats exposed at low tide. Though considerably diminished by historical reclamation schemes, notably around Myroe, Ballykelly and Longfield, it hosts the second largest area of inter-tidal habitat in Northern Ireland. The shoreline is generally engineered except around the Roe Estuary and northwards. Adjoining agricultural land is of importance as high tide roosts and in supporting wintering geese and swans.

5.1 BOUNDARY RATIONALE

The site principally includes the inter-tidal habitats within Lough Foyle, taking in all of the Lough Foyle ASSI and the adjoining coastal section of Magilligan ASSI/SAC north to Magilligan Point. Landward, the site is delimited by coastal defences. Sections of minor river estuaries have been included as they contain natural/semi-natural habitat of importance as bird roosts and feeding areas. Roost sites occurring outside the extent of natural or semi-natural habitat, together with those agriculturally improved areas utilised by swans and geese, have not been included but their importance must not be underestimated.

6 SPA SELECTION FEATURES

Feature Type	Feature	Population (5 year average 1995-2000)	Population at time of designation (ASSI)	Population at time of designation (SPA)	SPA Review population	Common Standards Monitoring baseline
Species	Bewick's Swan wintering population [b]	43	74	New (78)	78	10
Species	Whooper Swan wintering population [a]	811	905	890	890	566
Species	Golden Plover wintering population [b]	4511	4614	New	4891	2960
Species	Bar-tailed Godwit wintering population [a]	2059	2097	1896	1896	1535
Species	Light-bellied Brent Goose wintering population [a]	3765	3603	3730	3730	1765
Assemblage species	Great Crested Grebe wintering population	148	278	220	220	28
Assemblage species	Cormorant wintering population	106	120	Not listed	118	67
Assemblage species	Greylag Goose wintering population	391	85	67	67	22
Assemblage species	Shelduck wintering population	468	321	287	287	174
Assemblage species	Wigeon wintering population	9011	6153	8107	8107	3513
Assemblage species	Teal wintering population	660	718	751	751	403
Assemblage species	Mallard wintering population	1606	1802	1694	1694	1154
Assemblage species	Eider wintering population	143	154	50	50	8
Assemblage species	Red-breasted Merganser wintering population	135	96	73	73	26
Assemblage species	Oystercatcher wintering population	3101	2335	2045	2028	1683
Assemblage species	Lapwing wintering population	4024	3601	3084	3084	1078
Assemblage species	Knot wintering population	499	433	412	441	135
Assemblag	Dunlin wintering	4991	5606	4847	5606	3666

e species	population					
Assemblage species	Curlew wintering population	2263	2079	2152	2038	1710
Assemblage species	Redshank wintering population	988	811	791	812	386
Waterfowl assemblage	Waterfowl Assemblage wintering population [a] (Component species: Bewick's Swan, Whooper Swan, Golden Plover, Bar-tailed Godwit, Light-bellied Brent Goose, Great Crested Grebe, Cormorant, Greylag Goose, Shelduck, Wigeon, Teal, Mallard, Eider, Red-breasted Merganser, Oystercatcher, Lapwing, Knot, Dunlin, Curlew, Redshank)	24952	36416	36599	37310	14905
Habitat[1]	Habitat extent					
Habitat[1]	Roost site locations					

Table 1. List of SPA selection features.

[1] Habitat is not a selection feature but is a factor and is more easily treated as if it were a feature.

Notes on SPA features – may not be applicable to all SPAs

The above table lists all relevant qualifying species for this site. As the identification of SPA features has and continues to evolve, species may have different status but all should be considered in the context of any HRA process. Ultimately all SPAs will be renotified to formalise species features.

[a] – species cited in current SPA citation and listed on current N2K dataform

[b] – species selected post SPA designation through UK SPA Review 2001

[c] – species highlighted as additional qualifying features through the UK SPA Review 2015 or the UK marine SPA programmes.

6.1 ADDITIONAL ASSI SELECTION FEATURES -

Feature Type (i.e. habitat, species or earth science)	**Feature**	**Size/ extent/ pop[.]**
Habitat	Coastal saltmarsh	
Habitat	Saline lagoon	
Earth Science	Coastal processes	
Species	Great Crested Grebe wintering population	
Species	Cormorant wintering population	
Species	Greylag Goose wintering population	
Species	Shelduck wintering population	
Species	Wigeon wintering population	
Species	Teal wintering population	
Species	Mallard wintering population	
Species	Eider wintering population	
Species	Red-breasted Merganser wintering population	
Species	Oystercatcher wintering population	
Species	Lapwing wintering population	
Species	Knot wintering population	
Species	Dunlin wintering population	
Species	Curlew wintering population	
Species	Redshank wintering population	
Species	Mute Swan	

Table 2. List of ASSI features, additional to those that form all or part of SPA selection features. These will be referred to in ANNEX II.
[1] These species are selected as they contribute to the waterfowl assemblage feature. They are not SPA features in their own right. All exceed national population threshold and so are of ASSI significance.

7 CONSERVATION OBJECTIVES

The Conservation Objectives for this site are:

To maintain each feature in favourable condition.
For each feature there are a number of component objectives which are outlined in the tables below. Component objectives for Additional ASSI Selection Features are not yet complete. For each feature there are a series of attributes and measures which form the basis of *Condition Assessment*. The results of this will determine whether a feature is in favourable condition, or not. The feature attributes and measures are found in the attached annexes.

8 LOUGH FOYLE SPA CONDITION ASSESSMENT 2014

Species	2005/06	2006/07	2007/08	2008/09	2009/10	CSM	5 yr mean	% CSM	Status
Golden Plover	7640	9534	9211	8486	5091	2960	7992.40	**270.01**	Favourable
Bewick`s Swan	18	0	0	0	0	10	3.60	**36.00**	Unfavourable
Whooper Swan	1030	1042	1167	1240	2033	566	1302.40	**230.11**	Favourable
Bar-tailed Godwit	1133	2672	2300	2789	1501	1535	2079.00	**135.44**	Favourable
Light-bellied Brent Goose	3641	1778	3251	2550	3875	1765	3019.00	**171.05**	Favourable
Waterbird assemblage	38372	35032	33155	37562	28535	28494	34531.20	**121.19**	Favourable

9 SPA SELECTION FEATURE OBJECTIVES

To maintain or enhance the population of the qualifying species
To maintain or enhance the range of habitats utilised by the qualifying species
To ensure that the integrity of the site is maintained;
To ensure there is no significant disturbance of the species and
To ensure that the following are maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species

Feature	Component Objective
Bewick's Swan wintering population	As above
Whooper Swan wintering population	As above

Golden Plover wintering population	As above
Bar-tailed Godwit wintering population	As above
Light-bellied Brent Goose wintering population	As above
Great Crested Grebe wintering population	As above
Cormorant wintering population	As above
Greylag Goose wintering population	As above
Shelduck wintering population	As above
Wigeon wintering population	As above
Teal wintering population	As above
Mallard wintering population	As above
Eider wintering population	As above
Red-breasted Merganser wintering population	As above
Oystercatcher wintering population	As above
Lapwing wintering population	As above
Knot wintering population	As above
Dunlin wintering population	As above
Curlew wintering population	As above
Redshank wintering population	As above
Waterfowl Assemblage wintering population	As above
Waterfowl Assemblage wintering population	Maintain species diversity contributing to the Waterfowl Assemblage
Habitat Extent	Maintain or enhance the area of natural and semi-natural habitats used or potentially usable by Feature bird species. (2056.13 ha intertidal area) subject to natural processes
Habitat Extent	Maintain the extent of main habitat components subject to natural processes
Roost sites wintering population	Maintain or enhance sites utilised as roosts

Table 4. SPA Component objectives

9.1 ADDITIONAL ASSI SELECTION FEATURE OBJECTIVES

Feature	Component Objective
Coastal saltmarsh	To maintain or extend, as appropriate, the area of saltmarsh, subject to natural processes
	To maintain or enhance, as appropriate, the composition of the saltmarsh communities
	To maintain transitions between saltmarsh communities and to other adjoining habitats
	To permit the continued operation of formative and controlling natural processes acting on the saltmarsh communities
Brackish lake	To maintain or enhance, as appropriate, the composition of the brackish water communities
Coastal processes	Permit the continued operation of formative and controlling natural processes acting on the inter-tidal system. Maintain natural site morphology subject to natural processes.

Table 5. ASSI Component objectives

10 MANAGEMENT CONSIDERATIONS

See also Views About Management for relevant ASSIs

Owner/Occupier's **–** (to be used to identify any key management considerations arising from ownership e.g. owners/organisations having an obvious bearing on conservation matters or from management agreements).

Approximately 58 individuals/organisations own land within the SPA. Major landowners and leasees within the SPA, relevant to the site management, include Crown Estate Commissioners, NIEA RSPB and Private Individuals. There may be conflicts of interest between the requirements of individual/organisations, both within and adjacent to the SPA, and the site management needs.

Adjacent commercial operations which may impact upon the SPA include Derry City Airport, Derry City Port and Du Pont. Specifically, ongoing works associated with the runway facility at Derry City Airport, may lead to further loss of the intertidal area within the SPA. Other threats include unregulated sea defence works by individual landowners and the potential expansion of the port facilities. Du Pont a chemical and synthetic fibre manufacturing company sited close to Lough Foyle SPA, is a Part A Process under the Industrial Pollution Control Order. Du Pont also own land within the SPA.

11. MAIN THREATS, PRESSURES, ACTIVITES WITH IMPACTS ON THE SITE OR SITE FEATURES

Notifiable Operations **-** Carrying out <u>any</u> of the Notifiable Operations listed in the schedule could affect the site. The list below is not exhaustive, but deals with the most <u>likely</u> factors that are either affecting Lough Foyle SPA, or could affect it in the future. Although, features 1, 2, 3, 4 etc, are the qualifying SPA features, factors affecting ASSI features are also considered.

<u>Generic site/feature issues</u>

These principally relate to the SPA features – the list may be extended to take account of additional ASSI features on the site.

No	Issue	Threat/comments	Local considerations	Action
1	Adjoining habitat	Particularly important for swans and geese as well as providing high tide roost locations. Significant changes in land management and disturbance are key considerations. Such areas lie without the site making effective management of developments other than those for which planning permission is required, difficult.	Extensive areas of arable land with varying crop type means field usage varies.	Assess planning applications. Identify key areas and promote site management schemes. Review use of Wildfowl Refuges. Consider the collective impact.
2	Aquaculture	Disturbance is a minor consideration unless carried out deliberately to minimise losses to shell-feeding waterfowl. Alteration of natural littoral and sub-littoral communities through seeding, tray/trestle cultivation,	Lough Foyle has been identified as having substantial additional potential for aquaculture development. Major mussel beds at Longfield	Liaise with DARD Fisheries Division. Assess all license applications individually. Consider the collective impact.

		dredging/control of pest species. Naturalisation of introduced species – both the shellfish themselves and associated species e.g. algae and disease vectors.	Point coincide with areas of considerable waterfowl importance.	
3	Bait digging – commercial or 'recreational' and shellfish gathering.	Disturbance and impact on sediment and invertebrate fauna – may be positive through making deeper prey items available on surface. Shellfish gathering represents a net loss to the system in terms of biomass. Generally unregulated.	Unclear as to extent of activity in this area.	Monitor scale of activity. Consider the collective impact.
5	Beach sand and gravel extraction.	Disturbance issue together with loss of biologically active upper sediments. Most beach systems are sedimentalogically closed thus material removed may not be renewed making the activity unsustainable. May lead to changed sediment character of beach ultimately impacting on birds.	Unclear as to extent of activity in this area. The coastline north of Balls Point could be particularly adversely affected by significant extraction.	'Permitted' extraction of beach sand and gravel should be halted through management agreements. Ad hoc removal should be addressed in conjunction with local authorities.
6	Boating activity – commercial	Disturbance and potential for impact from high-speed liners.	Commercial shipping is limited to the main channel. The Magilligan ferry is functional No high-speed boats currently operate.	Formal consultation likely relating to new schemes. Consider the collective impact.
7	Boating activity – recreational	Disturbance and potential for impact especially from jet skis. Generally relevant to particularly sensitive areas within site.	Not thought to be an issue here. Most boating activity is on the ROI side of the Lough.	Liaise with appropriate authority with codes of good practice, zoning and use of by-laws as necessary. Consider the collective impact.
8	Coastal protection schemes	Where there is no history of this, it impacts on natural beach systems with loss of habitat.	Major problem between Balls Point and Point Road, Magilligan.	Liaise with Planning Service and other parties with an involvement in coastal management.
11	Drainage	Potential impact on water flooding regime. Potentially significant in relation to adjoining habitat if it leads to reduction in traditional areas of flooding.	Extent of potential impact unknown – swans and geese mainly use improved arable and pasture land.	Identify key areas and promote site management schemes to protect and enhance site features. Consider the collective impact.
12	Dredging	Generally only an issue in relation to commercial shipping channels. Issues include disturbance, loss of sediment from the system, remobilisation of contaminated sediment and spoil dumping zones.	Routine annual dredging occurs to Derry Port. Spoil is currently dumped outside of Lough Foyle. Ideally dredged spoil should be retained within the system.	Liaise with port authority and Environmental Protection as required with regard to water quality issues and pollution incidents.
13	Enhanced bird competition	Activities onsite or offsite that influences or results in a shift in balance of species utilising a site.	The main tip at Culmore is now closed. This was a major gull roost/feeding site.	Liaise with Planning Service. Review wider countryside changes.
14	Fishing – commercial or recreational	Minimal disturbance consideration but may represent 'competition' for piscivorous birds. Represents a net loss to the system in terms of biomass.	Limited commercial fishing within the Lough.	Liaise with DARD and fishing authority as required. Liaise with angling clubs as required.
15	Habitat	Loss of habitats through development,	'Approved' losses through	Assess planning

	extent – inter-tidal	changes in coastal processes. Loss of inter-tidal habitat is a critical issue as this is the feeding zone for the majority (numbers and species) of birds.	City of Derry runway extension, DARD sea defences and Magilligan ferry development have all resulted in some degree of loss of inter-tidal habitat. Further losses must be carefully assessed.	applications. Monitor using aerial photography.
16	Habitat extent – open water	Loss likely to be limited, but expansion of commercial port facilities can impact on key localities.	Minimal impact from Magilligan ferry development. Not likely to be a significant issue.	Assess planning applications. Consider the collective impact.
17	Habitat quality – inter-tidal	Alteration of habitat quality through diminution of water quality, invasive species or changes in coastal processes.	Principle threat is through spread of Spartina. Chemical and other industries in Derry area may present a threat through build-up of routine discharges or accidental spillage.	Assess planning applications. Deal with invasive alien species by preventing their spread or reducing their impact. Liaise with Environmental Protection as required with regard to water quality issues and pollution incidents. Consider the collective impact.
18	Habitat quality – open water	Alteration of habitat quality through diminution of water quality or invasive species.	Chemical and other industries in Derry area may present a threat through accidental spillage.	Assess planning applications. Deal with invasive alien species by preventing their spread or reducing their impact. Liaise with Environmental Protection as required with regard to water quality issues and pollution incidents. Consider the collective impact.
20	High tide roosts	An essential component of sites hosting waders. Development of adjoining ground or actual traditional roost localities may adversely impact on the sites carrying capacity. Many such sites lie without the site making effective management of developments, other than those for which planning permission is required, difficult.	Localities should be mapped.	Assess planning applications. Identify key areas and promote site management schemes. Review use of Wildfowl Refuges. Consider the collective impact.
21	Introduced species	Range of threats from loss of habitat, feeding competition, disease, hosting species presenting a threat outside of the site.	Spartina is the main issue with unrestricted spread resulting in loss of more significant inter-tidal and saltmarsh habitats.	Liaise with appropriate authority. Consider feasibility of elimination. Participate in national/international initiatives.
22	Power cables	Specifically a problem in relation to swans and geese. Threat is through impact. Need to consider flight lines, as well as feeding and loafing areas, which ideally should be avoided.	Review line marking.	Liaise with NIE. Minimum need is for line marking based on best current practice. Consider the collective impact.
24	Recreational activities.	Disturbance is the main consideration although vehicle access may also lead to beach compaction and impacts on beachhead habitats.	Cumulative disturbance impacts (e.g. boating, wildfowlers, walkers, dogs etc) may be a significant	Liaise with local authorities and other managing parties.

			factor for wintering bird populations impacting on both feeding (inter-tidal) and roosting birds Not currently thought to be a problem.	
25	Research activities.	Census and ringing activities especially have the potential to impact on bird populations, particularly at breeding sites.	Routine winter WEBS counts.	Census and ringing activities to be undertaken by competent individuals, appropriately trained. In case of ringers, appropriate license must be held.
28	System dynamics	Cuts across many other issues. Dynamic systems, especially coastal, can be affected by many factors especially engineered structures and significant changes in dominant wind direction or storm frequency. Many systems may indeed still be undergoing responses to historical developments e.g. partial reclamation, seawall construction. Changes may include alteration in sediment grade, shifts in patterns of erosion and deposition etc. Consequences for habitat and species utilisation of the site can be profound.	Extensive historical reclamation along much of the shore together with coastal engineering works from the Roe towards Derry. New developments include the ferry at Magilligan and the runway extension at Longfield. Aquaculture developments may be significant.	Human induced change should be minimised. Assess planning applications and liaise with other relevant authorities. Ad hoc dumping and removal of natural materials should be managed. Major natural shifts in system behaviour may be identified through analysis of aerial photographs and site monitoring. Major and consistent changes to patterns of habitat distribution and bird utilisation of the site should be noted.
30	Wildfowling	Has direct effect through bag sizes/bag species and wider disturbance issue. Issue of regulated (through recognised shooting clubs) and ad hoc shooters. Lead shot on grazing lands.	Shooting is concentrated over Ballykelly, Longfield and Roe areas. Urgent review of wildfowling required over existing Nature Reserves.	Liaise with relevant shooting bodies (BASC especially) to define areas for wildfowling, the development of Wildfowlers Codes of Good Practice and encourage bag returns. Support pressure to stop use of lead shot. Review use of Wildfowl Refuges. Consider the collective impact.

Table 3. List of site/feature management issues

12. MONITORING

Monitoring of our Special Protection Areas takes place at a number of levels, using a variety of methods. Methods for both Site Integrity Monitoring and Condition Assessment can be found in the Monitoring Handbook (To be written).

Maintain the integrity of the site. Undertake Site Integrity Monitoring (SIM) at least annually to ensure compliance with the SPA/ASSI schedule. The most likely processes of change (e.g. dumping, infilling, gross pollution) will either be picked up by Site Integrity Monitoring, or will be comparatively slow (e.g. change in habitat such as growth of mussel

beds). More detailed monitoring of site features should therefore be carried out by Site Condition Assessment on a less frequent basis (every 6 years initially to pick up long-term or more subtle changes). A baseline survey will be necessary to establish the full extent of the communities present together with the current condition of the features, against which all further condition assessments will be compared.

In addition, detailed quality monitoring or verification monitoring may be carried out from time to time to check whether condition assessment is adequate to detect long-term changes that could affect the site. This type of quality monitoring may involve assessment of aerial photographs to determine site morphological changes. Methodology for this is being developed.

12.1 MONITORING SUMMARY

1. Monitor the integrity of the site (Site Integrity Monitoring or SIM) – Complete boundary survey to ensure integrity of site and that any fencing is still intact. Ensure that no sand extraction or dumping has been 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 selection feature (dune, saltmarsh, species). This will detect if the features are in favourable condition or not. See Annexes I and II for SAC and Additional ASSI Features respectively.

   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 appropriate assessment that may be needed. It should be noted that appropriate assessments are a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

12.2. ADDITIONAL MONITORING ACTIONS UNDERTAKEN FOR SITES IN UNFAVOURABLE CONDITION

Monitoring actions set out in section 6 and Annex 1 will use, amongst other attributes, bird population data to determine site condition. In the event of a significant population decline being detected, a series of subsequent actions will be initiated. The following list is not exhaustive, actions will be site dependant, but the order of these points IS hierarchical i.e. consider point 1, then 2, etc.

1. Assess the site population in a wider geographical context – Northern Ireland, Ireland, UK, world. Refer to BTO ALERT limits etc. Liaise with other competent bodies to meaningfully assess wider pattern. No site action if site decline mirrors regional pattern the cause of which is not related to the site. Action may be required at regional or larger scale. If the cause of the regional population decline (e.g. eutrophication) is found at the site then action may be necessary, but this may

need to form part of a network of strategic species action. Further research may be required.

2. Assess the site population in a wider geographical context – Northern Ireland, Ireland, UK, Europe, world. Determine if site losses are balanced by gains elsewhere e.g. breeding terns. Review site condition to determine if losses are due to site deterioration. Determine if possible whether population has relocated within SPA series (national, biogeographical, European). Note that the reasons for such locational changes may not be readily identifiable. Further research may be required.
3. For passage/wintering species assess breeding information. No site action if site decline is due to breeding ground failure, unless breeding ground failure is related to poor adult condition resulting from factors affecting wintering / passage birds.
4. Determine whether a major incident has affected the site e.g. toxic impact on prey items, predation event or geographical shift in available prey. Ability to respond to impacts may be limited.
5. Assess condition of principal site habitats e.g. vegetational composition and structure, change in habitat balance e.g. mudflats reduced by encroaching mussel beds.
6. Assess prey availability. Issues to consider are both within site e.g. water quality, broad site management, and without site e.g. climatically driven factors.
7. Assess whether there have been any changes in any other site features or management practices (see Table 3) that may have affected populations of site selection features.
8. Long-term site value must be considered even when it is found to be in unfavourable condition for a number of reporting cycles. This is particularly important for breeding seabird and wader sites where ongoing appropriate management may ultimately encourage re-establishment of a favourable population.

13 SELECTION FEATURE POPULATION TRENDS

Site trends are reported using running 5 year means of annual maximum count (WeBS and other data). Long term trends in index values have been used to assess changes in overall wintering populations for Northern Ireland and UK (WeBS data). Caution is always necessary in the interpretation and application of waterfowl counts given the limitations of these data. The lower number of both sites and birds in Northern Ireland, result in a greater degree of fluctuation. Trends for Ireland are based on five years of data 1994-1999 (I-WeBS data). Consequently short-term fluctuations apparent in the data series may reflect changes not indicative of actual population change.

SPECIES	SITE TREND	NI TREND	ROI TREND	UK TREND	COMMENTS
Bewick's Swan	Declining	Declining	Large Fluctuation	Fluctuating	High Alert for NI
Whooper Swan	Stable	Declining	Moderate Fluctuation	Increasing	Moderate Alert for NI
Golden Plover	Stable		Slight Fluctuation		Golden Plover is not included in the indexing proce
Bar-tailed Godwit	Stable	Declining	Large Fluctuation	Stable/Declining	High Alert for NI
Light-bellied Brent Goose	Stable	Fluctuating	Slight Fluctuation		
Great Crested Grebe	Fluctuating	Increasing	Moderate Fluctuation	Increasing/Stable	
Cormorant	Fluctuating	Increasing	Stable	Increasing/Stable	
Greylag Goose	Fluctuating		Moderate Fluctuation	Increasing/Stable	
Shelduck	Increasing	Fluctuating/Increasing	Slight Fluctuation	Stable	
Wigeon	Fluctuating	Fluctuating	Stable	Stable	In the early 1980s in NI, counts of over 20,000 birds were regular. Numbers now peak well below this level.
Teal	Fluctuating	Fluctuating	Increasing	Increasing	
Mallard	Declining	Stable	Stable	Stable	Declining since 1990 in UK. Moderate Alert for UK.
Eider	Fluctuating	+/- Stable		Stable	
Red-breasted Merganser	Increasing	Stable	Stable	Fluctuating/Increasing	
Oystercatcher	Increasing	Increasing	Stable	Stable	
Lapwing	Increasing		Slight Fluctuation		Lapwing is not included in the indexing processes.
Knot	Stable	Fluctuating	Large Fluctuation	Stable	High Alert for NI. Moderate Alert for UK.
Dunlin	Stable	Stable	Slight Fluctuation	Fluctuating	Moderate Alert for UK
Curlew	Stable	Stable	Slight Fluctuation	Stable	
Redshank	Fluctuating	Fluctuating/Increasing	Stable	Stable/Fluctuating	
Waterfowl Assemblage	Fluctuating				

ANNEX I

Feature (SPA) – Wintering waterfowl

* = primary attribute. One failure among primary attribute = unfavourable condition
# = optional factors – these can be in unfavourable condition without the site being in unfavourable condition

Attribute	Measure	Targets	Comments
* Bewick's Swan wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
* Whooper Swan wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
* Golden Plover wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
* Bar-tailed Godwit wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
* Light-bellied Brent Goose wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Great Crested Grebe wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.

Attribute	Measure	Targets	Comments
# Cormorant wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Greylag Goose wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Shelduck wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Wigeon wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Teal wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Mallard wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Eider wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.

Attribute	Measure	Targets	Comments
# Red-breasted Merganser wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Oystercatcher wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Lapwing wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Knot wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Dunlin wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Curlew wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Redshank wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.

* Waterfowl Assemblage wintering population	Bird numbers	No significant decrease in Waterfowl Assemblage population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Waterfowl Assemblage wintering population	Species diversity	Maintain species diversity contributing to the Waterfowl Assemblage	

Feature (SPA) - Non-avian factors

Attribute	Measure	Targets	Comments
* Habitat extent	Area of natural and semi-natural habitat	Maintain the area of natural and semi-natural habitats used by notified species, within the SPA, subject to natural processes.	Monitor once every reporting cycle by aerial photography.
# Extent of different habitats	Extent of different habitats	Maintain the extent of main habitat components subject to natural processes	Evaluate habitat quality should bird populations decline due to on site factors. Map any changes in area. This may include mapping areas with different vegetation structures where this would lead to different usage by notified species.
# Roost sites	Location and number of roost sites	Maintain or enhance sites utilised as roosts	Map roost site locations. Visit once every reporting cycle to ensure sites are available.

ANNEX II

Feature (ASSI)

* = primary attribute. One failure among primary attribute = unfavourable condition
# = optional factors – these can be in unfavourable condition without the site being in unfavourable condition

Attribute	Measure	Targets	Comments
Coastal saltmarsh			
Brackish Lake			

Coastal processes			

LOUGH MELVIN SAC
UK0030047

CONSERVATION OBJECTIVES

Document Details

Title	*Lough Melvin SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
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Contact	cdp@doeni.gov.uk

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Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	January 2015	Complete review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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: FERMANAGH

GRID REFERENCE: IG 920532

AREA: 516.47 ha

5. SUMMARY SITE DESCRIPTION

Lough Melvin originates from the end of the last Ice Age with a catchment lying mainly in the Republic of Ireland. The catchment is relatively small for such an expansive waterbody (15.8 million $m^{3)}$. The lough is fed by five major rivers; and drains into the Drowes River, a 7km outlet into Donegal Bay. The water is in a relatively pristine state, as it has not been artificially enriched by pollutants. Most of the shoreline and shallow margins of the lough are exposed to wave action and have a rocky character.

The lough itself is characterised by open water plant communities typical of mesotrophic (unenriched) conditions, a narrow fringe of emergent swamp and fen and a number of wooded islands. In addition, some of the surrounding lands contain traditionally managed grasslands including Fen Meadow that are rich in plant species. The wide range of habitats is reflected in the diversity of plant and animal communities present. Lough Melvin is of particular importance for its fish population.

The water volume of Lough Melvin is 15.8 million m^3 and has a flushing rate of 360 days. The water is in a relatively pristine state, as it has not been artificially enriched by pollutants, being dilute in both major ion and nutrient chemistry. Calcium concentration is 19.3mg/l (1988), slightly below normal for lowland lakes in Northern Ireland reflecting the relative preponderance of inert rocks in the catchment. Total phosphorus concentration is 19 □g/l (1989), not as enriched as most lowland lakes and low enough to categorise the water as mesotrophic. This probably reflects the small size of the catchment, as well as the population and land-use within it.

The shoreline of Lough Melvin ASSI totals 48km, of which 12.5km (lough shore length - 10.5km, island shore length - 2km) is within the Northern Ireland at an altitude of approximately 25m, with a mean depth of 8.5m and a maximum depth of 45m towards the southern shore.

The Lough Melvin catchment and water body lies mainly with in the jurisdiction of Republic of Ireland. Both the Republic of Ireland and Northern Ireland Governments have put forward Lough Melvin as a SAC.

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 boundary has been drawn to include the open water of the lough, its islands and adjacent semi-natural habitats such as woodland, species rich grassland and natural transition vegetation such as scrub or heath. The SAC boundary was extended to include Garvros ASSI. The site boundary utilised permanent man made boundary features wherever possible, however along some stretches of the foreshore, such boundaries were absent and recognisable topographical or physical features such as break in slopes or scrub line where used.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/pop
Habitat	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflora* and/or of the *Isoet-Nanojuncetea*	A	409.12
Habitat	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinia caeruleae*)	B	26.5
Habitat	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	C	28
Species	Atlantic Salmon *Salmo salar*	C	
Habitat	Residual alluvial forests (Alnion glutinoso-incanae)	D	
Habitat	North Atlantic wet heaths with *Erica tetralix*	D	
Species	Otter *Lutra lutra*	D	P

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 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 Lough Melvin SAC.

6.1 ASSI SELECTION FEATURES

Lough Melvin ASSI

Feature Type	Feature	Size/ extent/ pop~
Habitat	Mesotrophic Lakes	409.1 ha
Habitat	Purple Moor-grass & Rush Pasture	26.5 ha
Habitat	Oakwood	28 ha
Species	Atlantic Salmon *Salmo salar*	
Species	Freshwater & estuarine fish assemblage (Unique post-glacial fish community – Sonaghen *Salmo nigripinnis,* Gillaroo *S. stomachius,* Ferox *S. ferox*, Atlantic Salmon *S. salar* and Arctic Charr *Salvelinus alpinus.*)	
Species	Higher plant assemblage (Slender-leaved Pondweed *Potamogeton filiformis* (2), Chaffweed *Anagallis minima* (3), Globeflower *Trollius europaeus* (5), Thin-spiked Wood Sedge *Carex strigosa* (2), Blue-eyed Grass *Sisyrinchium bermudiana* (3))	ABCD score 15
Species	Invertebrate assemblage	

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The *Conservation Objective* for this site is:

To maintain (or restore where appropriate) the

- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflora* and/or of the *Isoet-Nanojuncetea*
- Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinia caeruleae*)
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- 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	Global Status	Objective
Oligotrophic to mesotrophic standing water with vegetation belonging to *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea*	A	Open water area to remain stable and water level regime to follow a natural cycle.
		The lake water to remain poor in plant nutrients and not to fluctuate outside normal limits.
		The lake water alkalinity not to fluctuate outside normal limits.
		The degree of peat staining of the lake water to remain at low levels
		Characteristic aquatic vegetation to remain present, including zones of isoetid vegetation.
		Hard basin substrate not to become buried below soft sediments. Inflows not to carry an abnormal sediment load.
		Minimal negative impacts from artificial structures.
		Minimal negative impacts from recreation.
		Co-ordinate monitoring efforts north and south of the border, and correlate the results
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinia caeruleae*)	B	Maintain and <u>expand</u> the extent of existing fen meadow but not at the expense of other SAC (ABC) features. (There are area of degraded heath, scrub, and damp grassland which have the potential to develop into fen meadow)
		Maintain and enhance fen meadow species diversity including the presence of notable or rare species.
		Maintain the diversity and quality of habitats associated with the fen meadow, e.g. wet grasslands, wet heath, wet woodland and scrub, especially where these exhibit natural transition to fen meadow.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for restoring fen meadow.
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	C	Maintain and <u>expand</u> the extent of existing oak woodland but not at the expense of other SAC (ABC) features. (There are area of degraded heath, wetland and damp grassland which have the potential to develop into oak woodland)
		Maintain and enhance Oak woodland species diversity including the presence of notable or rare species.

		Maintain and enhance Oak woodland structure
		Maintain the diversity and quality of habitats associated with the Oak woodland, e.g. fen meadow, grasslands, wet heath wet woodland and scrub, especially where these exhibit natural transition to Oak woodland
		Seek nature conservation management over adjacent forested areas outside the SAC where there may be potential for woodland rehabilitation.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for woodland expansion.
Salmon *Salmo salar*	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. ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Mesotrophic Lakes	See SAC Selection Feature Objective Requirements table.
Purple Moor-grass & Rush Pasture	See SAC Selection Feature Objective Requirements table.
Oakwood	See SAC Selection Feature Objective Requirements table.
Atlantic Salmon *Salmo salar*	See SAC Selection Feature Objective Requirements table.
Freshwater & estuarine fish assemblage	Maintain and if possible, expand population numbers and distribution of unique post glacial fish community - (Sonaghen *Salmo nigripinnis*, Gillaroo *S. stomachius*, Ferox *S. ferox*, and Arctic Charr *Salvelinus alpinus*)
	Maintain and where possible, enhance the extent and quality of suitable habitat, in particular the chemical and biological quality of the water
Higher Plant Assemblage	Maintain abundance and distribution and if feasible, enhance population of five individual rare and notable plant species.
	Establish the status of these species and if appropriate draw up further conservation priorities for these species.
Invertebrate assemblage	Maintain abundance and distribution and if feasible, enhance population.

	Maintain and enhance species and community diversity including the presence of notable species.

10. MANAGEMENT CONSIDERATIONS

Ownership

The majority of the terrestrial areas included within the SAC are privately owned, the open water body and sporting rights are owned by the Trustees of Lough Melvin (Garrison lly Trustees). In total, there are 46 individuals or orginisations with ownership or other rights associated with the site.

Adjoining Land Use

The Lough Melvin catchment is relatively small for such an expansive waterbody. Five major rivers; Tullymore, Roogagh, County, Ballagh and Glenaniff feed the lough. The Tullymore and Roogagh rivers lie in Northern Ireland, and the County River forms the border between Co. Fermanagh and Co. Leitrim. The lough drains into the Drowes River, a 7km outlet into Donegal Bay south of Bundoran, forming the border between Co. Donegal and Co. Leitrim.

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 <u>likely</u> factors that are either affecting Lough Melvin, or could affect it in the future.

Although **Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflora* and/or of the *Isoet-Nanojuncetea*, Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinia caeruleae*), Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles and Salmon *Salmo salar***
are the qualifying SAC features, factors affecting ASSI features are also considered.

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

OPEN WATER IMPACTS

Nutrient enrichment
The ecology of this lake type is very susceptible to any degree of nutrient enrichment.
ACTION: Continued monitoring of water quality by Environment Protection and the Northern Regional Fisheries Board in the Republic of Ireland should identify increases in the eutrophic status of the lough.

Recreational Pressure
Although disturbance is minimal in most areas of the Lough, it is possible that the popularity of this area for angling, camping and boating holidays will increase considerably.
ACTION: Monitor possible adverse impacts from increasing recreational pressure.

Alien Species
Only a few exotic plant species have been recorded for the water body, the most common being the Canadian Pondweed *Elodea canadensis*. This species although having a very high frequency of occurrence is not having a notable ecological impact.

Recent monitoring has indicated that Zebra Mussel (*Dressiness polymorpha*) is widespread and increasing in density within the Erne System. The potential impacts on the ecology of Lough Melvin are difficult to predict if it spreads into this system.
ACTION: Monitor the impacts of alien species and if necessary take control measures to reduce any adverse impacts from such species.

WOODLAND IMPACTS

Grazing/Poaching/Tree barking and Browsing
Free access to woodland by domestic stock and feral goats is causing direct damage to the ground flora community by poaching and trampling, grazing, and barking, is preventing regeneration and will increasingly, with time, cause a detrimental change in the 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 goats is available.
ACTION: Investigate the current activity relating to the practice of grazing woods by domestic stock. Reduce stocking pressure in woods to sustainable level or exclude stock by fencing off woodland under management agreement.
Undertake census of the current population levels of feral goats and initiate control measures to reduce numbers to acceptable levels using appropriate measures.

Woodland Clearance
Localised and *ad hoc* removal of woodland takes place. Removal of woodland could lead to a reduction in diversity.
ACTION: Ensure there is no removal of woodland from the site.

Dead Wood Removal
Dead wood should be left *in situ* if safe or practical to do so. This provides valuable habitat for fungi, invertebrates etc. Removal of wood or fire-wood should be discouraged.
ACTION: Ensure there is no removal of dead wood from the site.

Invasion by exotics
Exotic species have a localised distribution. They vary in the degree of impact they have and the threat they pose. Very invasive species such as Sycamore *Acer pseudoplatanus*, and Rhododendron are seen as posing a current threat. Others are not seen as an immediate threat due to their very limited occurrence or their slow rate of spread i.e. Beech *Fagus sylvatica*.
ACTION: The very invasive species require management to control their spread, which in most cases will require the current seed source to be removed from site. Those species not posing a threat at present should be monitored and in the long-term controlled if required.

Fly-tipping
There are a few localised occurrences of fly-tipping .
ACTION: Removal of dumped material from the woods when practical to prevent the build up of debris and to discourage further tipping. Fence off woodland adjacent to roads to discourage further tipping.

SPECIES IMPACTS

The post-glacial salmonid community is typically very fragile and susceptible to disruption and destruction. In particular the genetic uniqueness of Lough Melvin fish populations are in a delicate balance and susceptible to human-induced changes such as stocking either of trout of non-Melvin origin or non-indigenous species.
Arctic Charr would be under threat from smolt-rearing and cage-rearing of salmonids should they be introduced. Predation by and competition with native brown trout and introduced coarse fish species also threaten this important population. A report of the existence of Rudd in the lough is a cause for concern.
ACTION: Ensure there is no introduction of non-indigenous salmonids or coarse fish which would threaten Lough Melvins indigenous salmonid population.
Instigate cross border monitoring mechanism between the relevant fisheries authorities to monitor population trends.

GRASSLAND IMPACTS

Grassland dereliction
The lack of positive management is resulting in the loss of both extent and quality of this habitat. Undergrazing or cessation of grazing results in pastures becoming rank, with a loss in species diversity and ultimately, scrub encroachment. Scrub encroachment is a natural successional development, but results from neglect or undergrazing. On the other hand, over-grazing leads to physical damage through poaching, in addition to reducing species diversity. The thin skeletal soils of calcareous grassland are particularly prone to damage if overgrazed.
ACTION: The correct grazing levels should be introduced to promote the maintenance of a species-rich grassland sward, which will be beneficial to both plants, invertebrates and grassland fungi.

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 Lough Melvin SAC.

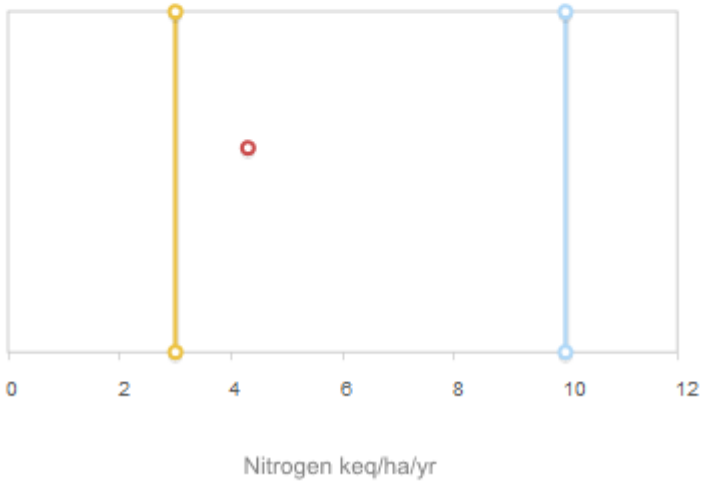
Feature: Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoeto-Nanojuncetea

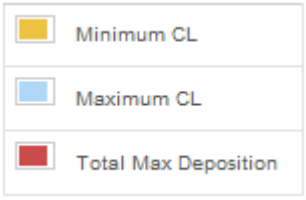
Critical Load Class: Permanent oligotrophic waters: Softwater lakes

Critical Loads (kg N/ha/yr): 3-10

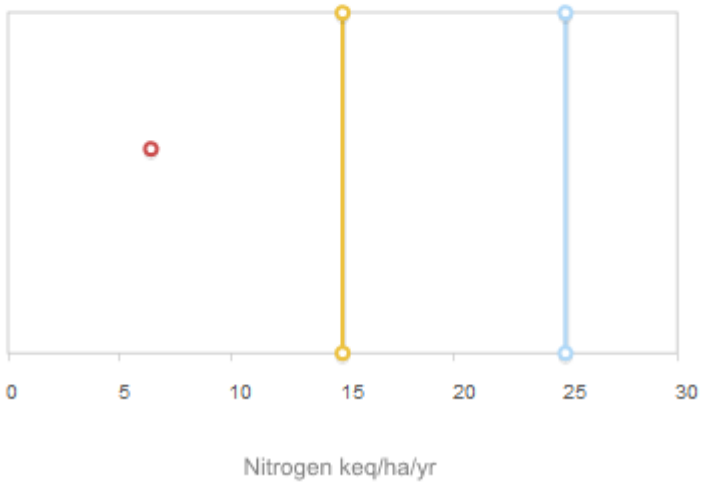
Nitrogen Deposition (kg N/ha/yr):

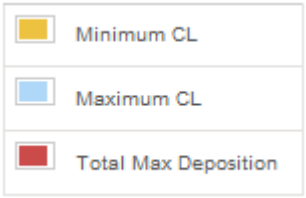
Maximum: 4.3 Minimum: 4.1 Average: 4.2



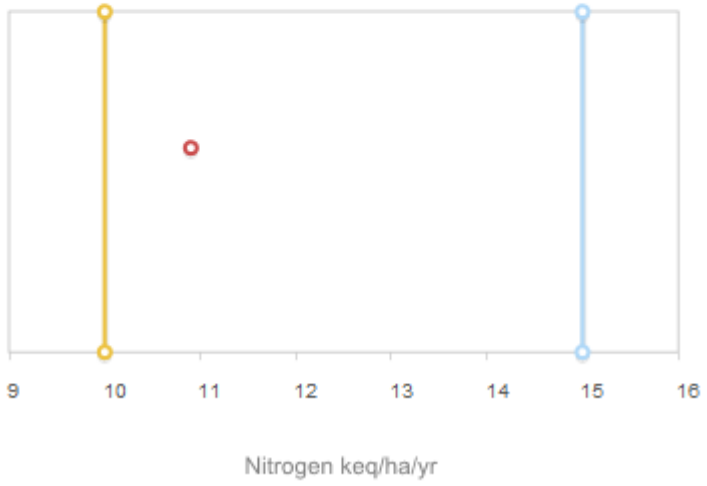


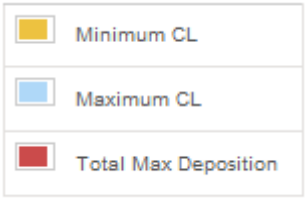
Feature: Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)
Critical Load Class: Moist and wet oligotrophic grasslands: Molinia caerulea meadows
Critical Loads (kg N/ha/yr): 15-25
Nitrogen Deposition (kg N/ha/yr):
Maximum: 6.4 Minimum: 5.7 Average: 6



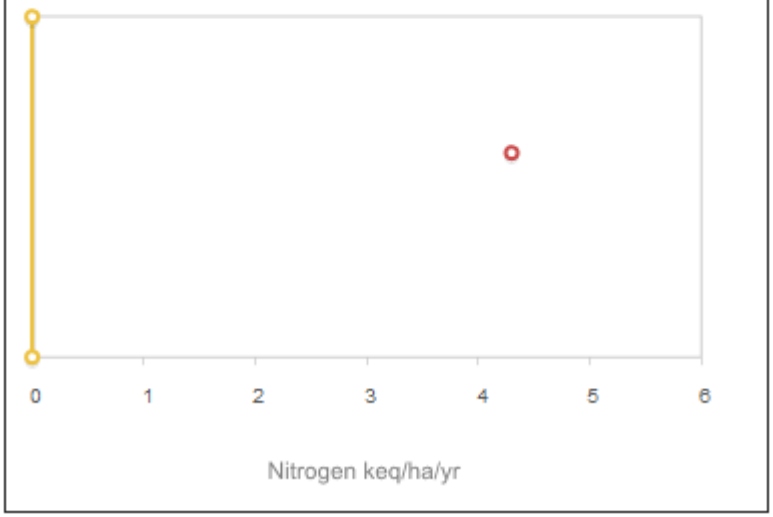


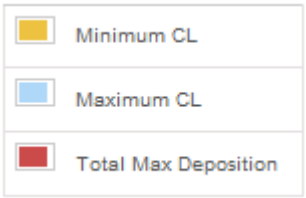
Feature: Old sessile oak woods with Ilex and Blechnum in the British Isles
Critical Load Class: Acidophilous Quercus-dominated woodland
Critical Loads (kg N/ha/yr): 10-15
Nitrogen Deposition (kg N/ha/yr):
Maximum: 10.9 Minimum: 9.4 Average: 9.9





Feature: Salmo salar - Atlantic salmon
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 4.3 Minimum: 4.1 Average: 4.2





(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. 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. 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.

12.1 MONITORING SUMMARY

1. *Monitor the integrity of the site (SIM or Compliance Monitoring)*
Check the integrity of fences and check for any obvious problems (e.g. algal blooms, dumping of rubbish) 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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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.

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ANNEX I

Feature 1 (SAC) - Oligotrophic to mesotrophic standing water with vegetation belonging to *Littorelletea uniflorae* and/or of the *IsoUto-Nanojuncetea*

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

Attributes	Measure	Target	Comment
Extent	Assessment against baseline map. Aerial photographs may be used.	No loss of extent of standing water	
Composition of macrophyte community	Characteristic species composition	No loss of characteristic species present at the site	This type of water body occurs in the majority of Member States and is abundant in the more mountainous areas of Europe. In the UK this freshwater habitat type is largely confined to the mountainous regions of the north and west and is characterised by two intergrading types: oligotrophic and mesotrophic waters. The vegetation community is characterised by amphibious short perennial vegetation, with shoreweed *Littorella uniflora* being considered a defining component. There are two distinct community types, one extremely oligotrophic with the presence of *Subularia aquatica* as the main associate, with *Littorella uniflora* and *Isoetes lacustris*. *Myriophyllum alterniflorum, Lobelia dortmanna* and *Sparganium angustifolium* occur as associates. The other community has a clinal range of species as the trophic state increases. These richer trophic states cannot support *Subularia*

	Non-native plants	Non-native species should be absent or present at low frequency. No introductions of non-native species	*aquatica* but the presence of some or all of *Nuphar lutea, Persicaria amphibia, Sparganium minimum, Potamogeton perfoliatus, P obtusifolius* is indicative of an increased trophic state. (N.B. *Subularia* may be naturally absent from some regional areas.) Two nationally scarce plants *Luronium natans* and *Pilularia globulifera* occur at the interface between oligotrophic and mesotrophic water types. **As this interest feature covers a wide range of trophic states it is essential to establish which community type represents the feature for the site in question.** The presence of high cover of *Sphagnum* species and/or *Juncus bulbosus* var. *fluitans* above 40% level for oligotrophic waters and *Myriophyllum* or *Elodea canadensis* above 40% level or presence of *Elodea nuttallii* for mesotrophic waters is indicative of a site in unfavourable condition. e.g. Presence of *Crassula helmsii* is indicative of a site moving out of favourable condition; dominance of *C. helmsii* is indicative of a site in unfavourable condition.
*Macrophyte community structure	Distribution Extent	Characteristic zones of vegetation should be present Maintain at least the present maximum depth	Characteristic zonation with increasing depth should be: *Littorella,* then overlapping zones of *Littorella* with *Lobelia,* then *Isoetes* *L. uniflora* and *L. dortmanna* dominant in depths <1.5 m; *Isoetes*

	Structure	distribution of *Isoetes* Maintain at least the present community structure	dominant > 1.5 m. *Isoetes* has been recorded in Waste Water at depths of 7 m. It is very sensitive to wave action, setting a shallow depth limit particularly in exposed sites.
*Water quality	Water Chemistry	Maintain oligotrophic/mesotrophic conditions The pH/ANC, and nutrient levels (P and N) should be stable and appropriate for the interest feature	As a guide Stable nutrient levels: TP target/limit: Oligotrophic = 10 $\mu g\ L^{-1}$ Stable nutrient levels: TP target/limit: Mesotrophic = 10 $\mu g\ L^{-1}$ Stable pH values: pH – 5.5 to circumneutral Adequate dissolved O_2 (>5 $\mu g\ L^{-1}$) There is a wide clinal range of community types embraced in this feature. Water quality targets should be set for individual SACs and an acceptable range established. The acceptable range of chemical conditions (especially total P, other forms of phosphorus, pH/ANC, and where appropriate NO_3-N,) should be set for individual SACs from recent or historical water chemistry data Check for changes in catchment land-use in the catchment causing diffuse pollution and/or siltation and check point sources of pollution. Aerially applied agro-chemicals have a high potential to change plant communities, and move them out of favourable condition.

			Other methodologies involving trophic scoring can contribute to the assessment of favourable condition. There is a need to develop a UK-wide lake environment monitoring protocol, which includes biology, water chemistry, nutrients, aesthetic conditions and toxic substances.
Hydrology	Hydrological regime	No deterioration in hydrological regime compared to the baseline.	Natural flushing rate and seasonal pattern of fluctuation need to be considered. Maintain flushing rate of system. Modifications of inflows and outlets or changes in hydrology (e.g. from flood control regimes, abstraction and gravel removal) can lead to unnatural changes in lake levels. *L. uniflora* can tolerate extreme inter-annual fluctuations in water level and long periods of exposure. *L. dortmanna* is tolerant of short periods of exposure but intolerant of desiccation.
Lake substrate character	Shore line and substrate	Maintain the natural shoreline of the lake. Substrate should be natural and	Substrate is typically sand, gravel, stones and boulders with low organic content but sometimes locally high peat content. Sediment quality and quantity when enriched can cause excessive growths of *Juncus bulbosus* var. *fluitans* or growths of algae.

		characteristic of lake type.	
Sediment load	Sediment load	Minimal	Increases in siltation could result from increased lake productivity, changes in catchment land-use (particularly over-grazing), lake level fluctuations, climatic fluctuations or changes in sewage treatment.

Aspects of environmental disturbance to be noted as an accompaniment to assessing favourable condition

Objective	Specified assessment method (if appropriate)	Comment
Minimal negative impact from artificial structures Minimal negative impact from recreation Direct application of lime to the water column as an acidification amelioration strategy should not be carried out No impacts from fish farming Catchment area changes affecting the lake, such as flood defences and infrastructure schemes should be considered.		Artificial structures could include boat-mooring facilities, dams, fish reefs. Negative impacts from recreational activities can include enrichment caused by ground baiting, introduction of bottom feeding fish and other organisms not characteristic of the habitat, increased disturbance to SACs from water-sports. Efforts should be directed towards reducing atmospheric emissions and implementing catchment management strategies, especially in relation to coniferous forestry.

Feature 2 (SAC) – *Molinia* meadows on calcareous peaty or clayey-silt-laden soils (*Molinion caeruleae*) (Status B)

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

Attribute	Target	Method of Assessment	Field Notes	Comments
Extent				
* Extent of Purple Moor-grass and rush pastures	Maintain the extent of Purple Moor-grass and rush pastures.	Visual estimate in 2x2 m plots and across the Purple Moor-grass and rush pastures using a combination of aerial photographs, SIM and Condition Assessment structured walk.	No loss of grassland was observed during the condition assessment, but SIM and aerial photographs were not consulted.	In exceptional circumstances, target may be set to accept some loss to other habitat, e.g. if required by specialist taxa or other ASSI feature in a mosaic such as lowland meadow or calcareous grassland Threshold areas for assessing 'significant' loss will vary according to site and the quality of available vegetation maps and/or aerial photos.
Presence of associated semi-natural habitats	Maintain existing associated semi-natural habitats.	Visual estimate in 2x2m plots and across the ASSI using a combination of aerial photographs, SIM and Condition Assessment structured walk.	The condition of this attribute cannot be assessed until the next monitoring period.	Repeat monitoring of plots using GPS should indicate whether mosaics and associated habitats have changed or been lost.

Vegetation structure				
Height (excluding *Juncus* spp.)	Mean vegetation height 2-20cm	Visual estimate in 2x2m plots		Note that this figure is for pasture and that a late visit to a hay meadow may come out over or under this target.
% cover litter (in a more or less continuous layer, distributed either in patches or in one larger area).	Less than 25% mean cover	Visual estimate in 2x2 m plots		
Cover of bare ground not rock extent. Noticeable without disturbing the vegetation.	Less than 10% mean cover	Visual estimate in 2x2 m plots		NB. It is the average amount present through the sward. It must be visible from above without disturbing the vegetation and will not include rock or pebbles.
Vegetation composition – Positive indicators				
* Frequency of *Molinia caerulea*. *Molinia* should be frequent throughout the sward. This only applies to Fen Meadow.	Must be at least occasional throughout the sward.	Presence recorded in 2x2m plots and then establish frequency in 2x2m plots throughout the entire site by working out % plots that species occurs within.		This only applies to Purple Moor-grass fen meadow (M24/M25/M26).
* Cover of herbs, sedges and small wood-rushes.	35-90% herbs.	Visual estimate in 2x2 m plots		Herbs include small wood-rushes and sedges. Be careful estimating herb cover as it is usually underestimated in tall swards.

* Frequency of community character species *Alchemilla* sp. *Anagallis tenella* *Breutelia chrysocoma* *Briza media* *Carex flacca* *Caltha palustris* *Carex hostiana* *Carex nigra* *Carex panicea* *Carex pulicaris* *Centaurea nigra* *Cirsium dissectum* *Crepis paludosa* *Ctenidium molluscum* *Dactylorhiza sp*. *Epilobium palustre* *Equisetum palustre* *Erica tetralix* *Euphrasia officinalis agg.* *Filipendula ulmaria* *Galium palustre,* *Hydrocotyle vulgaris* *Lathyrus pratensis* *Linum catharticum* *Lotus pedunculatus* *Lychnis flos-cuculi* *Lysimachia nummularia Mentha aquatica*	At least two of these species at least frequent and three at least occasional throughout the sward At least frequent is equivalent to greater than 41% occurrence in recorded plots. At least occasional is equivalent to greater than 21% occurrence in recorded plots.	Record presence in 2x2m plot		This list applies to the NVC communities M23, M24, M25 and M26. The species in red are only to be considered when the community is MG8 or there is no clear distinction between M23a and MG5.

Pedicularis sylvatica *Potentilla erecta* *Primula vulgaris* *Ranunculus flammula* *Rhinanthus minor* *Succisa pratensis* *Vicia cracca*				
Vegetation composition – Indicators of negative change				
* Frequency and cover of negative indicator species- agricultural weeds : *Cirsium arvense* *Cirsium vulgare* *Rumex crispus* *Rumex obtusifolius* *Urtica dioica* *Bellis perennis* *Plantago major*	No more than occasional throughout the sward. No species at 5% cover or as a group at 10% cover.	Record presence in 2x2m plot		
* Cover of negative indicator species – agriculturally favoured species : *Lolium perenne* *Ranunculus repens* *Holcus lanatus* *Trifolium repens*	No species at 10% cover or as a group of species at 20% cover throughout the sward	Visual estimate in 2x2 m plots		*Holcus* tends to be at a higher cover in wetter grasslands, so the generic target of may be increased on a case by case basis.
* Cover of rank grasses.	No more than 10% cover	Visual estimate in 2x2 m plots		Species such as *Arrhenatherum elatius*, *Deschampsia cespitosa* and *Dactylis glomerata*.

* Cover (combined) of *Cirsium palustris* and *Senecio aquaticus*.	No more than 20% cover combined	Visual estimate in 2x2 m plots		To quantify any sward disturbance through overgrazing etc.
* % cover of *Juncus effusus and J. inflexus.*	Bulky rush species should not exceed 20%	Visual estimate in 2x2 m plots		
* Cover of scrub/tree species and *Pteridium aquilinum* (except *Salix repens* or ericoids). Where invertebrates are an interest feature a higher cover of scrub may be acceptable.	No more than 5% mean cover within the sward as measured in 10m radius of the plot. No more than 5% mean cover measured in a 10m radius from the 2x2m plot.	Visual estimate within a 10 m radius of plot.		These targets should be used with caution. Scrub and tree cover can form a useful transition habitat across part of a site, but if more than occasional throughout a sward, even at less than 5% cover, scrub and bracken can soon become a problem if grazing levels are not sufficient or if control measures are not being carried out. High scrub cover may be required at sites with specialist invertebrate interest.
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.	Name the species 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.	It is recommended that the appropriate size class and extent of scarce taxa be recorded. For plants, recommended size classes are as follows for number of shoots (or ramets): very small 1-10; small 11-100, medium 101-

				1000, large 1001-10000; very large >10000.

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

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

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

Attribute	Targets	Method of Assessment	Comments
* Area of Oakwood	Maintain the extent of Oakwood at 28 ha.	Visual estimate in 10x10m plots and 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 and 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 *Luzula sylvatica*.	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: *L. sylvatica* 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	Standing dead wood at least occasional in 70% of plots and	Visual estimate in 10x10m plots.	

dead wood (DAFOR)	at least frequent in 30% of 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)	Non–native invasive canopy species should be present in	Visual estimate in 10x10m plots.	The canopy of the Oak woodland should be largely comprised of Oak trees. Non-native species are

(presence/absence)	less than 20% of plots, but never frequent.		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. *Galium aparine, Urtica dioica, Heracleum spp, Epilobium spp. Rumex obtusifolius* No more than occasional is equivalent to less than 40% occurrence in recorded plots.	Visual estimate in 10x10m plots.	
* Cover of *Pteridium* (% cover)	The mean cover of *Pteridium* for the wood should be less than 10%.	Visual estimate in 10x10m plots.	
* Cover of grasses (non-woodland	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

species) (% cover)			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) (DAFOR)	There should be no felling or coppicing of native trees or shrubs.	Visual estimate in 10x10m plots and across the extent of the ASSI using a combination of aerial photographs, SIM and Condition	Felling non-native species as part of management for conservation is acceptable.

		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:- *Vaccinium myrtillus,* *Blechnum spicant,* *Dicranum spp.,* *Luzula pilosa,* *Rhytidiadelphus loreus*	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:- *Sanicla europea,* *Geum urbanum,* *Polystichum setiferum,* *Aneomne nemorosa,* *Primula vulgaris.*	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:- *Carex remota,* *Ranunculus repens,* *Chrysosplenium oppositifolium,* *Filipendula ulmaria,* *Lysimachia nemorum.*	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	Maintain current levels of standard variation within	Name the species at least present along	

to the site.	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.	the length of the Condition Assessment structured walk.	

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

Feature 4 (SAC) – Atlantic salmon (*Salmo salar*) (Status C)

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

Attribute	Measure	Targets	Comments
*Population dynamics	Number	Stable or increasing	
	Adult Run	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.	The N.I. equivalent of Environment Agency MBAL (Minimum Biological Acceptable Level) should be set for each catchment.
	Juvenile population densities	These should not differ significantly from those expected for the river type/reach under conditions of high physical and chemical quality.	Expectation needs to be tempered by the intrinsic ability of the river type to support salmon. Fish classification schemes operated regionally and nationally should permit an interpretation of performance.

	Biological disturbance: Introductions	The population should be naturally self-sustaining. There should be a presumption against stocking of salmon unless it is agreed to be necessary as an emergency interim measure to maintain population viability whilst underlying ecological problems are being addressed. No introduction, or stocking, of other species, or sub-species, at excessively high densities in salmon spawning and nursery areas. Effective screening on all fish farm intakes and discharges.	The nature conservation aim is to provide conditions in the river that support a healthy and natural population, achieved through habitat protection/restoration and the control of exploitation as necessary. 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 stocked and naturally produced individuals, disease introduction and genetic alterations to the population. For these reasons, consideration of stocking is only justifiable in cases where population viability is threatened. Stock must come from within the same catchment area. The presence of artificially high densities of other fish creates unacceptably high levels of predatory and competitive pressure on juvenile salmon. Escapes from fish farms are a form of uncontrolled introduction and should be prevented.

***Population dynamics**	Exploitation	All exploitation should be sustainable without compromising any components of the stock.	Controls on exploitation should include migratory passage to the SAC within territorial waters, including estuarine and coastal net fisheries, as well as exploitation within the SAC from rod fisheries.
***Physical integrity**	Disturbance of habitat	No artificial barriers significantly impairing adults from reaching existing and historical spawning grounds and smolts from reaching the sea.	In all river types, artificial barriers should be made passable. Natural barriers to potentially suitable spawning areas should not be circumvented.
	River morphology	Maintain and where necessary restore the characteristic physical features of the river channel, banks & riparian zone.	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 the species. The close 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 impact are not acceptable within the SAC, whilst restoration *may/will* be needed in some reaches.
	River Substrate	Clean gravels should dominate channels. <10% fines in top 30cm of spawning gravels	Elevated levels of fines can interfere with egg & fry survival through suffocation of eggs and loss of interstitial refugee for fry. Sources of fines include; run-off from arable land, land (especially banks) trampled by livestock, sewage and industrial discharges.

***Water quantity**	Flow	Flow regime should be characteristic of the river. As a guideline, at least 90% of the naturalised daily mean flow should remain in the river throughout the year Existing flow criteria already laid down for salmon should also be complied with.	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 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.

***Water quality**	Biological class. Environment Protection's General Quality Assessment scheme. Assess every year.	'a'	Generally, water quality should not be injurious to any life stage. A wide range of water quality parameters can affect the status of interest features, but standard biological monitoring techniques provide a reasonable integrated picture in relation to many parameters. The river quality classifications used in all parts of the UK have a biological component. All classified reaches within the site that contain, or should contain, the interest feature under conditions of high environmental quality should comply with the targets given.
	Ecosystem Class. Environment Protection's General Quality Assessment scheme. Assess every years	"a"	The River Ecosystem Classification 1995 sets standards for dissolved oxygen, biochemical oxygen demand, total and un-ionised ammonia, pH, copper and zinc. It therefore covers a number of water quality parameters that can cause problems within river systems. All classified reaches within the site that should contain the interest feature under conditions of high environmental quality should comply with the targets given.

	Soluble Reactive Phosphorus	Targets should be set in relation to river/reach type(s and should be near background levels) **Annual mean <0.02mg/l - upland** **watercourses, <0.06mg/l mid-altitude** **watercourses on hard substrates and** **<0.2mg/l interim target for lowland rivers on** **clay substrates and large alluvial rivers.**	The target of 25mgL^{-1} is based on the EC Freshwater Fish Directive a more precautionary figure has been used for salmon to help protect substrates used for salmon spawning. The mg/l used here are indicative values for rivers in England, the equivalent for Northern Ireland will have to be defined
***Water quality**	Pollution	None	Pollutants such as silage or Sheep dip can cause extreme mortality
	Suspended solids	Annual mean <10mgL^{-1} (spawning & nursery grounds) Annual mean <25mg L-1 (migratory passage)	Elevated levels of suspended solids can clog the respiratory structures of salmon.

LOUGH NEAGH AND LOUGH BEG-

SPECIAL PROTECTION AREA (SPA)

UK9020091

CONSERVATION OBJECTIVES

Document Details

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V1	01/04/1996	Internal working document	IE	
V1.1	August 2013	Review	IE	
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Site relationship

To fully understand the site conservation requirements for this site it may be necessary to also refer to other site Conservation Objectives

This SPA partially overlaps with Reas Wood and Farrs Bay SAC

The SPA also overlaps with part of the Lough Neagh and Lough Beg Ramsar site.

See also Boundary Rationale

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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, terrestrial/inter-tidal 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).

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.

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

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 GENERAL INFORMATION

COUNTY: Antrim, Down, Armagh, Tyrone and Londonderry

G.R. J030 700 AREA: 41188 ha.

5 SUMMARY SITE DESCRIPTION

Lough Neagh is a large, shallow, eutrophic lake contained within Counties Antrim, Down, Londonderry and Tyrone. Lough Neagh is the largest freshwater lake in the UK and is one of the top ten sites in the UK for wintering waterfowl (based on annual mean numbers). The SPA also includes the smaller lakes, Lough Beg and Portmore Lough. The main habitats within the SPA are open water with beds of submerged aquatic vegetation, species-rich wet grassland, reedbed, islands, swamp, fen and carr woodland. The SPA supports internationally important numbers of wintering waterfowl and is internationally important for a number of wildfowl species including Whooper Swan, Bewick's Swan, Pochard, Tufted Duck, Scaup and Goldeneye. It is also internationally important for breeding Common Tern.

5.1 BOUNDARY RATIONALE

The boundary takes in the main waterbodies, including Portmore Lough and Lough Beg, together with all adjoining natural and semi-natural habitat of conservation significance. All islands within Lough Neagh are also included. Adjoining agriculturally improved areas utilised by swans have not been included but their importance must not be underestimated.

6 SPA SELECTION FEATURES

Feature Type (i.e. habitat or species)	Feature	Population[1]	Population at time of designation (ASSI)	Population at time of designation (SPA)	SPA Review population	Common Standards Monitoring baseline
Species	Common Tern breeding population [a]	137 individuals (Seabird 2000 data)		200 pairs	185	118
Species	Great Crested Grebe breeding population [a]	500 pairs (Data source unknown)		New feature	500	
Species	Great Crested Grebe passage population [b]	2440 (1995 max count)		New feature	2440	438
Species	Whooper Swan wintering population [a]	1031	1152	923	1031	283
Species	Bewick's Swan wintering population [a]	136	314	251	136	23
Species	Golden Plover wintering population[b]	5334	3625	Not listed	5298	1626
Species	Great Crested Grebe wintering population [a]	1431	1173	741	1821	110
Species	Pochard wintering population [a]	26441	31508	32165	26341	19588
Species	Tufted Duck wintering population [a]	22454	19372	23476	22372	17972
Species	Scaup wintering population [a]	3698	1584	2557	3798	1215
Species	Goldeneye wintering population [a]	10781	11521	12479	10776	6700
Assemblage species	Little Grebe wintering population	465	395	390	465	290
Assemblage species	Cormorant wintering population	718	815	781	728	445
Assemblage species	Greylag Goose wintering population	156	120	129	176	7
Assemblage species	Shelduck wintering population	180	142	165	159	107
Assemblage species	Wigeon wintering population	3117	2607	3447	3117	2607
Assemblage species	Gadwall wintering population	166	120	114	166	88
Assemblage species	Teal wintering population	1597	2288	1868	1596	1154
Assemblage	Mallard wintering	5422	5330	4982	5256	3591

species	population					
Assemblage species	Shoveler wintering population	163	169	173	148	43
Assemblage species	Coot wintering population	7018	5979	6676	6993	3062
Assemblage species	Lapwing wintering population	6946	3042	Not listed	6899	2822
Waterfowl assemblage	Waterfowl Assemblage wintering population[a] (Component species: Whooper Swan, Bewick's Swan, Golden Plover, Great Crested Grebe (wintering) Pochard, Tufted Duck, Scaup, Goldeneye, Little Grebe, Cormorant, Greylag Goose, Shelduck, Wigeon, Gadwall, Teal, Mallard, Shoveler, Coot, Lapwing)	81827	87049	79915	99221	62352
Habitat[2]	Habitat extent					
Habitat[2]	Roost site locations					

Table 1. List of SPA selection features.

[1] Designation population given as 1995/96 five year running mean of maximum annual WeBS counts (except where stated). Note that for some of the selection features these differ from the figures given in the SPA citation, but have been used as they are considered to be more relevant to future monitoring

[2] Habitat is not a selection feature but is a factor and is more easily treated as if it were a feature. Habitat extent is also used for breeding birds reported as an area. Extent of swamp/tall fen will be used for breeding waterfowl

Notes on SPA features – may not be applicable to all SPAs

The above table lists all relevant qualifying species for this site. As the identification of SPA features has and continues to evolve, species may have different status but all should be considered in the context of any HRA process. Ultimately all SPAs will be renotified to formalise species features.

[a] – species cited in current SPA citation and listed on current N2K dataform

[b] – species selected post SPA designation through UK SPA Review 2001

[c] – species highlighted as additional qualifying features through the UK SPA Review 2015 or the UK marine SPA programmes.

6.1 ADDITIONAL ASSI SELECTION FEATURES

Feature Type (i.e. habitat, species or earth science)	Feature	Size/ extent/ pop.
Habitat	Purple Moor-grass and rush pastures (Lough Beg and Lough Neagh ASSI)	
Habitat	Wet woodlands (Lough Neagh ASSI)	
Habitat	Reed beds and swamps (Lough Neagh ASSI)	
Habitat	Fens (Lough Neagh ASSI)	
Species	Higher Plant Assemblage (Lough Beg and Lough Neagh ASSI)	
Species	Breeding waterbird assemblage (Lough Beg and Lough Neagh ASSI)	
Species	Breeding bird assemblage (wet woodland)	
Species	Breeding wader assemblage	

Species	Little Grebe wintering population	
Species	Cormorant wintering population	
Species	Greylag Goose wintering population	
Species	Shelduck wintering population	
Species	Wigeon wintering population	
Species	Gadwall wintering population	
Species	Teal wintering population	
Species	Mallard wintering population	
Species	Shoveler wintering population	
Species	Coot wintering population	
Species	Lapwing wintering population	
Species	Mute Swan wintering population	
Species	Freshwater and Estuarine fish (Lough Neagh ASSI)	
Species	Invertebrate assemblage (Lough Neagh ASSI)	
Earth Science	Coastal processes - refers to near-shore sand complexes (Lough Neagh ASSI)	

Table 2. List of ASSI features, additional to those that form all or part of SPA selection features. These will be referred to in ANNEX II.

7 CONSERVATION OBJECTIVES

The Conservation Objectives for this site are:

To maintain each feature in favourable condition.

For each feature there are a number of component objectives which are outlined in the tables below. Component objectives for Additional ASSI Selection Features are not yet complete. For each feature there are a series of attributes and measures which form the basis of Condition Assessment. The results of this will determine whether a feature is in favourable condition, or not. The feature attributes and measures are found in the attached annexes.

8 LOUGH NEAGH AND LOUGH BEG SPA CONDITION ASSESSMENT 2014

Species	Year 1	Year 2	Year 3	Year 4	Year 5	CSM	5 yr mean	% CSM	Status
Common Tern (B)	94	79	118	96	98	59	97.00	**164.41**	Favourable
Golden Plover	6475	3129	7097	4047	1539	1626	4457.40	**274.13**	Favourable
Bewick's Swan	0	0	0	0	0	23	0.00	**0.00**	Unfavourable
Whooper Swan	515	535	637	388	248	283	464.60	**164.17**	Favourable
Goldeneye	2993	4626	3684	3003	3437	6700	3548.60	**52.96**	Unfavourable
Great Crested Grebe (W)	236	1181	733	947	1030	110	825.40	**750.36**	Favourable
Great Crested Grebe (P)	634	676	nc	561	941	438	703.00	**160.50**	Favourable
Pochard	8878	8902	5770	9183	5027	19588	7552.00	**38.55**	Unfavourable
Scaup	4348	5587	6335	2989	2257	1215	4303.20	**354.17**	Favourable
Shelduck	131	87	193	188	126	107	145.00	**135.51**	Favourable
Tufted Duck	6336	5845	4995	9167	7669	17972	6802.40	**37.85**	Unfavourable
Waterbird assemblage	47771	48575	43168	43462	35837	75215	43762.60	**58.18**	Unfavourable

9 SPA SELECTION FEATURE OBJECTIVES

To maintain or enhance the population of the qualifying species
Fledging success sufficient to maintain or enhance population
To maintain or enhance the range of habitats utilised by the qualifying species
To ensure that the integrity of the site is maintained;
To ensure there is no significant disturbance of the species and
To ensure that the following are maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species

5.1 SPA SELECTION FEATURE OBJECTIVES

Feature	Component Objective
Common Tern breeding population	As above
Common Tern breeding population	Fledging success sufficient to maintain or enhance population
Great Crested Grebe breeding population	As above
Great Crested Grebe breeding population	Fledging success sufficient to maintain or enhance population
Great Crested Grebe passage population	As above
Whooper Swan wintering population	As above
Bewick's Swan wintering population	As above
Golden Plover wintering population	As above
Great Crested Grebe wintering population	As above
Pochard wintering population	As above
Tufted Duck wintering population	As above
Scaup wintering population	As above
Goldeneye wintering population	As above
Little Grebe wintering population	As above
Cormorant wintering population	As above
Greylag Goose wintering population	As above
Shelduck wintering population	As above
Wigeon wintering population	As above
Gadwall wintering population	As above
Teal wintering population	As above
Mallard wintering population	As above
Shoveler wintering population	As above
Coot wintering population	As above
Lapwing wintering population	As above
Waterfowl Assemblage wintering population	No significant decrease in population against national trends

Feature	Component Objective
Waterfowl Assemblage wintering population	Maintain species diversity contributing to the Waterfowl Assemblage
Habitat	To maintain or enhance the area of natural and semi-natural habitats used or potentially usable by Feature bird species subject to natural processes
Habitat	Maintain the extent of main habitat components subject to natural processes
Habitat	Maintain or enhance sites utilised as roosts

Table 3. List of SPA Selection Feature Component Objectives

Tern nesting localities current and historical (TO BE FINALISED)

Torpedo platform, Antrim Bay

Table 4. Tern nesting locations within the SPA

9.1 ADDITIONAL ASSI SELECTION FEATURE OBJECTIVES

Feature	Component Objective
Purple Moor-grass and rush pastures	
Wet woodlands	
Reed beds and swamps	
Fens	
Higher Plant Assemblage	
Breeding Birds	
Freshwater and Estuarine fish	
Invertebrate assemblage	
Coastal processes – refers to near-shore sand complexes	

Table 5. List of Additional ASSI Selection Feature Objectives

10 MANAGEMENT CONSIDERATIONS

See also Views About Management for relevant ASSIs

Owner/Occupier's – As of October 1995 there were 463 individual landowners within Lough Neagh SPA. These include the Shaftesbury Estate of Lough Neagh, the National Trust, Armagh, Banbridge and Craigavon Council and the Department of Agriculture and Rural Development for Northern Ireland (DANI). There are five National Nature Reserves (NNRs) within the SPA; Lough Neagh Islands, Rea's Wood, Farr's Bay, Oxford Island and Randalstown Forest with a proposed sixth at Blacker's Rock. There are also an additional four management agreements in place for four small landholdings within the SPA.

11. MAIN THREATS, PRESSURES, ACTIVITES WITH IMPACTS ON THE SITE OR SITE FEATURES

Notifiable Operations **-** Carrying out <u>any</u> of the Notifiable Operations listed in the schedule could affect the site. The list below is not exhaustive, but deals with the most <u>likely</u> factors that are either affecting Lough Neagh SPA, or could affect it in the future. Although, features 1, 2, 3, 4 etc, are the qualifying SPA features, factors affecting ASSI features are also considered.

<u>Site/feature management issues</u>

No	Issue	Threat/comments	Local considerations	Action
1	Adjoining habitat	Particularly important for swans and geese as well as providing high tide roost locations. Significant changes in land management and disturbance are key considerations. Such areas	Imminent road development through Toome swanfields the effects of which will require monitoring.	Assess planning applications. Identify key areas and promote site management schemes. Review use of Wildfowl Refuges. Consider the collective impact.

No	Issue	Threat/comments	Local considerations	Action
		lie without the site making effective management of developments other than those for which planning permission is required, difficult.		
6	Boating activity – commercial	Disturbance and potential for impact from commercial vessels.	No evidence of a significant impact on the selection features of Lough Neagh	Formal consultation likely relating to new schemes. Consider the collective impact.
7	Boating activity – recreational	Disturbance and potential for impact especially from jet skis. Generally relevant to particularly sensitive areas within site.	A major concern during the breeding season, particularly around the Torpedo platform at Six Mile Water.	Liaise with appropriate authority with codes of good practice, zoning and use of by-laws as necessary. Consider the collective impact.
8	Coastal (shoreline) protection schemes	Where there is no history of this, it impacts on natural beach systems with loss of habitat.	There is ad hoc dumping around the shoreline, in places this is in response to erosion.	Liaise with Planning Service and other parties with an involvement in coastal management.
9	Cull of fledglings/ young	Licensed selective culling of species impacting on 'more desirable' species. Licensed by NIEA.	Culling of larger gull species is undertaken to reduce impact on breeding wildfowl and terns.	NIEA to review all licenses. Consider the collective impact.
11	Drainage	Potential impact on water flooding regime. Potentially significant in relation to adjoining habitat if it leads to reduction in traditional areas of flooding.	Routine watercourse maintenance programme by Rivers Agency is referred to NIEA for comment.	Identify key areas and promote site management schemes to protect and enhance site features. Consider the collective impact.
13	Enhanced bird competition	Activities onsite or offsite that influences or results in a shift in balance of species utilising a site.	General issue of gulls during breeding season. Historical high numbers of Black-headed Gull may have been related to access to feeding on a dump site (Denny's), now closed.	Liaise with Planning Service. Review wider countryside changes.
14	Fishing – commercial or recreational	Minimal disturbance consideration but may represent 'competition' for piscivorous birds. Represents a net loss to the system in terms of biomass.	Important long-established commercial eel, coarse fish and salmonid fishery. Concern regarding diving duck taken as by-catch in nets either accidentally or deliberately.	Liaise with DARD and fishing authorities as required. Liaise with commercial fishing interests and angling clubs as required. Netting of diving duck as a Wildlife Order offence – action is dependant on evidence.
16	Habitat extent – open water	Loss likely to be limited but expansion of commercial port facilities can impact on key localities.	Not a concern.	Assess planning applications. Consider the collective impact.
18	Habitat quality – open water	Alteration of habitat quality through diminution of water quality or invasive species.	Water quality is a concern with progressive eutrophication. Longer	Assess planning applications. Deal with invasive alien species by preventing their spread or reducing their

No	Issue	Threat/comments	Local considerations	Action
			term improvement in water quality will reduce productivity and may affect waterfowl populations.	impact. Liaise with Environmental Protection as required with regard to water quality issues and pollution incidents. Consider the collective impact.
19	Habitat extent and quality-breeding	Alteration of habitat area or quality through inappropriate use or absence of site management.	Terns mainly breed on Torpedo Platform, Six Mile Water, but also on some islands.	Assess needs of breeding species. Liaise with owner or appropriate authority to adjust or introduce site management.
21	Introduced species	Range of threats from loss of habitat, feeding competition, disease, hosting species presenting a threat outside of the site.	Roach and Ruddy Duck are present, Zebra Mussel must be considered a real threat.	Liaise with appropriate authority. Consider feasibility of elimination. Participate in national/international initiatives.
22	Power cables	Specifically a problem in relation to swans and geese. Threat is through impact. Need to consider flight lines, as well as feeding and loafing areas, which ideally should be avoided.	Generally lines in the area are well marked. Assess all new proposals and existing network in relation to swan usage..	Liaise with NIE. Minimum need is for line marking based on best current practice. Consider the collective impact.
23	Predation.	Mainly of concern on bird breeding sites.	Impact from large gulls is deemed to be a problem. Care to be taken as breeding Lesser Black-backed Gull are notable.	Must be dealt with as part of wider countryside management considerations. Carry out appropriate site management.
24	Recreational activities.	Disturbance is the main consideration. Breeding birds, especially seabirds, are vulnerable to disturbance as absence of adults can often result in predation or chilling of young with a reduction/loss in fledging success.	Breeding birds are particularly vulnerable to disturbance. Cumulative disturbance impacts (e.g. boating, sand dredgers, wildfowlers, walkers, dogs etc) may also be a significant factor for wintering bird populations	Liaise with local authorities and other managing parties.
25	Research activities.	Census and ringing activities especially have the potential to impact on bird populations, particularly at breeding sites.	Routine winter WEBS counts.	Census and ringing activities to be undertaken by competent individuals, appropriately trained. In case of ringers, appropriate license must be held.
26	Sand dredging - commercial	Issue presently limited to Lough Neagh and subject to current (2015) detailed evaluation	Restricted in area but possibly impacting the more diverse invertebrate assemblages. Possibly a limited disturbance issue.	Liaise with commercial operators, Planning Service and other regulatory authorities.
28	System dynamics	Cuts across many other issues. Dynamic systems, especially coastal, can be affected by many factors	Historical lowering of the lough level reduced considerably the area subject to flooding but	Human induced change should be minimised. Assess planning applications and liaise with other relevant

No	Issue	Threat/comments	Local considerations	Action
		especially engineered structures and significant changes in dominant wind direction or storm frequency. Many systems may indeed still be undergoing responses to historical developments e.g. partial reclamation, seawall construction. Changes may include alteration in sediment grade, shifts in patterns of erosion and deposition etc. Consequences for habitat and species utilisation of the site can be profound.	also would have had implications for shore and nearshore morphology particularly the dynamics of sand bar and river mouth shoal complexes. Ongoing sand exploitation could alter lough bed substrate and influence near shore sediment mobility.	authorities. Ad hoc dumping and removal of natural materials should be managed. Major natural shifts in system behaviour may be identified through analysis of aerial photographs and site monitoring. Major and consistent changes to patterns of habitat distribution and bird utilisation of the site should be noted.
29	Water abstraction	Potential impact on water flooding regime. Potentially significant in relation to adjoining habitat if it leads to reduction in traditional areas of flooding.	Lough Neagh is a major source of drinking water with ongoing abstraction together with proposals for increased volumes taken.	Liaise with Water Service and Rivers Agency.
30	Water level control	Impacts on natural fluctuation of water body. Potentially significant in relation to adjoining habitat if it leads to reduction in traditional areas of flooding.	Lough water level essentially controlled by sluice gates at Toome.	Liaise with Rivers Agency.
31	Wildfowling	Has direct effect through bag sizes/bag species and wider disturbance issue. Issue of regulated (through recognised shooting clubs) and ad hoc shooters. Lead shot on grazing lands.	Generally a good relationship with main gun clubs. Overall perception is that lough is heavily shot.	Liaise with relevant shooting bodies to define areas for wildfowling, the development of Wildfowlers Codes of Good Practice and encourage bag returns. Support pressure to stop use of lead shot. Review use of Wildfowl Refuges. Consider the collective impact.

Table 3. List of site/feature management issues

12 MONITORING

Monitoring of our Special Protection Areas takes place at a number of levels, using a variety of methods. Methods for both Site Integrity Monitoring and Condition Assessment can be found in the Monitoring Handbook (To be written).

In addition, detailed quality monitoring or verification monitoring may be carried out from time to time to check whether condition assessment is adequate to detect long-term changes that could affect the site. This type of quality monitoring may involve assessment of aerial photographs to determine site morphological changes. Methodology for this is being developed.

12.1 MONITORING SUMMARY

1. Monitor the integrity of the site (Site Integrity Monitoring or SIM) – to ensure compliance with the SPA/ASSI schedule and identify likely processes of change (e.g. dumping, infilling, gross pollution). This SIM should be carried out once a year.

2. Monitor the condition of the site (Condition Assessment) - Monitor the key attributes for each selection feature (species, assemblage, habitat, etc). This will detect if the features are in favourable condition or not. See Annexes I and II for SPA and Additional ASSI Features respectively.

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 appropriate assessment that may be needed. It should be noted that appropriate assessments are a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

12.2 ADDITIONAL MONITORING ACTIONS UNDERTAKEN FOR SITES IN UNFAVOURABLE CONDITION

Monitoring actions set out in section 6 and Annex 1 will use, amongst other attributes, bird population data to determine site condition. In the event of a significant population decline being detected, a series of subsequent actions will be initiated. The following list is not exhaustive, actions will be site dependant, but the order of these points IS hierarchical i.e. consider point 1, then 2, etc.

1. Assess the site population in a wider geographical context – Northern Ireland, Ireland, UK, world. Refer to BTO ALERT limits etc. Liaise with other competent bodies to meaningfully assess wider pattern. No site action if site decline mirrors regional pattern the cause of which is not related to the site. Action may be required at regional or larger scale. If the cause of the regional population decline (e.g. eutrophication) is found at the site then action may be necessary, but this may need to form part of a network of strategic species action. Further research may be required.
2. Assess the site population in a wider geographical context – Northern Ireland, Ireland, UK, Europe, world. Determine if site losses are balanced by gains elsewhere e.g. breeding terns. Review site condition to determine if losses are due to site deterioration. Determine if possible whether population has relocated within SPA series (national, biogeographical, European). Note that the reasons for such locational changes may not be readily identifiable. Further research may be required.
3. For passage/wintering species assess breeding information. No site action if site decline is due to breeding ground failure, unless breeding ground failure is related to poor adult condition resulting from factors affecting wintering / passage birds.
4. Determine whether a major incident has affected the site e.g. toxic impact on prey items, predation event or geographical shift in available prey. Ability to respond to impacts may be limited.
5. Assess condition of principal site habitats e.g. vegetational composition and structure, change in habitat balance e.g. mudflats reduced by encroaching mussel beds.
6. Assess prey availability. Issues to consider are both within site e.g. water quality, broad site management, and without site e.g. climatically driven factors.
7. Assess whether there have been any changes in any other site features or management practices (see Table 3) that may have affected populations of site selection features.
8. Long-term site value must be considered even when it is found to be in unfavourable condition for a number of reporting cycles. This is particularly important for breeding seabird and wader sites where ongoing appropriate management may ultimately encourage re-establishment of a favourable population.

13 SELECTION FEATURE POPULATION TRENDS

A summary statement of site population trends, together with wider geographical trends. Date of completion is given as well as information sources used. Site trends are reported as % increase/decline from designation population (1995/96) using running 5 year means of annual maximum count (WEBS data). For breeding populations the best available data is used. Other trends are generally limited to terms such as 'consistent increase/decline', 'variable with overall increase/decline', 'no discernable trend'.

SPECIES	SITE TREND	NI TREND	IRISH TREND	UK TREND	COMMENTS
Common Tern (breeding)	insufficient data	Data unavailable	34% decline between surveys in 1969-70 and 1985-87 (per SPA review)	11% increase between surveys in 1969-70 and 1985-87 (per SPA review)	
Great Crested Grebe	insufficient data	Data unavailable	I-WeBS data unavailable	No discernible trend (1994-99 Breeding	

SPECIES	SITE TREND	NI TREND	IRISH TREND	UK TREND	COMMENTS
(breeding)				Bird Survey)	
Great Crested Grebe (passage)	insufficient data	Data unavailable	I-WeBS data unavailable	Data unavailable	
Whooper Swan (wintering)	-10% (1999/2000)	Variable with overall decline 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	Variable with overall increase 1990/91-1999/2000 (WeBS)	
Bewick's Swan (wintering)	-41% (1999/2000)	Consistent Decline 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	No discernible trend 1990/91-1999/2000 (WeBS)	
Golden Plover (wintering)	+6% (1999/2000)	Data unavailable	I-WeBS data unavailable	Data unavailable	
Great Crested Grebe (wintering)	-11% (1999-2000)	Variable with overall increase 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	No discernible trend 1990/91-1999/2000 (WeBS)	
Pochard (wintering)	-5% (1999-2000)	Variable with overall decline 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	No discernible trend 1990/91-1999/2000 (WeBS)	
Tufted Duck (wintering)	Stable (1999-2000)	No discernible trend 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	No discernible trend 1990/91-1999/2000 (WeBS)	
Scaup (wintering)	+9% (1999-2000)	Data unavailable	I-WeBS data unavailable	Data unavailable	
Goldeneye (wintering)	-29% (1999-2000)	Consistent decline 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	No discernible trend 1990/91-1999/2000 (WeBS)	
Little Grebe (wintering)	-10% (1999-2000)	No discernible trend 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	Consistent increase 1990/91-1999/2000 (WeBS)	
Cormorant (wintering)	+89% (1999-2000)	Consistent increase 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	Variable with overall increase 1990/91-1999/2000 (WeBS)	
Greylag Goose (wintering)	+114% (1999-2000)	Data unavailable	I-WeBS data unavailable	Data unavailable	
Shelduck (wintering)	+15% (1999-2000)	Consistent increase 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	Variable with overall decline 1990/91-1999/2000 (WeBS)	
Wigeon (wintering)	+8% (1999-2000)	No discernible trend 1990/91-	I-WeBS data unavailable	Variable with overall increase 1990/91-1999/2000	

SPECIES	SITE TREND	NI TREND	IRISH TREND	UK TREND	COMMENTS
		1999/2000 (WeBS)		(WeBS)	
Gadwall (wintering)	-21% (1999-2000)	Variable with overall decline 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	Consistent increase 1990/91-1999/2000 (WeBS)	
Teal (wintering)	+6% (1999-2000)	No discernible trend 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	Variable with overall increase 1990/91-1999/2000 (WeBS)	
Mallard (wintering)	+1% (1999-2000)	No discernible trend 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	Consistent decline 1990/91-1999/2000 (WeBS)	
Shoveler (wintering)	-31% (1999-2000)	No discernible trend 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	Variable with overall increase 1990/91-1999/2000 (WeBS)	
Coot (wintering)	+1% (1999-2000)	Variable with overall increase 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	Variable with overall increase 1990/91-1999/2000 (WeBS)	
Lapwing (wintering)	+11% (1999-2000)	Data unavailable	I-WeBS data unavailable	Data unavailable	
Wintering Waterfowl Assemblage (Component species: Little Grebe, Great Crested Grebe, Bewick's Swan, Whooper Swan, Greylag Goose, Shelduck, Wigeon, Gadwall, Teal, Mallard, Shoveler, Pochard, Tufted Duck, Scaup, Goldeneye, Coot, Golden Plover, Lapwing)	-3% (1999-2000)	N/a	I-WeBS data unavailable	N/a	

ANNEX I

Feature (SPA) – Breeding seabirds - waterbirds

* = primary attribute. One failure among primary attribute = unfavourable condition
# = Optional factors – these can be in unfavourable condition without the site being in unfavourable condition

Attribute	Measure	Targets	Comments
*Common Tern breeding population	Apparently occupied nests	No significant decrease in Common Tern breeding population against national trends	Requirement that annual data is collected , then apply 5 year mean criteria. Ideally the population will be maintained above 1% of the national population. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Common Tern fledging success	Annual survey (as per Gilbert *et al*. 1998). Determine number of fledglings raised and add to total number of fledglings raised over previous four years and divide by five to obtain average. This should remove variation from season to season, e.g. in response to bad weather.	>1 fledgling per pair successfully raised per year over five year period	Appropriate level of fledgling survival to be determined
*Great Crested Grebe breeding population	Annual count of breeding pairs Calculate new five year running mean. Plot running five-year means.	No significant decrease in Great Crested Grebe breeding population against national trends	Requirement that annual data is collected , then apply 5 year mean criteria. Ideally the population will be maintained above 1% of the national population.
# Great Crested Grebe fledging success	Annual survey (as per Gilbert *et al*. 1998). Determine number of fledglings raised and add to total number of fledglings raised over previous four years and divide by five to obtain average. This should remove variation from season to season, e.g. in response to bad weather.	>1 fledgling per pair successfully raised per year over five year period	Appropriate level of fledgling survival to be determined

Non-avian factors

Attribute	Measure	Targets	Comments
* Habitat extent	Area of natural and semi-natural habitat	Maintain the area of natural and semi-natural habitats used by notified species, within the SPA, subject to natural processes.	Monitor once every reporting cycle by aerial photography.
# Extent of different habitats	Extent of different habitats	Maintain the extent of main habitat components subject to natural processes	Evaluate habitat quality should bird populations decline due to on site factors. Map any changes in area. This may include mapping areas with different vegetation structures or breeding sites, where this would lead to different usage by notified species.

Feature (SPA) – Passage and Wintering waterfowl

Attribute	Measure	Targets	Comments
* Great Crested Grebe passage population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
*Whooper Swan wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
*Bewick's Swan wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
*Golden Plover wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.

Attribute	Measure	Targets	Comments
* Great Crested Grebe wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
* Pochard wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
*Tufted Duck wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
*Scaup wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
*Goldeneye wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Little Grebe wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Cormorant wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Greylag Goose wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.

Attribute	Measure	Targets	Comments
# Shelduck wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Wigeon wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Gadwall wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Teal wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Mallard wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Shoveler wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Coot wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Golden Plover wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.

Attribute	Measure	Targets	Comments
# Lapwing wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
*Waterfowl assemblage wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. Decline to a level below the Common Standards Monitoring baseline over a five year period may indicate unfavourable condition of the site.
# Waterfowl assemblage wintering population	Bird numbers	Maintain species diversity contributing to the Waterfowl Assemblage	

Non-avian factors

Attribute	Measure	Targets	Comments
* Habitat extent	Area of natural and semi-natural habitat	Maintain the area of natural and semi-natural habitats used by notified species, within the SPA, subject to natural processes.	Monitor once every reporting cycle by aerial photography.
# Extent of different habitats	Extent of different habitats	Maintain the extent of main habitat components subject to natural processes	Evaluate habitat quality should bird populations decline due to on site factors. Map any changes in area. This may include mapping areas with different vegetation structures where this would lead to different usage by notified species.
# Roost sites	Location of roost sites	Maintain all locations of roost sites.	Map roost site locations. Visit once every reporting cycle to ensure sites are available.

ANNEX II

Feature (ASSI)

Attribute	Measure	Targets	Comments
Purple Moor-grass and rush pastures (Lough Beg and Lough Neagh ASSI)			
Wet woodlands (Lough Neagh ASSI)			
Reed beds and swamps (Lough Neagh ASSI)			
Fens (Lough Neagh ASSI)			
Higher Plant Assemblage (Lough Beg and Lough Neagh ASSI)			
Breeding Birds (Lough Beg and Lough Neagh ASSI)			
Freshwater and Estuarine fish (Lough Neagh ASSI)			
Invertebrate assemblage (Lough Neagh ASSI)			
Coastal processes - refers to near-shore sand complexes (Lough Neagh ASSI)			

MAGHERAVEELY MARL LOUGHS SAC
UK0016621

CONSERVATION OBJECTIVES

Document Details

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Approved By	*P. Corbett*
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1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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: FERMANAGH

SUB-SITES	GRID REFERENCE
Kilroosky Lough	IH 495274
Burdautien Lough	IH 495282
Knockballymore Lough	IH 478269
Drumacrittin Lough	IH 549327
Annachullion Lough	IH 519302
Summerhill Lough	IH 491280

AREA: 58.8 ha

5. SUMMARY SITE DESCRIPTION

Magheraveely Marl Loughs SAC is comprised of six lakes low-lying in the catchment of the River Finn. They are individually designated as ASSIs and were selected from a cluster of lakes situated here because of the combination of hard water and low nutrient status, resulting in lakes that approach the classic marl lake condition. In addition, they are surrounded by wetlands whose interest is also promoted by high calcium concentration.

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

It was not attempted to include the surface water catchments for the basins. Boundaries were drawn to include the open water and swamp areas within

Northern Ireland, and any related adjacent semi-natural habitat, but habitats of lesser interest were not incorporated into a 'buffer zone'.

It is an objective that where a section of a lake and its adjacent wetland has been designated on one side of the border between Northern Ireland and the Republic of Ireland, there should be a corresponding designation on the other side. This has nearly been achieved, with the corresponding Kilroosky Lough cluster (SAC 001786) designated in the Republic of Ireland, although this includes Dummy's Lough which remains undesignated in Northern Ireland, and does not include any wetland around the Drumacrittin/Black Lough sub-site designated in Northern Ireland. Both areas are currently under consideration by the respective agencies.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ pop~
Habitat	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* formations	B	6 sub-sites 10.5 ha*
Species	White-clawed Crayfish *Austropotamobius pallipes*	B	5 sub-sites
Habitat	Alkaline fens	B	6.8 ha
Habitat	Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae	C	3 sub-sites 0.8 ha

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

Note that there is some overlap between the *Cladium* fens and the alkaline fens as, following JNCCs lead, the former are included here where zones of closed, species-poor *Cladium* have at their margins, transitions to species-rich short-sedge mire vegetation. As these are calcium-rich sites the small sedge component often comprises the calcicoles *Carex diandra* and *C. viridula* ssp. *brachyrrhyncha* in vegetation separately included as alkaline fen.

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 Magheraveely Marl Loughs SAC.

6.1 ASSI SELECTION FEATURES

Magheraveely Marl Loughs ASSI

Feature Type	Feature	Size/Extent/Population
Habitat	Marl Lakes	10.5 ha
Habitat	Fens	7.6 ha
Species	White-clawed Crayfish	
Species	Invertebrate Assemblage	

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The ***Conservation Objective*** for this site is:

To maintain (or restore where appropriate) the

- Hard oligo-mesotrophic waters with benthic vegetation of *Chara formations*
- White-clawed Crayfish *Austropotamobius pallipes*
- Alkaline fens
- Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae

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
Hard oligo-mesotrophic waters with benthic vegetation of *Chara* formations	B	No change in the lake hydrology outside normal seasonal fluctuations.
		Maintain the characteristic low nutrient status and high calcium concentration of the lake waters
		Maintenance of an assemblage of aquatic plants characteristic of Northern Ireland marl lakes.
		The extent of the fringing swamp zone to remain stable (not expanding into the lake, or contracting).
		There should be swamp gaps, or zones within the fringing swamps where the vegetation is sparse enough to allow charophyte growth.
		Minimal negative impact from artificial structures
		Minimal negative impact from recreation
White-clawed Crayfish *Austropotamobius pallipes*	B	Population size to be maintained or expanded at all sub-sites. No significant drop in trapped animals per unit standard trap effort.
		Recruitment of young animals into the population should be maintained.
		No stocking of the fish predators of Crayfish
Alkaline Fens	B	Maintain and expand the extent of existing alkaline fens.
		Maintain and enhance fen species and community diversity including the presence of notable species

		Maintain and enhance alkaline fen structure and hydrology
		Maintain the diversity and quality of habitats associated with the alkaline fens, e.g. reedbed and transitions to them
Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae	C	Maintain or expand the area/shoreline length of vegetation with >50% *Cladium mariscus* cover.
		Areas of alkaline fen adjacent to *Cladium mariscus* dominated zones should remain in favourable condition.
		Frequency of tree / scrub spp. incl. saplings no more than rare.

9. ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Marl Lakes	See SAC Selection Feature Objective Requirements table.
Fens	See SAC Selection Feature Objective Requirements table.
White-clawed Crayfish	See SAC Selection Feature Objective Requirements table.
Invertebrate Assemblage	To be finalised.

10. MANAGEMENT CONSIDERATIONS

Ownership

All of the lakes are in individual private ownership, and with the exception of Knockballymore Lough, in multiple ownership.

Three of the lakes straddle the border with the Republic of Ireland, and a further lake abuts the border.

Summerhill Lough	Border runs through lake basin
Kilroosky Lough	Border runs through lake basin
Burdautien Lough	Border runs through lake basin
Drumacrittin Lough	Site boundary runs to border
Knockballymore Lough	Wholly within Northern Ireland
Annachullion Lough	Wholly within Northern Ireland

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 Magheraveely Marl Loughs, or could affect it in the future.

Although **Hard oligo-mesotrophic waters with benthic vegetation of *Chara* formations, White-clawed Crayfish *Austropotamobius pallipes*, Alkaline fens and Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae** 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.

Application of fertiliser

Application of fertiliser, either in inorganic form or as manure/slurry to the catchment could have great repercussions for the water quality. Marl lake water bodies are characterised by very clear water and low nutrient status. They are chemically buffered from phosphorus (P) enrichment to a degree, as P is immobilised by marl formation, but P is still stored and may be released if the buffering mechanism is disrupted and the lake 'switches' to a eutrophic state. This increases the vulnerability of these lakes as the early stages of P accumulation are disguised.

The effect upon adjacent wetlands is also noticeable as the vegetation type shifts to one adapted to more fertile wetlands and the influence of Calcium becomes a secondary variable. Changes in surrounding land use, for example Conifer plantation on a small scale, has been noted around Kilroosky Lough, and this may be accompanied by fertiliser application.

ACTION: Prevent nutrient enrichment from fertiliser drift and runoff by encouraging landowners to leave adequate buffer strips between fertiliser spray areas and sensitive interest features such as alkaline fens and nutrient poor loughs.

Drainage

On wetlands, a reduction in the frequency or duration of saturation or inundation has obvious direct effects on wetland organisms. For lakes, the effect can be profound even if the lake itself is not threatened, as the lake edge contracts the photic zone will move with it, and the lake bed substrate and depth profile will not necessarily be similar at the new location.

Major capital schemes for arterial drainage have in the past been very damaging to lakes and wetlands in Northern Ireland, but now seem to out of political favour. But piecemeal land drainage has also been a feature of agricultural

intensification in Ireland. Kilroosky Lough provides an example, where the outflow was deepened to lower the water level. A temporary sluice funded by Dúchas has recently been damaged by by-passing.

Underdrained grassland is more likely to lose nitrogen than undrained soil, as the sub-surface drains carry nutrient-rich water away from the area
ACTION: Installation of a staff gauge in these lakes with the owners permission. This is also important when depth measurements are implicated by monitoring.

Sedimentation
The natural process of siltation and terrestrialisation, sometimes hastened by management, may threaten the existence of an open water area in shallow lakes, in most cases this would be regarded as an unwelcome loss of site diversity.
ACTION: Reduce the rate of catchment sedimentation by encouraging landowners to leave adequate vegetation buffer strips between ploughed fields and adjacent drains and streams that may drain into the alkaline fens and nutrient poor loughs.

Invasion by exotics
In the UK, introduced crayfish species are aggressively out-competing the white-clawed crayfish and crayfish plague, introduced with them, is spreading through the country, wiping out the white-clawed crayfish populations. In Northern Ireland, no crayfish farms have been established and as of 2001, we do not have this problem, but the possibility of exotic crayfish species and of crayfish plague spreading here cannot be ruled out.
ACTION: Site integrity monitoring.

Grazing intensity
Marshes and swamps are affected by grazing and hence are vulnerable to poor grazing management - this could be the heavy grazing of all marsh and swamp areas, suppressing the development of tall vegetation and causing excessive poaching, or equally, could be the exclusion of grazers from all wetland areas, suppressing the development of open freshwater marsh swards in favour of species-poor swamp stands.
ACTION: Through liaison with landowners and monitoring, ensure sustainable grazing levels for the conservation interest features.

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 Magheraveely Marl Loughs SAC.

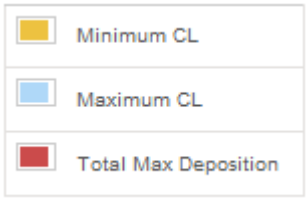
Feature: Hard oligo-mesotrophic waters with benthic vegetation of Chara spp

Critical Load Class: No comparable habitat with established critical load estimate available

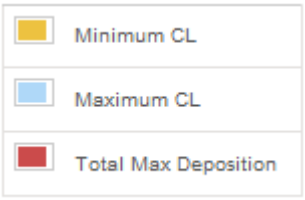
Critical Loads (kg N/ha/yr): no critical loads available for this feature

Nitrogen Deposition (kg N/ha/yr):

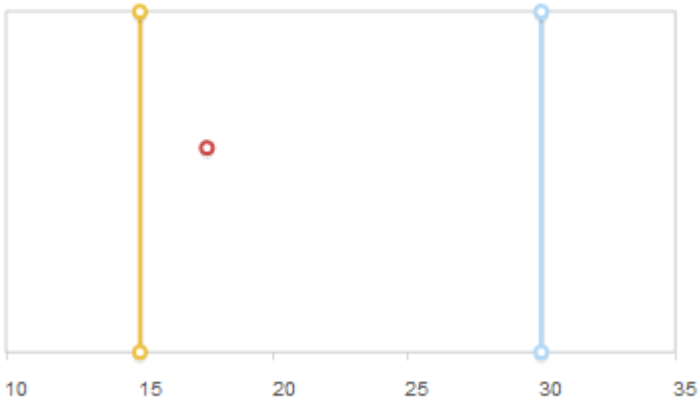
Maximum: 7.6 Minimum: 6 Average: 6.7

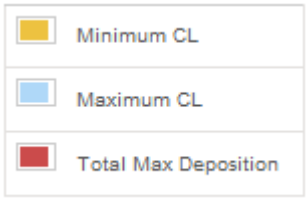


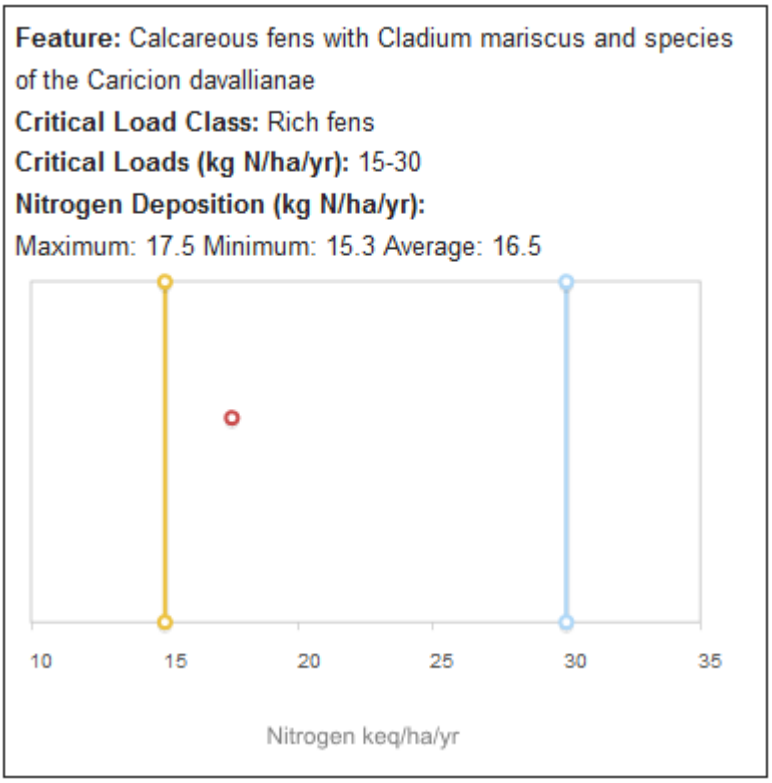
Feature: Austropotamobius pallipes - White-clawed (or Atlantic stream) crayfish
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 7.6 Minimum: 6 Average: 6.7



Feature: Alkaline fens
Critical Load Class: Rich fens
Critical Loads (kg N/ha/yr): 15-30
Nitrogen Deposition (kg N/ha/yr):
Maximum: 17.5 Minimum: 15.3 Average: 16.5







(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. 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. 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.

12.1 MONITORING SUMMARY

1. *Monitor the integrity of the site (SIM or Compliance Monitoring)*
Check for obvious signs of damage e.g. check on the lakes' water levels, signs of drainage in the designated area and signs of over-stocking causing damage to habitats adjacent to the lakes. 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 I

Feature 1 (SAC) – Hard oligo-mesotrophic waters with benthic vegetation of *Chara* formations (Status B)

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

Attribute	Measure	Targets	Comments
*Nutrient status	Summer total phosphorus $\mu g/l^{-1}$	No more than 25 $\mu g/l^{-1}$ in any lake, and no more than 25% higher than the N I Lakes Survey value.	Part of SIM. Collection methods still to be established
	Abundance weighted Trophic Ranking score	Within 0.2 of the NI Lakes Survey generated value	
	Abundance weighted Trophic Ranking Score	Less than 7.6 in all lakes	
*Water clarity	Subjective assessment	Clear	
	Secchi disc depth if lake is deep enough (cm)	Still visible at 300 cm	

*Charophyte extent	Plant Importance Value for total charophyte presence	No decline since the N I Lake Survey or PIV at least 3 (Frequent) in all lakes.	
	% of the phototrophic zone occupied.	> 50% occupied	Generic guidelines have varied in the target (lower LAC) cover of Chara in the photic – from 5% to 50%
*Filamentous algae (blanketweed)	Plant Importance Value	PIV <2 (occasional)	
Selected aquatic species	Plant Importance Values for any of: *Potamogeton coloratus* *Hippurus vulgaris* *Utricularia vulgaris* agg. *Chara hispida* var. *rudis (=C. rudis)*	No decline by a value more than 1 since the N I Lake Survey.	
*Sedimentation	Maximum depth c.f. staff gauge reference.	< 6cm reduction in a 6 year reporting cycle	

*Accretion	Width of swamp zone from a fixed point.	Less than 1m increase from the fixed point to the edge of the dense reeds. in any 6 year period.	

Feature 2 (SAC) – White-clawed Crayfish *Austropotamobius pallipes* (Status B)

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

Attribute	Measure	Targets	Comments
* Population size	Catch per unit effort (CPU). Based on 40 liver-baited Trappy traps © with 10 mm mesh in clusters of 10 at four locations overnight	At least five lakes with populations. At least one lake with a CPU > 1	All lakes to be sampled
* Recruitment	Size distribution of crayfish within the sample	Smallest cohort for the trap mesh size > 5% of the sample.	
Population health	Crayfish plague symptoms	None	
	Thelohaniasis symptoms	< 10% of the sample where the sample numbers >20 individuals	

Feature 3 (SAC) – Alkaline fens (Status B)

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

Attribute	Measure	Targets	Comments
* Extent	% of lakeshore backed by alkaline fen	No decline since the Northern Ireland Lakes Survey	= communities identifiable as Northern Ireland Lakes Survey Shore type 29 with > 50% small sedge cover Define fixed transects
	Width of alkaline fen zones (m)	No decrease in baseline reference value at any transect.	identifiable as type 29 with > 50% small sedge cover
*Community diversity	Number of recognisable alkaline fen sociations	No loss of recognisable sociations	Regardless of ease of NVC classification

*Sward composition in alkaline fen areas	Frequency of positive indicators (DAFOR scale) *Carex diandra* *Carex elata* *Carex paniculata* *Carex pseudocyperus* *Carex viridula ssp brachyrrhyncha* *Cladium mariscus* *Epipactis palustris* *Galium uliginosum* *Lysimachia vulgaris* *Parnassia palustris* *Rorippa palustris* *Sagina nodosa* *Scutellaria galericulata* *Veronica anagallis-aquatica* *Veronica scutellata*	No loss of more than one species since the baseline survey.	From anywhere in the fen/wetland. Note DAFOR status and position of the plants for use by future surveyors.
*Sward composition in alkaline fen areas	Frequency of negative indicators (DAFOR scale) as listed in 'monitoring species lists.doc'	Determine on a site by site basis	Use to identify a drift towards a grassy state – *Agrostis stolonifera*, *Holcus lanatus*, *Juncus effusus, Ranunculus repens… etc.* or to a more nutrient–rich state – *Epilobium hirsutum, Urtica dioica, Calystegia sepium*…. etc.

	Species-richness	No single species overwhelmingly dominant	although *Carex diandra* is often very abundant
* Sward structure in the fen areas	Cover of tall grasses	No more than 25%.	
	Cover of small sedges	No less than 50%	
	Frequency of tree/scrub spp.	Frequency of tree / scrub spp. incl. saplings no more than Rare (Occasional??) (DAFOR scale)	Alder (*Alnus glutinosa*) is the most likely coloniser – check carefully for establishment.
	Extent of bare mud or peat visible without disturbing the vegetation	No more than 10%	
	Average vegetative sward height	No less than 10 cm	
	Frequency of litter/thatch accumulation in the alkaline fen areas	No more than occasional	Hard to measure or estimate.

	Hoof prints	No more than occasional over the whole fen	
* Hydrology	Normal summer level of the 'water table' relative to the ground surface.	In the range 0 to – 12 cm	Dig a small hole, replace 'divot' afterwards
	Ellenberg mean F in the fen area	No more than 10% decline from baseline	Based on the fixed transects
	Drains	No new drains	

Feature 4 (SAC) – Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae (Status C)

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

Attribute	Measure	Targets	Comments
*Extent	% of shoreline occupied by vegetation with *Cladium mariscus* cover > 50% Area of vegetation with *Cladium mariscus* cover > 50%	For both measures: Maintenance or expansion in Kilroosky Burdautien and Summerhill Loughs (Re)establishment in suitable areas in the other sub-sites	Expansion into, but not dominance in any adjacent small sedge zones is desirable.
*Adjacent small sedge mires	Extent of calcium enriched small sedge mire adjacent to the *Cladium mariscus* bed.	Maintenance of the baseline extent	

MONAWILKIN SAC
UK0016619

CONSERVATION OBJECTIVES

Document Details

Title	*Monawilkin SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
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Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	Dec 2014	Complete review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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 Directive79/409/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: FERMANAGH

GRID REFERENCE: IH 090534

AREA: 175 ha

5. SUMMARY SITE DESCRIPTION

Monawilkin is primarily a calcareous grassland site with Blue Moor-grass *Sesleria caerulea* dominated grassland the richest of its type in Northern Ireland. The underlying rock is for the most part Carboniferous Upper Limestone with the north-west of the site underlain by sandstone. The site also supports a range of species associated with a mosaic of other habitats including cliffs, screes, base rich flushes, heathland, scrub and woodland. There are transitions from open water to fen, swamp and Alder carr present around Carrick and Monawilkin Loughs within the site.

In addition to the floral interest, the south-facing limestone scarp is the best inland site for Lepidoptera in Northern Ireland. There are recent records for a total of 23 butterfly species, and the site is the only known location in NI for the Small Blue *Cupido minumus*. The site has recently, post declaration, been shown to be of national importance for its assemblage of grassland fungi. The Freshwater Crayfish *Austropotamobius pallipes* occurs in Monawilkin Lough.

Small exposures of the Glencar Limestone Formation, of Lower Carboniferous age, have yielded an exceptionally rich silicified fauna dominated by bryozoa and brachiopods. This material has formed the basis of numerous descriptive publications covering more than 130 species, for 29 of which this is the type locality.

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 boundary has been drawn to include the best examples of calcareous grassland and other areas where there is continuity of semi-natural habitats from calcareous grassland to other communities such as woodland and heath. Monawilkin Lough is included as an a example of a mesotrophic lake, an ASSI selection feature in its own right and also part of Carrick Lough, important for its fen and swamp communities. It should be noted, that whilst areas of improved grassland can be easily identified and excluded from a site, distinguishing unimproved from semi-improved grassland can be difficult, because of the potential range of variation from one to the other. Separation depends upon the judgement of the surveyor, and is based on a variety of factors, such as herb : grass : sedge ratio.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ pop~
Habitat	Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)	B	64.67ha
Habitat	Old Sessile Oak woods with *Ilex* and *Blechnum* in the British Isles.	C	13ha
Habitat	North Atlantic wet heaths with *Erica tetralix*	D	11.5ha
Habitat	European dry heaths	D	11ha
Habitat	Alkaline fens	D	1ha

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 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 Monawilkin SAC.

6.1 ASSI SELECTION FEATURES

Monawilkin ASSI

Feature Type	Feature	Size/ extent/ pop~
Habitat	Calcareous Grassland	64.7 ha
Habitat	Oakwood	13 ha
Species	Invertebrate assemblage	
Species	Butterfly Assemblage including the Small Blue Butterfly *Cupido minimus.*	
Species	Breeding Bird Assemblage	
Species	Fungi Assemblage - *Hygrocybe,* Geoglossaceae, Clavariaceae and *Entoloma*	
Earth Science	Upper Palaeozoic Palaeontology: Carboniferous palaeontology - Carrick Lough	

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The ***Conservation Objective*** for this site is:

To maintain (or restore where appropriate) the Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) and the Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles 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
Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)	B	Maintain the extent of existing species-rich dry calcareous grasslands (CG9).
		Maintain and enhance species diversity within the CG9 community including the presence of notable species.
		Seek nature conservation management over suitable areas immediately outside the SAC where there is possibility of restoring calcareous grassland
		Maintain the diversity and quality of habitats associated with the calcareous, e.g. fen, swamp, neutral grasslands, scrub, especially where these exhibit natural transition to calcareous grassland.
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	C	Maintain the extent of existing 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.

9. ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Calcareous Grassland	See SAC Selection Feature Objective Requirements table.
Oakwood	See SAC Selection Feature Objective Requirements table.
Invertebrate assemblage	Maintain populations of important inverts including Small Blue *Cupido minimus*.
	Maintain habitat conditions suitable for completion of the Small Blue life cycle, including areas of flowering Kidney vetch *Anthyllis vulneraria* for feeding larva and adults and scrub for roosting adults
	Seeks to expand population of Small Blue *Cupido minimus*. to areas outside ASSI where there is habitat suitable for reintroduction or introduction.
Butterfly Assemblage including the Small Blue Butterfly *Cupido minimus*	To be finalised.
Breeding Bird Assemblage	To be finalised
Fungi Assemblage - *Hygrocybe,* Geoglossaceae, Clavariaceae and *Entoloma*	Establish the extent and importance of grassland fungi on this site. Maintain populations of grassland fungi.
Upper Palaeozoic Palaeontology: Carboniferous palaeontology - Carrick Lough	Maintain the potential for access to and sampling of this semi-buried feature subject to natural processes

10. MANAGEMENT CONSIDERATIONS

Ownership
There are approximately seven owners within the site.

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 Monawilkin, or could affect it in the future. Although Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) and Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles 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.

Application of fertiliser
There is no information on the current rate of fertiliser application on the site, but HST survey suggests that treatment rates are low or non-existent over much of the site. Research indicates that the application of any inorganic fertiliser to grassland leads to a reduction in species diversity, both plants, fungi and indirectly associated invertebrates, through nutrient enrichment. Therefore the ultimate aim should be eliminate fertiliser use altogether.
ACTION: Through liaison with owner/occupiers evaluate current use of inorganic fertilisers to eliminate or minimise any applications that may cause enrichment.

Additions of manure/slurry
No information available on current practice. Whilst additions of farmyard manure can be part of traditional meadow management, significant increases in organic nitrogen will lead to a loss in species diversity (as above). The ecology of water-bodies such the Monawilkin loughs are also susceptible to any degree of nutrient enrichment. Generally, slurry should not be applied, especially near water-bodies.
ACTION: Through liaison with owner/occupiers evaluate current use of organic fertilisers to eliminate or minimise any applications that may cause enrichment.

Grazing
No information on current grazing levels. Cattle graze parts of the site including some areas of woodland. Undergrazing or cessation of grazing results in pastures becoming rank, with a loss in species diversity and ultimately, scrub encroachment. Scrub encroachment is a natural successional development, but results from neglect or undergrazing. On the other hand, over-grazing leads to physical damage through poaching, in addition to reducing species diversity. The

thin skeletal soils of calcareous grassland are particularly prone to damage if overgrazed. The correct grazing level should promote the maintenance of a species-rich grassland sward which will be beneficial to both plants, invertebrates and grassland fungi. Grazing should not be as intense in other habitats but light levels are desirable in heath areas. In general, grazing in woods is undesirable.
ACTION: Through liaison with owner/occupiers evaluate current grazing levels and ensure the grazing levels are appropriate to maintain each habitat type.

Supplementary feeding
Supplementary feeding of livestock can lead to severe localised poaching and the risk of soil nutrient enrichment. Hay from an alternative source can lead to alien species colonising the site.
ACTION: Ensure any supplementary feeding at Monawilkin is restricted to field units outside the boundary of the site, if at all possible. If supplementary feeding does take place within the site it should be carefully controlled and monitored.

Woodland Clearance
Removal of woodland would lead to a reduction in diversity.
ACTION: Ensure there is no removal of woodland from the site.

Dead Wood Removal
Dead wood should be left in situ if safe or practical to do so. This provides valuable habitat for fungi, invertebrates etc. Removal of wood or fire-wood should be discouraged.
ACTION: Ensure there is no removal of dead wood from the site.

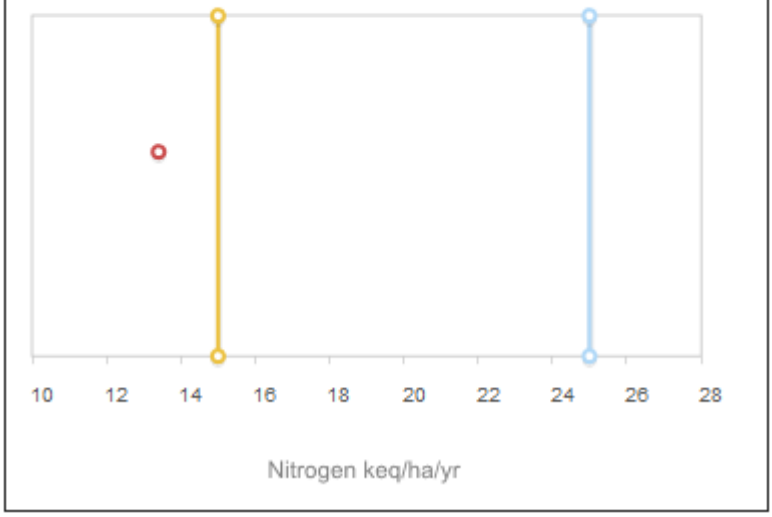
Invasion by exotics
Exotic species, especially within woods, should be monitored. Very invasive species such as Sycamore *Acer pseudoplatanus* can pose a threat. Their removal should be considered whilst other less invasive species may require little more than monitoring and removal in the long term if appropriate.
ACTION: Monitor the encroachment of any invasive/exotic species onto the site and remove when necessary.

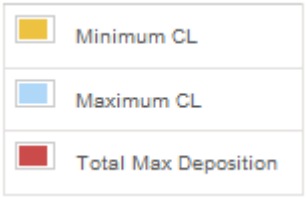
Drainage
Several communities within Monawilkin depend on a degree of water movement through the soil or fairly waterlogged soil conditions. Increased drainage would have a detrimental effect on such communities.
ACTION: Ensure no drainage takes place that would adversely affect the sites conservation interests.

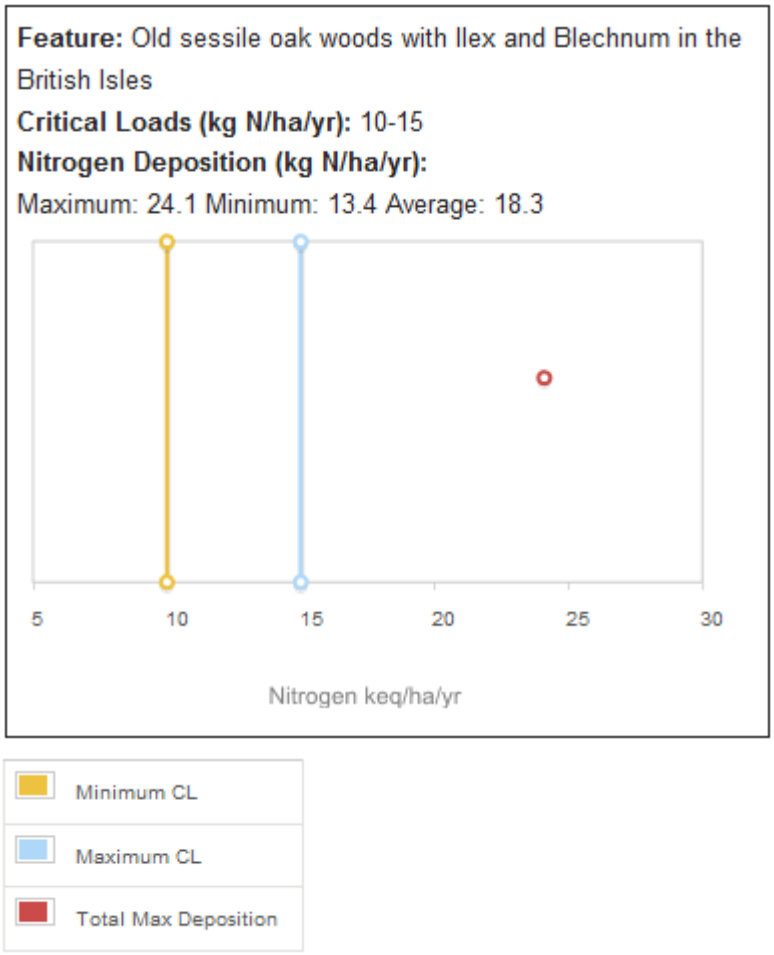
Nitrogen Deposition
Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on

natural and semi-natural habitats to be widespread across the UK. Lower and upper critical loads have been calculated for Monawilkin SAC.

Feature: Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)
Critical Loads (kg N/ha/yr): 15-25
Nitrogen Deposition (kg N/ha/yr):
Maximum: 13.4 Minimum: 8.3 Average: 10.7







(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

Activities occurring outside the site (e.g. agricultural intensification, drainage works, and development) may be detrimental to the site through remote affects.

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 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. woodland clearance, overwintering of stock, dumping etc), or will be comparatively slow. 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)*
   Particular note should be made of cattle/sheep numbers if possible and supplementary feeding points. SIM should be carried out once a year.

2. *Monitor the condition of the site (Condition Assessment)*
   Monitor the key attributes for each selection feature. This will detect if the features are in favourable condition or not.

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) – Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia)* - Status B

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

Attribute	Target	Method of Assessment	Comments
* Extent of Calcareous Grassland	Maintain the extent of Calcareous grassland at least 64.7 ha.	Visual estimate in 2x2 m plots and across the calcareous grassland using a combination of aerial photographs, SIM and Condition Assessment structured walk.	In exceptional circumstances, target may be set to accept some loss to other habitat, e.g. if required by specialist taxa or other SAC feature in a mosaic such as rush pasture grassland Threshold areas for assessing 'significant' loss will vary according to site and the quality of available vegetation maps and/or aerial photos.
Presence of associated semi-natural habitats	Maintain existing associated semi-natural habitats.	Visual estimate in 2x2m plots and across the SAC 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.

Height of pasture (cm)	Mean vegetation height 2-10cm	Visual estimate in 2x2 m plots.	Outside target indicates insufficient grazing or over-grazing. This attribute can contribute to a loss of positive indicator species and herb richness. Note that this figure is for pasture and that a late visit to a hay meadow may come out over or under this target
% Cover litter in a more or less continuous layer, distributed either in patches or in one larger area.	Less than 25% mean cover	Visual estimate in 2x2 m plots.	Outside of the target indicates insufficient management either by lack of grazing or mowing. This attribute can contribute to a loss of positive indicator species and herb richness.
% Cover bare ground **not rock** extent, noticeable without disturbing the vegetation.	Less than 10% mean cover	Visual estimate in 2x2 m plots.	Outside of the target indicates excessive trampling or sward disturbance and can lead to agricultural weed infestation or loss of herb richness and positive indicators.
* Cover of herbs, sedges and wood-rushes	30 - 90% herbs	Visual estimate in 2x2 m plots.	Note sedges taken as honorary herbs with small wood rushes
Frequency of *Sesleria albicans*.	At least frequent	Visual estimate in 2x2 m plots.	
Frequency of community character species - *Alchemilla sp, Anthyllis vulneraria,*	Four at least frequent and four at least occasional throughout the sward. At least frequent is equivalent	Presence recorded in 2x2 m plots and then establish frequency in 2x2 m plots throughout the	

Avenula pubescens, *Briza media,* *Campanula rotundifolia,* *Carex caryophyllea,* *Carex flacca,* *Danthonia decumbens,* *Euphrasia sp,* *Galium verum,* *Koeleria macrantha,* *Linum catharticum,* *Lotus corniculatus,* *Pilosella officinarum,* *Polygala sp*, *Potentilla erecta,* *Ranunculus bulbosus,* *Succisa pratensis,* *Thymus polytrichus,* *Veronica officinalis*	to greater than 41% occurrence in recorded plots. At least occasional is equivalent to greater than 21% occurrence in recorded plots	entire site by working out % plots that species occurs within.	
Where a site holds populations of rare species two of the following at least rare. *Antennaria dioica,* *Saxifraga hypnoides,* *Coeloglossum viride,* *Gentianella* sp	Two of the rare species at least rare throughout the sward.	Presence recorded in 2x2 m plots and then establish frequency in 2x2 m plots throughout the entire site by working out % plots that species occurs	Confirm with citation and site notes.

		within.	
* Cover of negative indicators - *Bellis perennis, Holcus lanatus, Ranunculus repens, Trifolium repens, Lolium perenne*	No species should be individually at more than 10% cover or combined cover exceeding 20%	Visual estimate in 2x2 m plots.	Care should be taken with the setting of these targets as thresholds may vary considerably by site and conservation goals.
*Frequency and % cover of negative indicators - agricultural weeds *Cirsium arvense, Cirsium vulgare, Senecio jacobaea, Urtica dioica, Plantago major, Urtica dioica*	No more than one negative more than occasional throughout the sward or singly at more than 5% cover	Presence recorded within 2x2 m plots and frequency worked out throughout the sward.	The majority of the listed agricultural species respond to some form of nutrient enrichment. Therefore high or increasing frequency/cover will generally indicate unfavourable condition. However, *S. jacobaea* often reflects grazing management rather than soil nutrient status, and some horse-grazed pastures with frequent *S. jacobaea* can be potentially favourable, where other agricultural weeds are absent or at very low levels.
% cover of Soft Rush *Juncus effusus*	Soft rush *Juncus effusus* should not exceed a cover of 20%	Visual estimate in 2x2 m plots.	Indicates poaching within the sward.
% cover of *Pteridium aquilinum*, in period mid May-end July, measured annually if possible	*Pteridium aquilinum* should not be at more than 10%	Visual estimate in 2x2 m plots.	

* Cover of scrub/tree species and (except *Salix repens* or ericoids). Where invertebrates are an interest feature a higher cover of scrub may be acceptable.	No more than 5% mean cover within the sward as measured in 10m radius of the plot.	Visual estimate within a 10m radius of plot.	These targets should be used with caution. Scrub and tree cover can form a useful transition habitat across part of a site, but if more than occasional throughout a sward, even at less than 5% cover, scrub can soon become a problem if grazing levels are not sufficient or if control measures are not being carried out. High scrub cover may be required at sites with specialist invertebrate interest.
Rare or scarce species specific to the site or locally distinctive attributes not covered above	Site dependent		It is recommended that the appropriate size class and extent of scarce taxa be recorded. For plants, recommended size classes are as follows for number of shoots (or ramets): very small 1-10; small 11-100; medium 101-1000, large 1001-10000; very large >10000.

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

ANNEX I

Feature 2 (SAC) - Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles (Status C)

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

Attribute	Targets	Method of Assessment	Comments
* Area of Oakwood	Maintain the extent of Oakwood.	Visual estimate in 10x10m plots and 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 and 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 *Luzula sylvatica*.	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: *L. sylvatica* 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.
	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.	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.
* 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	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
	Regeneration of Oak saplings	Visual estimate in 10x10m plots.	

of native tree regeneration within reasonable limits for the current structure of the Oak woodland.	Regeneration of other native seedlings.	Visual estimate in 10x10m plots.	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 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:	No one negative species no more than occasional throughout the wood and/or singly or together	Visual estimate in 10x10m plots.	

(DAFOR)	comprising more than 5% cover. *Galium aparine, Urtica dioica, Heracleum spp, Epilobium spp. Rumex obtusifolius*. No more than occasional is equivalent to less than 40% occurrence in recorded plots.		
* Cover of *Pteridium* (% cover)	The mean cover of *Pteridium* 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) (DAFOR)	There should be no felling or coppicing of native trees or shrubs.	Visual estimate in 10x10m plots and 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.
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:- *Vaccinium myrtillus,* *Blechnum spicant,* *Dicranum spp.,* *Luzula pilosa,* *Rhytidiadelphus loreus*	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:- *Sanicla europea,* *Geum urbanum,* *Polystichum setiferum,* *Aneomne nemorosa,* *Primula vulgaris.*	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:- *Carex remota,* *Ranunculus repens,* *Chrysosplenium oppositifolium,* *Filipendula ulmaria,* *Lysimachia nemorum.*	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.	

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

MONINEA BOG SAC
UK0030212

CONSERVATION OBJECTIVES

Document Details

Title	*Moninea Bog SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
Date Effective From	*01/04/2015*
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Contact	cdp@doeni.gov.uk

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Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	Nov 2014	Complete review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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: FERMANAGH

GRID REFERENCE: IH 299215

AREA: 45 ha

5. SUMMARY SITE DESCRIPTION

Moninea Bog represents a comparatively large area of uncut raised bog in Co. Fermanagh. It lies to the west of Upper Lough Erne directly south-west of Teemore and represents one of the few remaining examples from the complex of small raised bogs which once occupied hollows between the drumlins of South Ulster. The bog lies at an elevation of about 50m O.D. and is completely surrounded by a series of low drumlin hills which in turn are surrounded by a series of rivers.

The peat deposits are deep and permanently waterlogged and the main feature of interest is a large intact dome supporting a good surface microtopography. In addition, a number of notable plant species have been recorded including *Sphagnum fuscum*, *S. imbricatum* and *S. pulchrum*.

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 boundary has been drawn to include all areas of intact lowland raised bog and associated semi-natural habitats, including cutover bog and pockets of Birch scrub. The intact surface of the bog forms a compact hydrological unit, with quite an extensive area of scrub and woodland to the north of the dome and a narrow

strip of cutover bog to the south of the dome. A finger of scrub and cutover bog also extends to the east of the main area of intact raised bog. The boundary of the SAC encompasses areas of degraded bog, which are capable of regeneration to active raised bog given positive management. Small areas of *Molinia caerulea* acid grassland and pockets of scrub woodland fall into this category.

The boundary around the entire site is clearly defined as the edge of the semi-natural habitat associated with the cutover bog and is one distinct hydrological unit, completely surrounded by improved agricultural land. A minor road forms the boundary along the southern edge of the bog and there is no fencing along the road verge. The remaining boundaries, with the exception of a few areas around the site are clearly defined as ditches and old tracks, which are securely fenced and mark the edges of adjacent fields. Many of these fields have been reclaimed from the cutover bog in recent years. These boundaries are stock proof.

In several places, there are no physical boundaries around the periphery of the site and stock can move freely from the improved fields onto the intact surface of the bog. These boundaries must be fenced as soon as possible to prevent further grazing and poaching of the intact bog surface.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ population
Habitat	**Active raised bog**	**B**	**35.5 ha**
Habitat	Degraded raised bog still capable of regeneration	D	6.5 ha
Habitat	Depressions on peat substrates of the *Rhynchosporium*	D	0.1 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 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 Moninea Bog SAC.

6.1 ASSI SELECTION FEATURES

Moninea Bog ASSI

Feature Type	Feature	Size/ extent/ population
Habitat	Lowland Raised Bog	45 ha

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

SAC 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

ASSI 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.

10. MANAGEMENT CONSIDERATIONS

Ownership

Moninea Bog, including the turbary rights, is privately owned with over 30 individuals owning various sections of the bog and an additional 50 turbary plots

identified. The complex ownership pattern within the bog makes a unified approach to site management more difficult.

Adjoining Land Use

The main adjoining land-use outside the ASSI is improved and semi-improved agricultural land.

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 Moninea 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 extensive hand cutting of peat for many years around the periphery of Moninea Bog. This has encroached significantly into the intact surface of the raised bog. Although many of old hand cuttings now support actively regenerating bog vegetation, there has been significant scrub development in many of the drier cutover areas. In recent years some mechanised peat cutting has also taken place within the old cuttings and in some cases has encroached onto the remaining intact surface of the bog.

Peat cutting at the time of designation was problematical, but has been addressed by a series of management agreements with landowners. All peat cutting now appears to have been stopped, although hand cutting for domestic use has been consented in perpetuity for a number of turbary owners.

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.

There is evidence of recent burning within the SAC, i.e. a large burn around 1995 and a number of smaller burns associated with peat cutting in more recent years. Parts of the cutover may even have been burnt as late as 2000.

ACTION: No burning within the SAC.

Drainage

Within the main intact dome, there are a few very old drains bisecting the otherwise intact dome as well as a number of drains associated with the cuttings. These drains barely show up on the aerial photograph and are difficult to find on the ground and do not appear to be carrying water off the intact dome of the bog. There has also been extensive drainage within the old cutover areas. 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 on the bog's hydrology.

ACTION: Block active drains where appropriate.

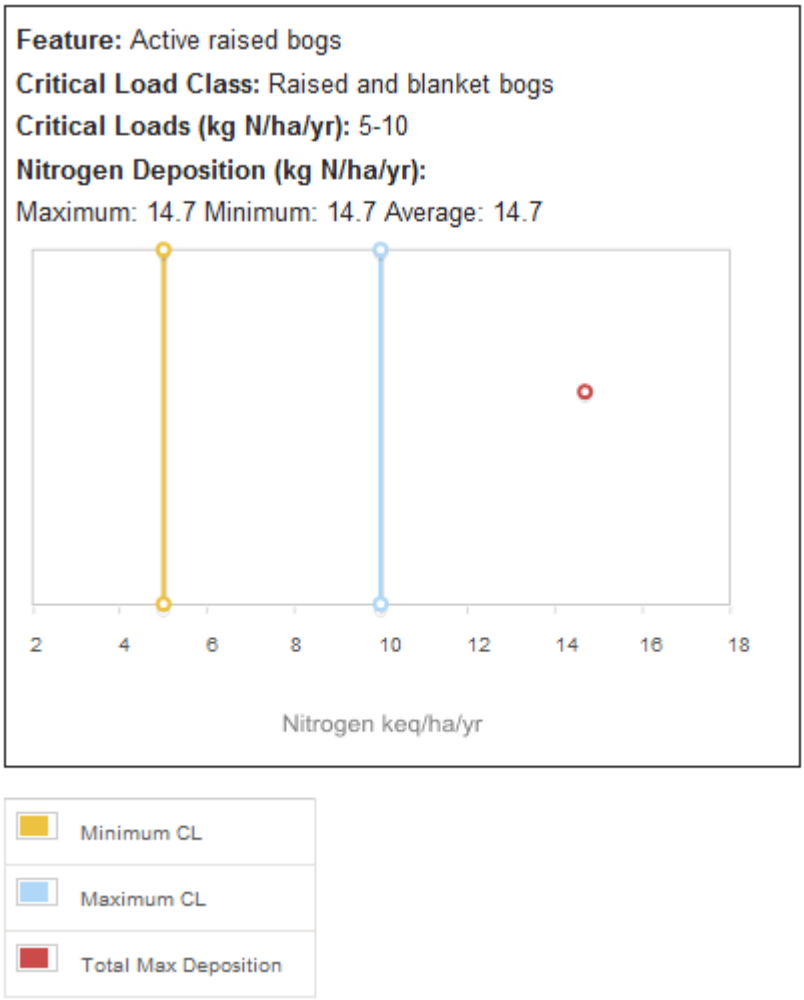
Grazing

Lowland raised bogs are not suitable for grazing, as the surface is fragile and easily damaged by poaching.

ACTION: Fences around the periphery of the bog should be maintained to prevent grazing occurring on the site.

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 Moninea 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.

Scrub Encroachment

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

ACTION: Monitor scrub encroachment and take remedial action if required. Remove any invasive exotic species, such as Rhododendron as a matter of urgency.

Fly-tipping

There has been some localised fly tipping along the edge of the road to the south of the site. Although this is not damaging to the main interest features, it is unsightly and may encourage others to continue the practice.

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

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

- *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

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Annex 1

SAC Feature – 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 35.5 ha	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 *Erica tetralix-Sphagnum papillosum* raised and blanket mire community and M2, the *Sphagnum cuspidatum/recurvum* bog pool community dominated by *S. cuspidatum*.
* 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. *S. cuspidatum* , *S. denticulatum* *S. magellanicum, Drosera, anglica, D. intermedia, Menyanthes trifoliata*.	Visual estimate within a 10m radius of plots and 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.

* *Sphagnum* cover/abundance (% cover and frequency) Active Peat Formation (DAFOR)	Ombrotrophic *Sphagnum* 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: - *S. capillifolium* and *S. tenellum* and the thick hummock forming species*:* - *S. papillosum* and *S. magellanicum* at least occasional over the surface.	Visual estimate in 2x2m plots. Visual estimate in 2x2m plots.	A constant *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to measure the hydrological integrity of the intact bog surface.
* Ericaceous cover (%) and frequency of *Erica tetralix* (DAFOR).	Ericoid cover should be maintained between 40% and 60% of the intact bog surface. *Erica tetralix* 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 *Calluna vulgaris* 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.
* *Rhynchospora alba* abundance (% cover)	*Rhynchospora alba* cover should be less than 10%.	Visual estimate in 2x2m plots	*Rhynchospora alba* 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.
* *Myrica gale* abundance (% cover)	*Myrica gale* 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 and 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 *Juncus squarrosus* etc. and the presence of grazing induced *Calluna vulgaris* 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. *Sphagnum austinii* *Sphagnum fuscum* *Sphagnum pulchrum* *Utricularia spp.* *Andromeda polifolia*	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

OWENKILLEW RIVER SAC
UK0030233

CONSERVATION OBJECTIVES

Document Details

Title	*Owenkillew River SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
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Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	January 2015	Complete review	RMK
V3	July 2017	Edit and minor correction	PC

Site relationships

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

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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

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*.

Adjacent woodlands which form part of the SAC include Drumlea and Mullan Woods ASSI and the Owenkillew 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 (www.daera-ni.gov.uk).

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 Owenkillew 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 Owenkillew 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

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

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 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 Owenkillew River SAC.

6.1 ASSI SELECTION FEATURES

Owenkillew River ASSI

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 *Margaritifera margaritifera*	
Species	Otter *Lutra lutra*	
Species	Atlantic Salmon *Salmo salar*	

Table 2. List of ASSI features.

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 *Callitricho-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 *Margaritifera margartifera*	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 *Ranunculus fluitans* and *Callitricho-Batrachion* 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 *Ilex* and *Blechnum* in the British Isles	B	Maintain and expand 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 *Lutra lutra*	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 *Salmo salar*	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

9.1 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 *Margaritifera margaritifera*	See SAC Selection Feature Objective Requirements table.
Otter *Lutra lutra*	See SAC Selection Feature Objective Requirements table.
Atlantic Salmon *Salmo salar*	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 Owenkillew 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 *Callitricho-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 Owenkillew 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 land owners to avoid excessive fertiliser inputs, thus reducing diffuse pollution. Restrict stock access to less sensitive watering points.

Channel & Bank Modification

The Owenkillew 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 resectioning. 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/DARD Fisheries Division and Environmental Protection 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 that the effluent is adequately treated.
ACTION: Review existing Water Act 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 Act 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 Indian 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*, Indian Balsam *Impatiens glandulifera*, Salmon Berry *Rubus spectabilis* can be very invasive, while some are not seen as a immediate threat due to their limited occurrence (e.g. Rhododendron *Rhododendron ponticum*), or slow rate of spread (e.g. Beech *Fagus sylvatica*).

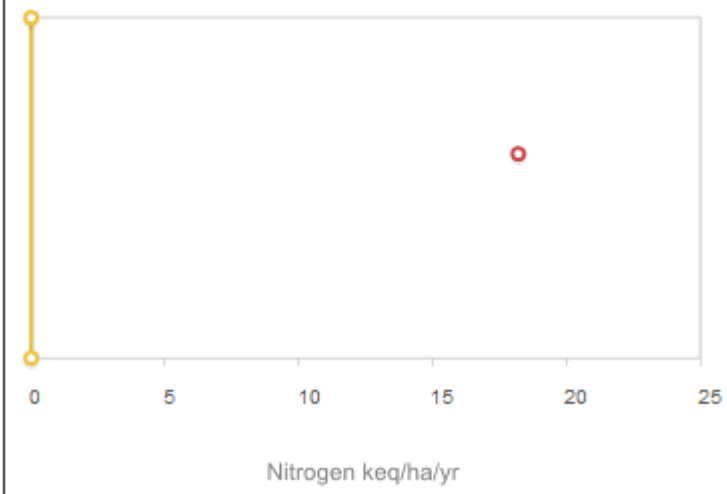
The most invasive species require management to control their spread – i.e. removal of seed sources. This is impractical with species such as Indian Balsam *Impatiens glandulifera* whose seed supply is partly recruited annually from water-borne seeds – indeed, it may be impossible to control the spread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

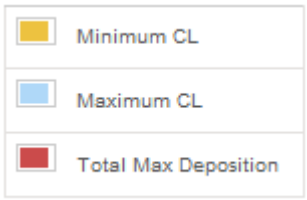
ACTION: Control invasive species where appropriate (e.g. Remove seeding Sycamore). Monitor other exotic species.

Nitrogen Deposition

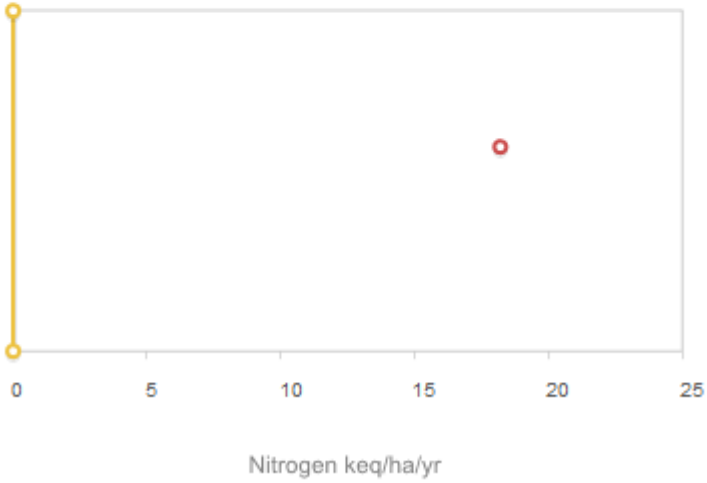
Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the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

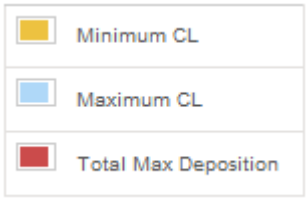
Feature: Margaritifera margaritifera - Freshwater pearl mussel
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 18.2 Minimum: 10.2 Average: 12.4



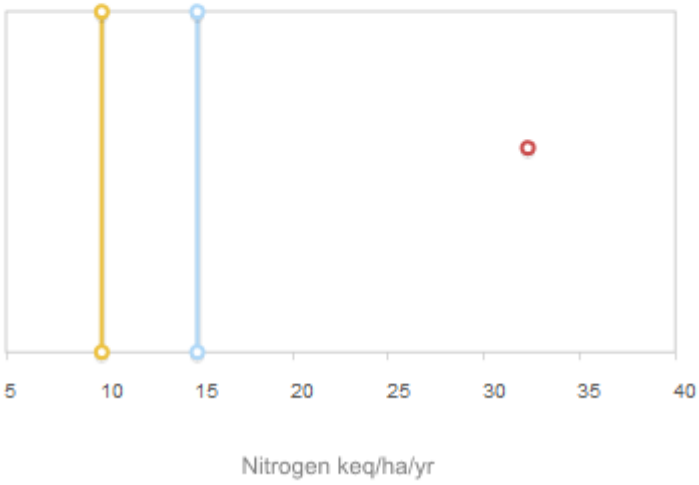


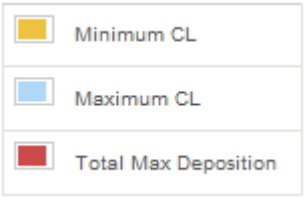
Feature: Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 18.2 Minimum: 10.2 Average: 12.4



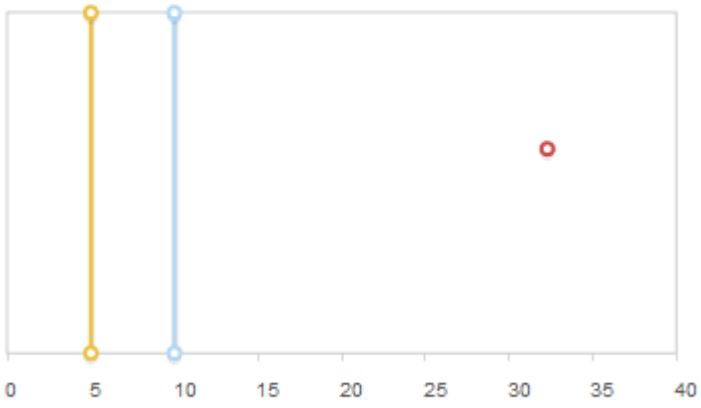


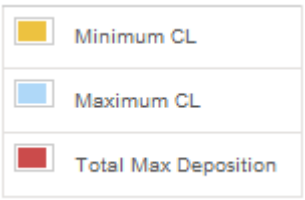
Feature: Old sessile oak woods with Ilex and Blechnum in the British Isles
Critical Load Class: Acidophilous Quercus-dominated woodland
Critical Loads (kg N/ha/yr): 10-15
Nitrogen Deposition (kg N/ha/yr):
Maximum: 32.3 Minimum: 23.9 Average: 26.5



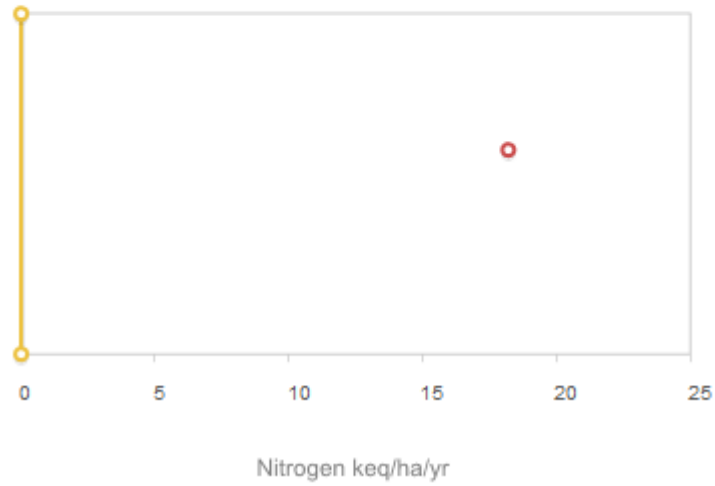


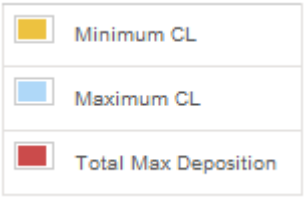
Feature: Bog woodland
Critical Load Class: Raised and blanket bogs
Critical Loads (kg N/ha/yr): 5-10
Nitrogen Deposition (kg N/ha/yr):
Maximum: 32.3 Minimum: 23.9 Average: 26.5



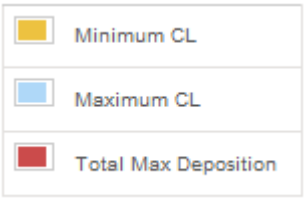


Feature: Lutra lutra - Otter
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 18.2 Minimum: 10.2 Average: 12.4





Feature: Salmo salar - Atlantic salmon
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 18.2 Minimum: 10.2 Average: 12.4



(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. 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. 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.

12.1 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 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 <u>not by itself</u> 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 I

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

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

Attribute	Measure	Targets	Comments
*Population dynamics	Number	Stable or increasing	
	Age structure	20% of population <20 years old with aged individuals (>60 years) also present	A least-cost methodology for monitoring this attribute is being investigated, involving the sampling of representative reaches within an SAC. An abundant supply of 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 mussel 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.
	Maximum age	80-110 years	
	Mortality rate	No more than 10% of the population in 10 years	
	Fish host populations: Juvenile salmonid densities (0+ and 1+ year classes)	Should be abundant (to be refined following the results of LIFE project on pearl mussel/fish host relationships)	

	Biological disturbance: Introductions	No stocking/translocation of pearl mussel unless agreed to be in the best interests of the population	Little work has been undertaken on pearl mussel genetics. However, given the sedentary nature of the pearl mussel, genetically discrete populations are likely.
		Absence of rainbow trout and brook trout and any other non-native species that may impair juvenile densities of salmon and brown/sea trout.	Rainbow trout and brook trout are resistant to glochidial infection and are, therefore, not suitable host species. Stocking of these species will create competition with native salmonids and is likely to reduce host opportunities for glochidia.
	Exploitation	No fishing for pearl mussels	
*Physical integrity	Disturbance of habitat	No disturbance of existing mussel beds by in-river activities	Relevant activities include fishing and watering stock (wading in the river) and canoeing (at access points to the river).
	River morphology	Maintain and where necessary restore [*to an extent characteristic of the river/reach*	

	River Substrate	<10% fines in top 30cm of substrates hosting juvenile & adult mussels.	Elevated levels of fines can clog substrates used by juvenile mussels and can impair adult feeding/respiration. The target for salmon has been used for pearl mussels in the absence of species-specific information Sources of fines include; run-off from arable land, land (especially banks) trampled by livestock, sewage and industrial discharges.
*Water quantity	Flow	Flow regime should be characteristic of the river. As a guideline, at least 90% of the naturalised daily mean flow should remain in the river throughout the year	
*Water quality:	Biological class. Environment Protection's General Quality Assessment scheme. Assess every years.	'A'	
	Ecosystem Class. Environment Protection's General Quality Assessment scheme. Assess every years	'A'	
	Pollution	No Sheep dip	

	Minimal Algae cover	Should be <5% coverage over mussel beds and potentially suitable areas of coarse substrate	Extent of filamentous algal growth: Algal mats can impair respiration, feeding, fertilisation and the release of glochidia.
	Suspended solids	Annual mean <10mg L-1	

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

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

Attribute	Measure	Targets	Comments
*Population dynamics	Extent	Coverage should be characteristic of river type.	High cover of *Ranunculus spp* is not necessarily indicative of favourable condition.
	Reproduction *(only applies where control measures are implemented)*	*Ranunculus* should be able to flower and set seed, in suitable habitat.	Flowering outside the normal period and weed cutting or other activities that do not leave patches (at least 25% in every 100 metres of river) to flower and set seed are indicators of unfavourable condition. Use of herbicides should be avoided.
*Macrophyte assemblage	Composition	Characteristic plant species should dominate the assemblage. Indicators of unfavourable condition should be rare.	The absence of *Ranunculus* and high frequency of occurrence of blanketweed and other algae, or dominance of *Potamogeton pectinatus* are signs of unfavourable condition.

Water quantity	Flow	Flow regime should be characteristic of the river. As a guideline, at least 90% of the naturalised daily mean flow should remain in the river throughout the year.	
Physical integrity	River morphology	Maintain and where necessary restore [*to an extent characteristic of the river/reach*]	
	River substrate	Channels should be dominated by clean gravels. Maximum fines content should not be too great to prevent the establishment of new plants.	Siltation of riverine sediments, caused by high particulate loads and/or reduced scour within the channel, is a major threat to interest features. Elevated fines levels can interfere with the establishment of *Ranunculus* plants. Sources of fines include; run-off from arable land, land (especially banks) trampled by livestock, sewage and industrial discharges.
*Water quality:	Biological class. Environment Protection's General Quality Assessment scheme. Assess every years.	'A'	

	Ecosystem Class. Environment Protection's General Quality Assessment scheme. Assess every years	'A'	
	Suspended solids	Annual mean <10mg L-1	
	Soluble Reactive Phosphorus	*Targets should be set in relation to river/reach types (and should be near background levels)* <0.02mg/l - upland watercourses <0.06mg/l mid-altitude watercourses on hard substrates	

ANNEX I

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 and 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 and 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 *Luzula sylvatica*.	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: *L. sylvatica* 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. *Galium aparine, Urtica dioica, Heracleum spp, Epilobium spp. Rumex obtusifolius* No more than occasional is equivalent to less than 40% occurrence in recorded plots.	Visual estimate in 10x10m plots.	
* Cover of *Pteridium* (% cover)	The mean cover of *Pteridium* for the wood should be less than	Visual estimate in 10x10m plots.	

	10%.		
* 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 and 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:- *Vaccinium myrtillus,* *Blechnum spicant,* *Dicranum spp.,* *Luzula pilosa,* *Rhytidiadelphus loreus*	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:- *Sanicla europea,* *Geum urbanum,* *Polystichum setiferum,* *Aneomne nemorosa,* *Primula vulgaris.*	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:- *Carex remota,* *Ranunculus repens,* *Chrysosplenium oppositifolium,* *Filipendula ulmaria,* *Lysimachia nemorum.*	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.	

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

ANNEX 1

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 and 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 and 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.	
	Maintain current levels of standard variation within reasonable limits for field, herb cover and moss cover. In addition record the cover of *Molinia caerulea* and the cover of *Sphagnum* mosses.	Visual estimate in 10x10m plots.	At least the current level of structural diversity should be maintained for field cover, herb cover and moss cover.
		Visual estimate in 10x10m plots.	
		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	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.	
	Over-mature trees (>75cm diameter) at least present in 5% of plots	Visual estimate in 10x10m 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.	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) Maintain current levels of native tree regeneration within reasonable limits for the current structure of Bog woodland.	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.
	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. *Galium aparine, Urtica dioica, Heracleum spp, Epilobium spp. Rumex obtusifolius* No more than occasional is equivalent to less than 40% occurrence in recorded plots.	Visual estimate in 10x10m plots.	
* Cover of *Pteridium* (% cover)	The mean cover of *Pteridium* for the wood should be less than 10%.	Visual estimate in 10x10m plots.	
* Cover of grasses (excluding *Molinia* 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 *Betula pubescens-Molinia caerulea* woodland is the main bog woodland community in Northern Ireland and has a naturally high *Molinia* component of the ground flora. However, where *Molinia* is not predominant, a high grass component other than woodland species indicates past and/or

			present grazing and is undesirable. Nvertheless, 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 and 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:- *Betula pubescens,* *Salix cinerea,* *Filipendula ulmaria,* *Viola palustris,* *Phragmites australis,* *Molinia caerulea,* *Carex laevigata,* *Brachythecium rutabulum,* *Sphagnum squarrosum,* *S. recurvum,* *S. fimbriatum,* *S. palustris.*	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

ANNEX 1

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 data from other surveys or Ulster Museum, if available
	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	EP water quality scale	Water quality should be at least category A or B, according to EP guidelines, with no pollution incidents	Refer to Environment Protection 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 Agency for sample data if 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	

Attribute	Measure	Target	Notes
		development	
Flow rate	Mean annual flow rate	No reduction attributable to increased abstraction.	Refer to data from Rivers Agency if available
Site integrity	Total area	No reduction or fragmentation of area	

ANNEX 1

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

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

Attribute	Measure	Targets	Comments
*Population dynamics	Number	Stable or increasing	
	Adult Run	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.	The N.I. equivalent of Environment Agency MBAL (Minimum Biological Acceptable Level) should be set for each catchment. Expectation needs to be tempered by the intrinsic ability of the river type to support salmon. Fish classification schemes operated regionally and nationally should permit an interpretation of performance.
	Juvenile population densities	These should not differ significantly from those expected for the river type/reach under conditions of high physical and chemical quality.	

	Biological disturbance: Introductions	The population should be naturally self-sustaining. There should be a presumption against stocking of salmon unless it is agreed to be necessary as an emergency interim measure to maintain population viability whilst underlying ecological problems are being addressed. No introduction, or stocking, of other species, or sub-species, at excessively high densities in salmon spawning and nursery areas. Effective screening on all fish farm intakes and discharges.	The nature conservation aim is to provide conditions in the river that support a healthy and natural population, achieved through habitat protection/restoration and the control of exploitation as necessary. 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 stocked and naturally produced individuals, disease introduction and genetic alterations to the population. For these reasons, consideration of stocking is only justifiable in cases where population viability is threatened. Stock must come from within the same catchment area. The presence of artificially high densities of other fish creates unacceptably high levels of predatory and competitive pressure on juvenile salmon. Escapes from fish farms are a form of uncontrolled introduction and should be prevented.

*Population dynamics	Exploitation	All exploitation should be sustainable without compromising any components of the stock.	Controls on exploitation should include migratory passage to the SAC within territorial waters, including estuarine and coastal net fisheries, as well as exploitation within the SAC from rod fisheries.
*Physical integrity	Disturbance of habitat	No artificial barriers significantly impairing adults from reaching existing and historical spawning grounds, and smolts from reaching the sea.	In all river types, artificial barriers should be made passable. Natural barriers to potentially suitable spawning areas should not be circumvented.
	River morphology	Maintain and where necessary restore the characteristic physical features of the river channel, banks & riparian zone.	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 the species. The close 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 impact are not acceptable within the SAC, whilst restoration *may/will* be needed in some reaches.

	River Substrate	Clean gravels should dominate channels. <10% fines in top 30cm of spawning gravels	Elevated levels of fines can interfere with egg & fry survival through suffocation of eggs and loss of interstitial refugee for fry. Sources of fines include; run-off from arable land, land (especially banks) trampled by livestock, sewage and industrial discharges.

Water quantity	Flow	Flow regime should be characteristic of the river. As a guideline, at least 90% of the naturalised daily mean flow should remain in the river throughout the year Existing flow criteria already laid down for salmon should also be complied with.	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 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.

*Water quality:	Biological class. Environment Protection's General Quality Assessment scheme. Assess every year.	'a'	Generally, water quality should not be injurious to any life stage. A wide range of water quality parameters can affect the status of interest features, but standard biological monitoring techniques provide a reasonable integrated picture in relation to many parameters. The river quality classifications used in all parts of the UK have a biological component. All classified reaches within the site that contain, or should contain, the interest feature under conditions of high environmental quality should comply with the targets given.
	Ecosystem Class. Environment Protection's General Quality Assessment scheme. Assess every years	"a"	The River Ecosystem Classification 1995 sets standards for dissolved oxygen, biochemical oxygen demand, total and un-ionised ammonia, pH, copper and zinc. It therefore covers a number of water quality parameters that can cause problems within river systems. All classified reaches within the site that should contain the interest feature under conditions of high environmental quality should comply with the targets given.

	Soluble Reactive Phosphorus	*Targets should be set in relation to river/reach type(s and should be near background levels)* Annual mean <0.02mg/l - upland watercourses, <0.06mg/l mid-altitude watercourses on hard substrates and <0.2mg/l interim target for lowland rivers on clay substrates and large alluvial rivers.	The target of 25mgL^{-1} is based on the EC Freshwater Fish Directive a more precautionary figure has been used for salmon to help protect substrates used for salmon spawning. The mg/l used here are indicative values for rivers in England, the equivalent for Northern Ireland will have to be defined
*Water quality:	Pollution	None	Pollutants such as silage or Sheep dip can cause extreme mortality
	Suspended solids	Annual mean <10mgL^{-1} (spawning & nursery grounds) Annual mean <25mg L-1 (migratory passage)	Elevated levels of suspended solids can clog the respiratory structures of salmon.

PETTIGOE PLATEAU SAC
UK0016607

CONSERVATION OBJECTIVES

Document Details

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Prepared By	*R. McKeown*
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Version	Date	Summary of Changes	Initials
V1.0	June 2013	Internal working document	PC
V2.0	2015	Complete review	RMK
V2.0	01.04.2015	Effective date of Version 2	PC
V2.1	11.10.2017	Removed wording '*excluding recently burnt areas*' from bare peat target in all relevant Annex tables	PMC

Site relationships

To fully understand the conservation requirements of this site, it is necessary to also refer to the Conservation Objectives for Pettigoe Plateau SPA.

Pettigoe Plateau SAC boundary is identical to the boundary for Pettigoe Plateau SPA.

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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 Directive79/409/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: FERMANAGH

GRID REFERENCE: IH010650

AREA: 1,270 ha (in 2 blocks)

5. SUMMARY SITE DESCRIPTION

Pettigoe Plateau lies between Belleek and Pettigoe to the north of the western tip of Lower Lough Erne in Co. Fermanagh. The Plateau, with its mosaic of lakes peatlands and forests extends across the border into Co. Donegal. Within Northern Ireland Pettigoe Plateau occurs in a gently rolling landscape bearing much evidence of glaciation, with ridges, knolls and circular drumlins interspersed with flat plains and hollows, mostly below 150 m. A thin layer of boulder clay underlies the blanketing peat over most of the area. In contrast to the rolling terrain are the rocky peaks of Croagh and Mallybreen that rise above the surrounding land to more than 180 m. Topography is variable, although most slopes tend to be moderate or gentle and altitude does not vary a great deal.

The area around Croagh Mountain contains outcrops displaying a wide variety of lithologies and structures typical of the Lough Derg Group. This is a series of mainly siliceous psammitic rocks containing minor intrusive basic igneous components. Late-phase feldspar-rich pegmatite veins are represented.

The area of blanket bog has a wide range of the structural features associated with this habitat: including a large number of well-developed pool complexes, frequent acid flushes, basin mires, ladder fens and bog plains. The bog vegetation is characterised by luxuriant *Sphagnum* mosses, dwarf-shrubs with associated species demonstrating a strong oceanic influence. Amongst the lakes included in the designation, several are clean soft-water types supporting a well-developed isoetid component in their aquatic vegetation.

The site contains a number of other notably scarce plant species and is also important for birds. It provides breeding habitat for a number of species and is especially important as the Irish stronghold for breeding Golden Plover *Pluvialis apricaria*. In addition, amongst the over-wintering birds, Pettigoe Plateau frequently supports Greenland White-fronted Geese *Anser albifrons flavirostris*.

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 boundary of The Pettigoe Plateau site has been drawn to include all areas of high quality blanket bog and associated semi-natural habitats, including cutover bog, wet and dry heath, acid flushes, flushed and wet grassland and dry grassland. Some of the peatland within the SAC has been modified to varying degrees, the semi-natural blanket bog vegetation remains in comparatively good condition.

The border between Co. Donegal and Co. Fermanagh demarcates about one third of the boundary of Pettigoe Plateau SAC. The remaining two thirds of the boundary is generally marked by the edge of the enclosed land that surrounds the open peatland. However, sometimes the peatland edge loses quality and does not justify inclusion within the SAC boundary. Separation between areas included within the SAC and those more degraded areas that are excluded depends upon the judgement of the surveyor. This was based on a variety of factors, such as *Sphagnum* moss cover, bare peat, and grass: dwarf-shrub ratio, frequency of dung and poaching, burning and drainage.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ population
Habitat	**Active blanket bog**	**B**	804 ha
Habitat	**Natural dystrophic lakes and ponds**	**B**	pool complexes (c10 ha)
Habitat	**European dry heath**	**C**	123 ha
Habitat	**Northern Atlantic wet heaths with *Erica tetralix***	**C**	117 ha
Habitat	**Oligotrophic to mesotrophic standing water with vegetation belonging to *Littorelletea uniflorae* and/or of the *IsoUto-Nanojuncetea***	**C**	8 lakes = 133 ha (inc. that in the Republic) (c62.7 ha in N.I.)
Habitat	Transition mires and quaking bogs	D	5.0 ha
Habitat	Depressions on peat substrates *(Rhynchosporion)*	D	0.1 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 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 Pettigoe Plateau SAC.

6.1 ASSI SELECTION FEATURES

Pettigoe Plateau ASSI

Feature Type	Feature	Size/ extent/ population
Habitat	Blanket Bog	804 ha
Habitat	Dystrophic Lakes	10 ha
Habitat	Dry Heath	123 ha
Habitat	Wet Heath	117 ha
Habitat	Oligotrophic Lakes	62.7 ha
Species	Breeding Golden Plover	
Species	Breeding Bird Assemblage	
Earth Science	Dalradian	

Table 2. List of ASSI features.

6.2 ADDITIONAL ASSI FEATURES (subsequent ASSI standard features)

Feature Type	Feature	Size/ extent/ population
Earth science	Precambrian stratigraphy – psammites, intrusive basic igneous components, pegmatite veins.	Croagh Mountain
Species	Invertebrate assemblage	

Table 3. List of Additional ASSI Features

7. CONSERVATION OBJECTIVES

The Conservation Objective for this site is:

To maintain (or restore where appropriate) the

- *Active Blanket Bog*
- *Natural dystrophic lakes and ponds*
- *European dry heath*
- *Northern Atlantic wet heaths with Erica tetralix*
- *Oligotrophic to mesotrophic standing water with vegetation belonging to Littorelletea uniflorae and/or of the IsoUto-Nanojuncetea*

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.
Natural dystrophic lakes and ponds	B	Maintain the open water area of ponds and lakes.
		Maintain the extent of pool complexes and the numbers of pools within.
		The lake water to remain poor in plant nutrients and not to fluctuate outside normal limits.
		Characteristic aquatic vegetation to remain present.
		Minimal negative impacts from artificial structures.
		Minimal negative impacts from recreation.
		Identify the main areas of transition mires and quaking bog and describe and delineate them with more precision.
Oligotrophic to mesotrophic standing water with vegetation belonging to	C	Open water area and water level regime to remain stable.
		The lake water to remain poor in plant nutrients and not to fluctuate outside normal limits.

Littorelletea uniflorae and/or of the *IsoUto-Nanojuncetea*		Characteristic aquatic vegetation to remain present.
European dry heath	C	Maintain the extent of existing European dry Heath vegetation.
		Maintain and enhance the quality of the European dry heath community types.
		Seek to expand the extent of the dry heath communities into degraded areas of species poor, dry acid grassland.
		Maintain the diversity and quality of other habitats of conservation interest, especially where these exhibit natural transition to the dry heath.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be the potential for dry heath rehabilitation.
Northern Atlantic wet heath with *Erica tetralix*.	C	Maintain the extent of existing Northern Atlantic wet heath vegetation.
		Maintain and enhance the quality of the existing wet heathland.
		Seek to expand the extent of the wet heath communities into degraded areas of species poor, wet acid grassland.
		Maintain the diversity and quality of other habitats of conservation interest, especially where these exhibit natural transition to the Northern Atlantic wet heath.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be the potential for wet heath rehabilitation.

9. ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Blanket Bog	See SAC Selection Feature Objective Requirements Table
Dystrophic Lakes	See SAC Selection Feature Objective Requirements Table
Dry Heath	See SAC Selection Feature Objective Requirements Table
Wet Heath	See SAC Selection Feature Objective Requirements Table
Oligotrophic Lakes	See SAC Selection Feature Objective Requirements Table
Breeding Golden Plover	Breeding numbers stable or increasing
	Chick mortality due to trampling by livestock to be minimised
	Disturbance of nesting pairs minimised
	A suitable nest site available for each summer resident pair of adult or sub-adult plovers.
Breeding Bird Assemblage	To be finalised
Dalradian	To be finalised

9.1 ADDITIONAL FEATURE (subsequent ASSI standard features) OBJECTIVES

Feature	Component Objective
Precambrian stratigraphy at Croagh	Maintain extent and quality of exposure, together with access to the feature subject to natural processes - psammites, intrusive basic igneous components, pegmatite veins.
Invertebrate assemblage	Maintain abundance and distribution and if feasible, enhance population.
	Establish the status of these species and if appropriate, draw up further conservation priorities.

10. MANAGEMENT CONSIDERATIONS

Ownership

The ownership of the designated area is complex with some of the site in public ownership, under three different Agencies, and the remainder under private ownership much in commonage and even some of the publicly or solely owned areas have multiple turbary or grazing rights. Turbary rights extend to about 10%

of the area, and a small amount of hand-cutting for private use has been consented.

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 Pettigoe Plateau, or could affect it in the future.

Although **Active Blanket Bog, Natural Dystrophic Lakes and Ponds, Oligotrophic to mesotrophic standing water with vegetation belonging to *Littorelletea uniflorae* and/or of the *IsoUto-Nanojuncetea*, European Dry Heath and Northern Atlantic Wet Heath with *Erica tetralix*** 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.

Peat Cutting

There has been extensive peat cutting around the periphery of Pettigoe Plateau SAC in the recent past. Peat cutting by any method is a particularly damaging activity, including extrusion cutting which far from sparing surface vegetation, has very profound effects upon its ecology and hydrology. Although peat extraction has almost ceased within the SAC, there may be some localised peat still taking place within the boundary. There should be no peat cutting within the SAC.
ACTION: No peat cutting within the SAC.

Burning

Burning of the vegetation is evident in places right across the site, although whether this is an agricultural management practice or an incidental effect of turf cutting is often unknown. Excessive burning favours acid grasses, *Molinia caerulea* and *Trichophorum cespitosum* at the expense of dwarf shrubs and destroys mature communities of *Sphagnum* mosses and of lichens. Blanket bog and wet heath should not be burnt and dry heath should not be burnt more than once every 12-20 years, and not at all in areas where the gradient is > 25^{o} as this may result in erosion.

If burning is practised, it should only be carried out between late October and early March and preferably on days when the wind is light and the ground is frozen or damp. If it is too dry or too windy the fire will be too hot, if it is too wet, combustion will be poor and subsequent regeneration weak. Therefore burning of peatland should only be carried out under controlled conditions.
ACTION : No burning within the SAC

Drainage

There are a series of drains associated with many of the peat cuttings around the periphery of the SAC and many continue to carry water off the peat mass at an accelerated rate. In addition, extensive areas of the deeper peats have also been moor-gripped. All of these drains show up on the aerial photograph and are clearly apparent on the ground.

Many of the lakes on the plateau are very nutrient-poor and thus very vulnerable to nutrient accumulation. Without a hydrological assessment of water movement through the peat, it would be difficult to predict the lakes exact catchment, so artificial drainage could also lead to their eutrophication, where it is associated with afforestation etc. Any major drains that are currently carrying water away from or within 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.

Grazing

Inappropriate grazing, particularly over-wintering sheep exert the most pressure on a peatland as this is when vegetation growth is minimal and the forces of erosion, most effective. At the most damaging intensities, this can lead to soil exposure by vegetation removal and trampling which in turn can instigate erosion. Sheep are selective grazers and a less dramatic form of damage, at lower grazing intensities, is the decline in dwarf shrubs. Summer grazing intensity should be set at an appropriate level. Ling heather (*Calluna vulgaris*) can tolerate the removal by grazing of 40% of the seasons growth but heavier grazing begins to have more of an effect on the plant.

Autumn grazing is potentially more damaging to heather and particular care should be taken to avoid Autumn overgrazing. The commonage system tends to promote over-stocking. Other areas however, particularly blanket bog communities, have suffered severe damage from poaching and overgrazing by cattle. Ideally, cattle should not be permitted on blanket bog because of the trampling damage caused.

Under-grazing, or the cessation of grazing, may result in the prevalence of over-mature and degenerate Ling heather *Calluna vulgaris*.

ACTION: Fences around the periphery of the SAC should be maintained to prevent sheep and cattle from outside the area straying into the SAC. Ideally, all other sections of the boundary should be fenced and stock proof, particularly, the north - south border. Current management units should be identified and current grazing levels established. Where it occurs, overgrazing and poaching should be addressed by setting more appropriate grazing levels, excluding all grazing in the winter months between November and February inclusive. Active shepherding of stock onto the drier heathland communities may be appropriate in some instances. There will be a need to carefully monitor the blanket bog and

heathland communities to establish if the set grazing prescriptions are permitting the peatland communities to recover towards favourable condition.

Supplementary stock feeding

Supplementary stock feeding causes localised overgrazing and poaching damage.

ACTION: Supplementary feeding should be avoided. If this not an option, it should be confined to less sensitive areas. Particularly avoiding denuded sloping areas and pockets of deeper level peat which are vulnerable to counter wind and gully erosion.

Land Reclamation

Reclamation of peatland involves drainage, liming and fertilisation, which will always damage a functioning peatland. Peatlands around the periphery of Pettigoe Plateau are particularly impacted by reclamation with the obtrusive bright green rectangles of re-seeded grass are commonly found adjacent to blanket bog and heathland landscapes throughout the area.

ACTION: There should be no reclamation of any lands within the SAC boundary. Any reclamation outside the boundary should be monitored to ensure the hydrology of the peatland habitats within the site is not affected.

Afforestation

Preparation for afforestation involves disturbing the surface by draining, ploughing, or mounding. Establishment of the trees involves fertilisation, pest control and often liming. A successfully established plantation will shade the peat surface and intercept airborne pollutants. Peatland that has been subject to these forestry operations has little potential to recover after harvesting.

Action: Afforestation is highly unlikely as Forest Service guidelines would preclude direct planting or grant-aid for planting within the SAC.

Damaging recreational activities

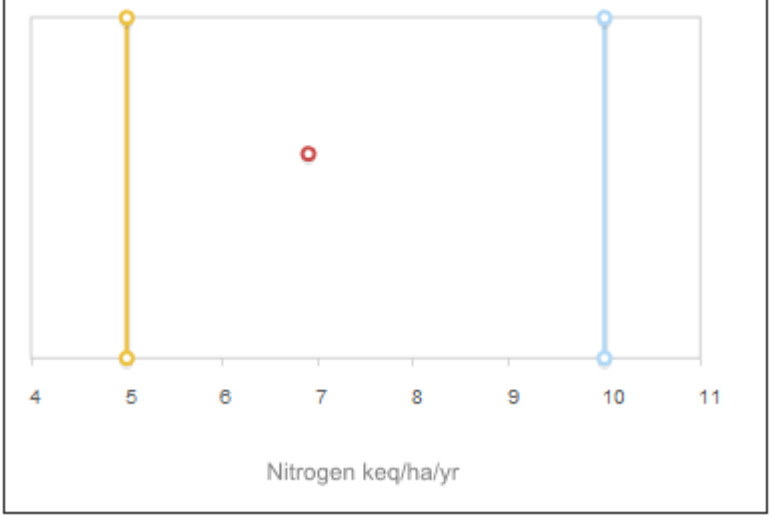
Four wheel drive access, can cause vegetation local loss which may lead to the cause significant erosion, particularly on sloping areas.

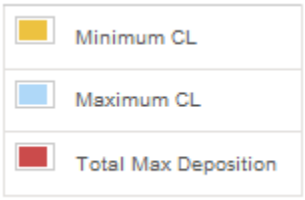
ACTION: No damaging recreational activities to take place within the site.

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 Pettigoe Plateau SAC habitats.

Feature: Blanket bogs (* if active bog)
Critical Loads (kg N/ha/yr): 5-10
Nitrogen Deposition (kg N/ha/yr):
Maximum: 6.9 Minimum: 5.5 Average: 6.2



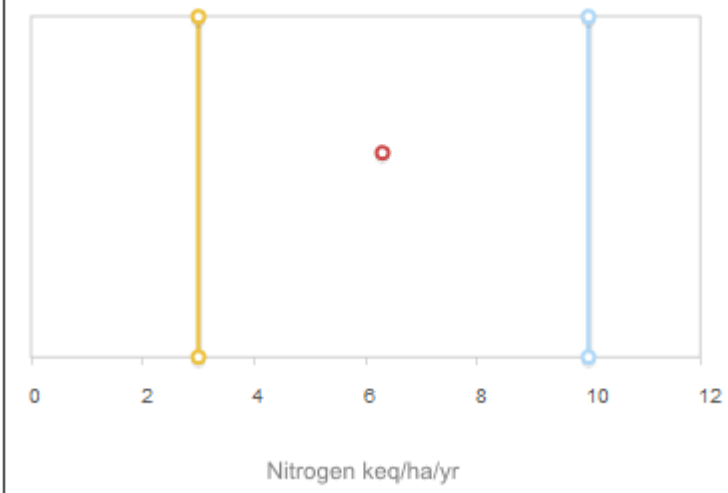


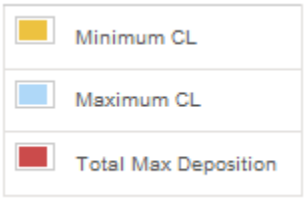
Feature: Natural dystrophic lakes and ponds

Critical Loads (kg N/ha/yr): 3-10

Nitrogen Deposition (kg N/ha/yr):

Maximum: 6.3 Minimum: 5.2 Average: 5.8



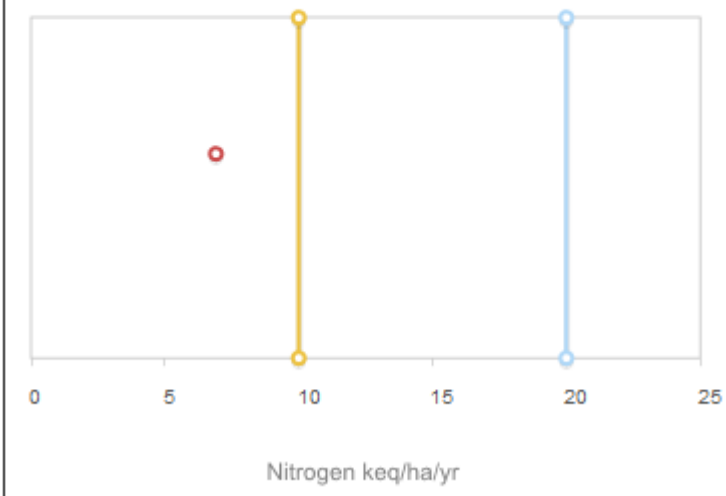


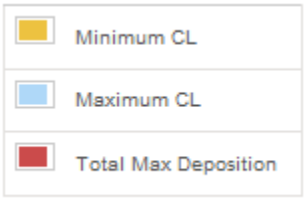
Feature: European dry heaths

Critical Loads (kg N/ha/yr): 10-20

Nitrogen Deposition (kg N/ha/yr):

Maximum: 6.9 Minimum: 5.5 Average: 6.2



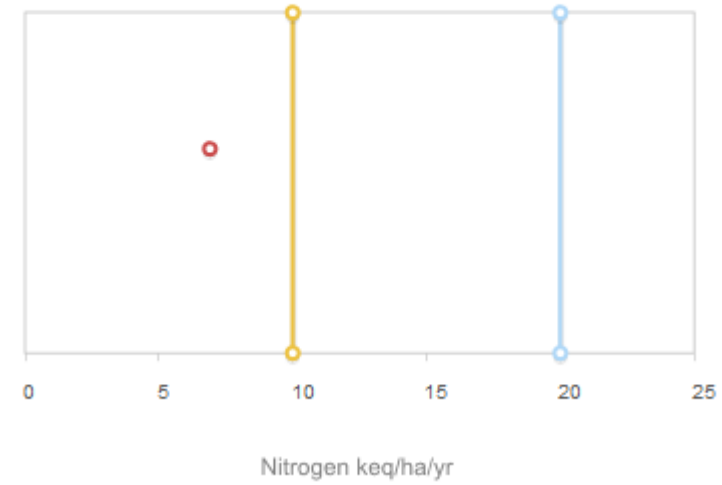


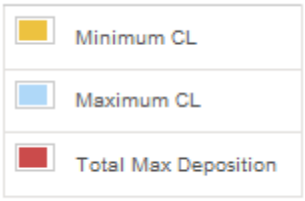
Feature: Northern Atlantic wet heaths with Erica tetralix

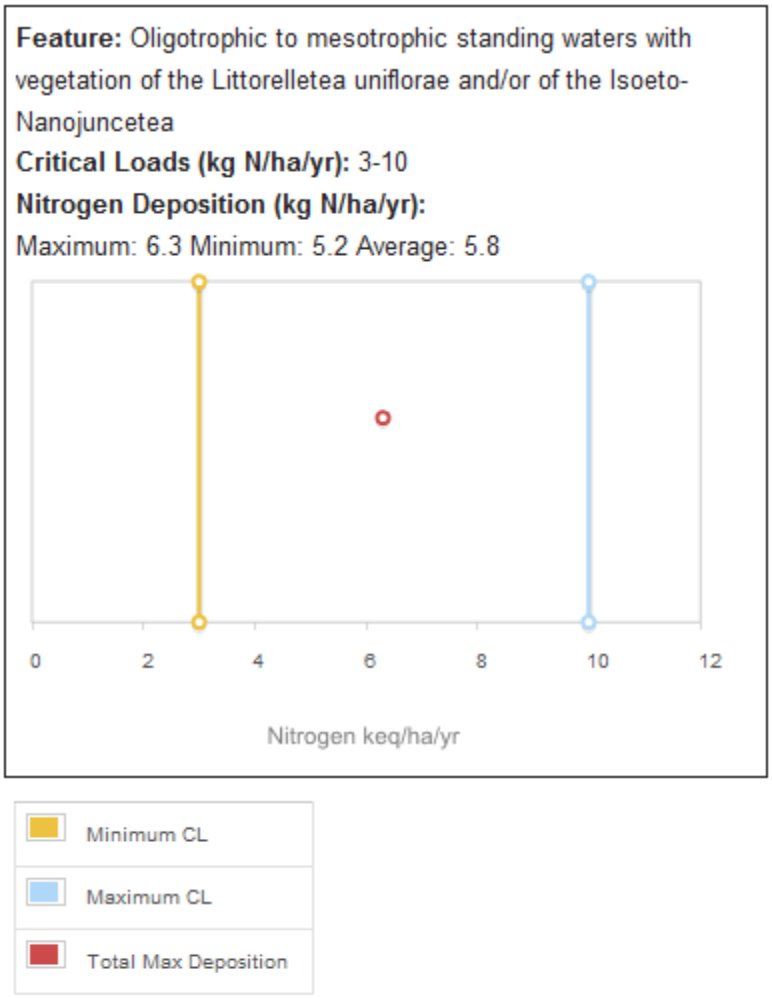
Critical Loads (kg N/ha/yr): 10-20

Nitrogen Deposition (kg N/ha/yr):

Maximum: 6.9 Minimum: 5.5 Average: 6.2







(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.

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 that the fencing, where present is still intact. Ensure that there has been no peat cutting, moor-gripping, dumping or inappropriate burning carried out within the SAC boundary. Evaluating stocking densities would also be desirable. This SIM should be carried out once a year.

2. Monitor the condition of the site (Condition Assessment)
Monitor the key attributes for all the SAC 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 attributes = 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.	Visual estimate in 2x2 m plots and across the blanket bog using a combination of aerial photographs, SIM and Condition Assessment structured walk.	The blanket bog communities include M17 – *Scirpus cespitosus Eriophorum vaginatum* blanket mire, M18 – *Sphagnum papillosum* raised and blanket mire and M19 *Calluna vulgaris - Eriophorum vaginatum* 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 *Sphagnum* species should be recorded with S. *cuspidatum* or S. *auriculatum* in the pools and S.	The extent of pool and hummock systems should be monitored using a combination of aerial photographs and SIM.	The extent of pool and hummock systems should be monitored using a combination of aerial photographs and Condition Assessment.

	papillosum and S. *capillifolium* forming the lawns and hummocks.		
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 *Polytrichum* spp., *Campylopus* 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.
* *Sphagnum* cover/ abundance (% cover and frequency) Active Peat Formation (DAFOR)	*Sphagnum* 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. Species present should include a mixture of both thin species: - *S. capillifolium* and *S. tenellum* and the thick hummock	Visual estimate in 2x2 m plots.	A constant *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to measure the hydrological integrity of the blanket bog surface.

	forming species*: - S. papillosum* and *S. magellanicum* 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 *Narthecium ossifragum* or *Sphagnum* spp. are abundant and forming lawns.	Visual estimate in 2x2 m plots.	Ericoid (dwarf-shrub species) include *Calluna vulgaris*, *Erica tetralix*, *E. cinerea*, *Myrica gale*, *Vaccinium myrtillis and Empetrum nigrum*.
* 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 *Calluna vulgaris* 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 (DAFOR)	Scrub/tree encroachment should be no more than rare on the intact bog surface, or in the actively regenerating cutover areas.	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 *Rhododendron ponticum* 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,	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

	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.		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 *Molinia caerulea* forming even swards over waterlogged areas with *Sphagnum* moss cover greater than 25%.	Visual estimate in 2x2 m plots.	Include true grasses, sedges, and rushes in this assessment. *Eriophorum vaginatum*, *Trichophorum cespitosum*, *Deschampsia flexuosa*, *Juncus squarrosus* or other graminoids (except *Molinia* 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 *Calluna vulgaris* growth forms indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.
Molinia caerulea Cover (%)	Where *Molinia caerulea* cover is greater than 50%, it should form an even (not tussocky) sward in waterlogged conditions with *Sphagnum* moss cover greater than 25%.	Visual estimate in 2x2 m plots.	*Molinia caerulea* 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.	*Sphagnum imbricatum* and *Sphagnum fuscum*, where they have been recorded, should	Visual estimate in 2x2 m plots.	

	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.		

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

ANNEX I

Feature 2 (SAC) – Natural Dystrophic Lakes and Pools (Status C)

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

Attributes	Measure	Target	Comment
Extent	Assessment against baseline map. Aerial photographs may be used.	No loss of extent of standing water	This attribute is to assess changes caused by active management, such as infilling or channel diversion. Changes due to drying out or successional change are covered under other attributes.
*Composition of macrophyte community	Characteristic species composition	i). No loss of characteristic species present at the site (see Box 5)	In the UK dystrophic lakes are widespread in the north west and scarce in the south. These systems most often occur on blanket bog and may include isolated seasonal pools, random collections of irregularly shaped waters and ordered linear or concentric arrays of pools and small lochs. Dystrophic pools may also be found on raised bogs situated mainly on plains and valley bottoms. The water usually has a high humic acid content and is usually stained brown through exposure to peat. Some dystrophic lakes are completely devoid of all macrophytes, while others may be completely dominated by bryophytes. This does not necessarily indicate unfavourable condition. With increasing diversity the characteristic species are usually *Drepanocladus fluitans* and/or *Juncus bulbosus* as submerged macrophytes, with *Sphagnum* communities present around the edge or in the littoral zone. *Menyanthes trifoliata, Potamogeton polygonifolius* and *Nymphaea alba* may also be present and at richer sites, *Utricularia minor* and *Nuphar lutea.*

Attributes	Measure	Target	Comment
			There may be valid reasons why a characteristic species is not present at a site (such as biogeographic range or isolation from source populations) which need to be considered when applying targets to an individual site. As this interest feature covers a floristic range it is essential to establish which community type represents the feature for the site in question. If algal growth is excessive, check for inputs of point or diffuse sources of pollution. If mire communities surround the site, the mire vegetation will turn green in the presence of fertilisers. Increased growth of *Sphagnum* may indicate the occurrence of artificial acidification. Turbid water conditions can also give blue-green algae a competitive advantage in the phytoplankton, where artificial nutrient enrichment is taking place. *Juncus bulbosus* var. *fluitans* can naturally grow as the dominant plant i.e. > 40% cover in depths up to 1.75 m, and is not necessarily an indicator of a site in unfavourable condition.
	Negative indicator species	Non-native species should be absent or present at low frequency	Introduced species should be identified. A number of non-natives have such invasive potential that they should be assessed separately. Species of particular concern are: *Crassula helmsii*, *Hydrocotyle ranunculoides*, *Myriophyllum aquaticum* and *Azolla filiculoides*. If any of these species are present, a water body should be considered as being in unfavourable condition. This list is not exhaustive and should be updated as new threats become

Attributes	Measure	Target	Comment
			apparent. Colonisation since the previous field visit by *Elodea nuttallii* or *Elodea canadensis* at >5% frequency is indicative of unfavourable condition, as is dominance of naturalised non-native species, such as *E. canadensis*. Occurrence of such species, at >40% frequency in unproductive waters, is indicative of unfavourable condition. Excessive growths of filamentous algae on lake substrate or macrophytes are indicative of nutrient enrichment. Increased filamentous green algae may also indicate the occurrence of artificial acidification.
***Macrophyte community structure**	Distribution Extent Structure	Characteristic zones of vegetation should be present. Maximum depth distribution should be maintained. Maintain at least the present structure.	Zonation , depth distribution and structure will be site specific. Colonisation at depth may be limited by poor light penetration or unsuitable sediment type. Where present, well defined hydroseres should be maintained.
***Water quality**	Water Chemistry	Maintain dystrophic conditions The pH/ANC, and nutrient levels (P and N)	As a guide Stable nutrient levels: TP target/limit: Dystrophic = 10 μg L^{-1} Stable pH values: pH < 5.0 Adequate dissolved O_2 (>5 μg L^{-1})

Attributes	Measure	Target	Comment
		should be stable and appropriate to the lake type Adequate dissolved oxygen levels for health of characteristic fauna. No excessive growth of cyanobacteria or green algae.	Water should be acid and poor in available nutrients. It should be stained by dissolved humic material, and will usually be visibly brown. As there is a wide clinal range of community types embraced by this feature, the acceptable range of chemical conditions (especially total P, other P fractions, pH/ANC, and where appropriate NO_3-N,) should be set for individual SAC lakes, from recent or historical water chemistry data. Acceptable ranges of values for each variable should be established. See main text. Mean annual TP concentrations (based on at least quarterly measurements), or spring TP levels, should meet the targets appropriate for the lake type documented in the guidance, unless site-specific targets are available. If palaeolimnological techniques or hindcast modelling have been employed to reconstruct natural background TP concentrations for a particular lake these can be used to set targets, although it may be necessary to accept a small deviation from these background conditions. Alternatively, historical water chemistry data may exist for individual lakes. Where existing, site-specific TP concentrations are consistently lower than the standard appropriate for the habitat type, a lower target should be applied to prevent deterioration from current status. Phosphorus and nitrogen values can be very variable, P is often in

Attributes	Measure	Target	Comment
			excess and plant development is limited by unavailability of N in the peat. Check for changes in catchment land-use in catchment causing diffuse pollution and/or siltation and check point sources of pollution. Aerially applied agro-chemicals have a high potential to change plant communities, and move them out of favourable condition. Other methodologies involving trophic scoring can contribute to the assessment of favourable condition. As a guide, pH < 5.00. Note that where water column pH is 4.5 or less, alkalinity will be 0. Levels of dissolved oxygen should support the invertebrate and vertebrate taxa associated with this lake type. There should be no evidence of excessive blue-green or green algal blooms.
Hydrology	Hydrological regime	No deterioration in hydrological regime compared to the baseline.	Natural flushing rate and seasonal pattern of fluctuation need to be considered. Maintain flushing rate of system. Modifications of inflows and outlets (where present), the creation

Attributes	Measure	Target	Comment
			of outlets, or changes in hydrology from flood control regimes, abstraction, peat harvesting and gravel removal, can lead to unnatural changes in lake levels.
Lake substrate character	Shore line and substrate	Maintain the natural shoreline of the lake. Maintain natural and characteristic substrate for lake type.	Sediment quality and quantity when enriched can cause excessive growths of *Juncus bulbosus* var. *fluitans* or growths of algae.
Sediment	Sediment Load	Maintain natural sediment load	Increases in siltation could result from increased lake productivity, changes in catchment land-use (particularly over-grazing, peat harvesting), lake level fluctuations, climatic fluctuations or changes in sewage treatment.
Indicators of local distinctiveness	Maintain distinctive elements (e.g. rare plant or invertebrate species, habitat features) at current extent/levels and/or in current locations.		This attribute is intended to cover any site-specific aspects of this habitat feature (forming part of the reason for notification) which are not covered adequately by the previous attributes, or by separate guidance (e.g. for notified species features). For species of local distinctiveness, which are documented on citations, or for which records are held for individual lakes, references such as LACON (Palmer, in prep.) should be consulted for current lists of species rare in the constituent countries of GB, and in EA and SEPA areas. For "notable" species (e.g. nationally scarce plants), it is not intended that a target is set for detailed species monitoring. It is intended that a rapid indication of presence/absence and /or approximate extent should be provided. Allowing for natural fluctuations in population size. The same approach applies to

Attributes	Measure	Target	Comment
			“notable” habitats.

Aspects of environmental disturbance to be noted as an accompaniment to assessing condition: Natural dystrophic lakes and ponds

Objective	Specified assessment method (if appropriate)	Comment
No introduction of non-native plants Minimal negative impact from artificial structures No peat cutting within the vicinity of the water body Direct application of lime to the water column as an acidification amelioration strategy should not be carried out		Artificial structures could include dams. Catchment area changes affecting the lake, such as land drainage and infrastructure schemes, should be considered. Efforts should be directed towards reducing atmospheric emissions and implementing catchment management strategies, especially in relation to coniferous forestry

Box 5. Characteristic species of natural dystrophic lakes and ponds

Characteristic species	Associates
Utricularia spp.	*Sparganium angustifolium*
Sphagnum spp.	*Eleogiton fluitans*
Juncus bulbosus	*Drepanocladus spp.*
Nymphaea alba	
Menyanthes trifoliata	
Potamogeton polygonifolius	

ANNEX I

Feature 3 (SAC) – European dry heaths (Status C)

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

Attributes	Targets	Method of Assessment	Comments
* Area of dry heath	Maintain the extent of dry heath.	Visual estimate in 2x2 m plots and across the dry heath using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Note that it may be possible to extend dry heath communities, provided this is into degraded areas and does not encroach into other habitats of scientific interest.
* Heath community diversity	Maintain the presence of the dry heath communities H7, H8, H10 etc. as established at base line survey.	Visual estimate in 2x2 m plots.	Repeat monitoring of plots using GPS should indicate whether dry heath communities have changed or been lost.
* Area of mosaic communities and associated semi-natural habitats	Maintain associated mosaic communities and semi-natural habitats.	Visual estimate in 2x2 m plots and across 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.

Dwarf-shrub height	Average ericoid height should be 15–35cm with at least 25% of the dry heath in the late mature/degenerate growth phase (greater than 35cm).	Visual estimate in 2x2 m plots.	On some areas of dry heath (especially on gentle slopes), the ericoid age structure will largely reflect recent burning patterns. However, in dry heath, burning should only be carried out occasionally under carefully controlled and monitored circumstances. A varied heather age structure is reflected in the height of heather.
* Bare peat, or ground covered by algal mats (% cover)	Bare peat etc. should occupy less than 2% of the dry heath surface overall.	Visual estimate in 2x2 m plots.	Bare peat (NOT exposed rock) or peat carpeted by *Polytrichum* spp., *Campylopus* spp. crust forming lichens or algal mats can occur as a consequence of constant burning and/or grazing. Bare peat here represents bare peat etc. within the dry vegetation rather than naturally eroded surfaces where exposed rock can form a natural part of the dry heath community.
* Ericaceous cover (% cover)	Dwarf-shrub cover should be greater than 75% over at least 75% of the dry heath community; and Mean dwarf-shrub cover should be greater than 75%	Visual estimate in 2x2 m plots.	
* Ericoid diversity	At least two species of dwarf-shrub at least present in 90% of plots.	Visual estimate in 2x2 m plots.	Ericoid (dwarf-shrub species) include *Calluna vulgaris*, *E. cinerea*, *Vaccinium myrtillis*, *Erica tetralix*, *Ulex gallii*, *Empetrum nigrum* and *Myrica gale*.
* Cover of *Ulex gallii* (% cover)	*Ulex gallii* cover should be less than 50% in plots within H8 stands.	Visual estimate in 2x2 m plots.	Mean percentage cover should be assessed for stands of H8 only – i.e. exclude plots in other heath communities from the calculations.

			Stands of H8 are generally restricted to the south-east of Northern Ireland.
* Cover of graminoids (% cover)	Total graminoid cover should be less than 33%.	Visual estimate in 2x2 m plots.	Include true grasses, sedges, and rushes in this assessment. *Nardus stricta, Deschampsia flexuosa*, *Juncus squarrosus* or other graminoids should not dominate over other species.
* Frequency and % cover of bryophytes and bushy lichens (esp *Cladonia* spp.) (DAFOR and % cover)	Bryophytes (excluding *Polytrichum* spp. and *Campylopus* spp. on bare ground) and/or Cladonia species should be at least frequent. At least frequent is equivalent to greater than 41% occurrence in recorded plots. Combined mean cover should be greater than 5%.	Visual estimate in 2x2 m plots.	Generally only bryophytes (mosses and liverworts) figure in this assessment, but occasionally bushy lichens can also be a prominent feature of the dry heath vegetation.
* Frequency and % cover of scrub/tree encroachment on dry heath communities (DAFOR and % cover)	Scrub/tree encroachment should be no more than occasional over the dry heath community. No more than occasional is equivalent to less than 40% occurrence in recoded plots.	Visual estimate within a 10 m radius of plots and across the feature using a combination of aerial photographs and Condition Assessment	Scrub encroachment should be checked using a combination of aerial photographs and Condition Assessment. Include invasive alien species in addition to *Betula pubescens, Prunus spinosa, Rubus* spp. Invasive exotic species such as *Rhododendron ponticum* should be removed immediately. Exclude *Ulex europaeus* (see below)

	Mean cover should be less than 5%.	structured walk.	
* Cover of Gorse *Ulex europaeus* (% cover)	Gorse (*Ulex europaeus)* cover should be less than 5%. During repeat surveys, Gorse cover should not exceed that of the baseline survey.	Visual estimate in 2x2 m plots and across the feature using a combination of aerial photographs and Condition Assessment structured walk.	Although a natural component of heath communities, Gorse can become invasive under both low and high grazing pressures. It is important to assess whether the relative quantities present in the site are increasing.
* Cover of Bracken (*Pteridium aquilinum*) encroachment (% cover)	Bracken cover less than 10% in dense canopy. During repeat surveys, Bracken cover should not exceed that of the baseline survey.	Visual estimate in 2x2 m plots and across the feature using a combination of aerial photographs and Condition Assessment structured walk.	Although a natural component of heath communities, Bracken can become invasive under both low and high grazing pressures. It is important to assess whether the relative quantities present in the site are increasing.
* Frequency and cover of undesirable agricultural grasses and weeds (DAFOR and % cover)	None of the following should be more than rare: *Cirsium arvense, C. vulgare, Senecio jacobaea, Urtica dioica, Plantago major, Phleum pratense, Trifolium repens, Holcus lanatus* and *Lolium perenne* No more than rare is equivalent to less than 20% occurrence in	Visual estimate in 2x2 m plot.	

	recorded plots. Combined mean cover of agricultural grasses and weeds less than 1%.		
* Management - Grazing (% cover)	Signs of moderate or heavy grazing should occupy less than 5% of the dry heath vegetation. The frequency of droppings, the extent of poaching, uprooting of dwarf shrubs and invasion by *Juncus squarrosus* etc. indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.	Visual estimate in 2x2 m plots.	
* Management - Burning (% cover)	Signs of recent burning should occupy less than 5% of the dry heath vegetation. Recent burning is represented by areas burnt within the last two years.	Visual estimate in 2x2 m plots and across feature using a combination of aerial photographs, SIM and Condition Assessment structured walk.	
Frequency and cover of erosion features associated with human impacts.	No gully erosion or bare rock associated with more concentrated human impacts (ATV tracks or recreational	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 high mountain slopes. However,

(DAFOR and % cover)	activities). Man induced/enhanced erosion should occupy less than 2% of the total area of dry heath other than very localised instances.		where natural erosion is exacerbated by human activity, mainly hill walking, the heath will not be in favourable condition, except where such erosion is very limited in nature.
Herb diversity	Herbs (excluding negative indicators) at least frequent. At least frequent is equivalent to greater than 41% occurrence in recorded plots.	Visual estimate in 2x2 m plots.	

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

Feature 4 (SAC) – Northern Atlantic wet heath with *Erica tetralix* (Status C)

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

Attributes	Targets	Method of Assessment	Comments
* Area of wet heath	Maintain the extent of wet heath.	Visual estimate in 2x2 m plots and across the wet heath using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Any loss of wet heath, or fragmentation of this habitat is unacceptable. Note that it may be possible to extend wet heath communities, provided this is into degraded areas and does not encroach into other habitats of scientific interest.
* Heath community diversity	Maintain the presence of the wet heath community M15 as established at base line survey.	Visual estimate in 2x2 m plots.	Repeat monitoring of plots using GPS should indicate whether wet heath communities have changed or been lost.
* Area of mosaic communities and associated semi-natural habitats	Maintain associated mosaic communities and semi-natural habitats.	Visual estimate in 2x2 m plots and across 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.
Dwarf-shrub height	Average ericoid height should be 15–35cm with at least 25%	Visual estimate in 2x2 m plots.	On some areas of wet heath (especially on gentle slopes), the ericoid age structure will largely reflect

	of the wet heath in the late mature/degenerate growth phase (greater than 35cm).		recent burning patterns. However, in wet heath, burning should only be carried out in exceptional circumstances. Heather height reflects the age structure of the Heather.
* Bare peat, or ground covered by algal mats (% cover)	Bare peat etc. should occupy less than 2% of the wet heath surface overall.	Visual estimate in 2x2 m plots.	Bare peat or peat carpeted by *Polytrichum* spp., *Campylopus* spp. crust forming lichens or algal mats can occur as a consequence of excessive burning and/or grazing. Bare peat here represents bare peat etc. within the wet heath vegetation.
* Ericaceous cover (% cover)	Dwarf-shrub cover should be maintained between 50–75%	Visual estimate in 2x2 m plots.	Although dominated by dwarf shrubs, the sward should be composed of a variety of higher plants and bryophytes.
* Ericoid diversity	At least two species of dwarf-shrub at least present in 90% of plots.	Visual estimate in 2x2 m plots.	Ericoid (dwarf-shrub species) include *Calluna vulgaris*, *Erica tetralix*, *Empetrum nigrum* and *Myrica gale*.
* Cover of graminoids (% cover)	Total graminoid cover should be less than 50%.	Visual estimate in 2x2 m plots.	Include true grasses, sedges, and rushes in this assessment. *Molionia caerulea, Trichophorum cespitosum, Deschampsia flexuosa*, *Juncus squarrosus* or other graminoids should not dominate over other species. Localised *Schoenus nigricans* flushes should not be included in this habitat assessment.
* Bryophyte cover and frequency of *Sphagnum* mosses (% cover and DAFOR)	Mean bryophyte cover (excluding *Polytrichum* spp. and *Campylopus* spp. on bare ground) should be at least 25%. *Sphagnum* moss species	Visual estimate in 2x2 m plots.	Bryophytes should include a range of pleurocarpus species forming patches below, or in more open swards beneath the dwarf-shrubs as well as *Sphagnum* moss species.

	should be at least frequent throughout the moss layer. At least frequent is equivalent to greater than 41% occurrence in recorded plots.		
* Frequency and % cover of scrub/tree encroachment on wet heath communities (DAFOR and % cover)	Scrub/tree encroachment should be no more than rare over the wet heath community. No more than rare is equivalent to less than 20% occurrence in recorded plots. Mean cover should be less than 2%.	Visual estimate within a 10 m radius of plots and across the feature using a combination of aerial photographs and Condition Assessment structured walk.	Scrub encroachment should be checked using a combination of aerial photographs and Condition Assessment. Invasive exotic species such as *Rhododendron ponticum* should be removed immediately.
* Frequency and cover of undesirable agricultural grasses and weeds (DAFOR and % cover)	None of the following should be more than rare: *Cirsium arvense, C. vulgare, Senecio jacobaea, Urtica dioica, Plantago major, Phleum pratense, Trifolium repens, Holcus lanatus* and *Lolium perenne*. No more than rare is equivalent to less than 20% occurrence in recorded plots.	Visual estimate in 2x2 m plot.	

	Combined mean cover of agricultural grasses and weeds less than 1%.		
* Management - Grazing (% cover)	Signs of moderate or heavy grazing should occupy less than 5% of the wet heath vegetation. The frequency of droppings, the extent of poaching, uprooting of dwarf shrubs and invasion by *Juncus squarrosus* etc. indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.	Visual estimate in 2x2 m plots.	
* Management - Burning (% cover)	Signs of recent burning should occupy less than 5% of the wet heath vegetation. Recent burning is represented by areas burnt within the last two years.	Visual estimate in 2x2 m plots and across the feature using a combination of aerial photographs, SIM and Condition Assessment structured walk.	
Frequency and cover of erosion features associated with human impacts (DAFOR and % cover)	No gully erosion, bare peat or rock associated with more concentrated human impacts (ATV tracks or recreational activities). Man	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 high mountain slopes. However, where natural erosion is exacerbated by human activity,

	induced/enhanced erosion should occupy less than 2% of the total area of wet heath other than very localised instances.		mainly hill walking, the heath will not be in favourable condition, except where such erosion is very limited in nature.
Herb diversity	Herbs (excluding negative indicators) at least frequent. At least frequent is equivalent to greater than 41% occurrence in recorded plots.	Visual estimate in 2x2 m plots.	Wet heaths tend to be dominated by dwarf-shrubs and graminoids; however, some herbs should be present in most plots (albeit at a low cover).

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

ANNEX I

Feature 5 (SAC) - Oligotrophic to mesotrophic standing water with vegetation belonging to *Littorelletea uniflorae* and/or of the *IsoUto-Nanojuncetea*

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

Attributes	Measure	**Target**	**Comment**
Extent	Assessment against baseline map. Aerial photographs may be used.	No loss of extent of standing water	
Composition of macrophyte community	Characteristic species composition	No loss of characteristic species present at the site	This type of water body occurs in the majority of Member States and is abundant in the more mountainous areas of Europe. In the UK this freshwater habitat type is largely confined to the mountainous regions of the north and west and is characterised by two intergrading types: oligotrophic and mesotrophic waters. The vegetation community is characterised by amphibious short perennial vegetation, with shoreweed *Littorella uniflora* being considered a defining component. There are two distinct community types, one extremely oligotrophic with the presence of *Subularia aquatica* as the main associate, with *Littorella uniflora* and *Isoetes lacustris*. *Myriophyllum alterniflorum,*

			Lobelia dortmanna and *Sparganium angustifolium* occur as associates. The other community has a clinal range of species as the trophic state increases. These richer trophic states cannot support *Subularia aquatica* but the presence of some or all of *Nuphar lutea, Persicaria amphibia, Sparganium minimum, Potamogeton perfoliatus, P obtusifolius* is indicative of an increased trophic state. (N.B. *Subularia* may be naturally absent from some regional areas.) Two nationally scarce plants *Luronium natans* and *Pilularia globulifera* occur at the interface between oligotrophic and mesotrophic water types. **As this interest feature covers a wide range of trophic states it is essential to establish which community type represents the feature for the site in question.** The presence of high cover of *Sphagnum* species and/or *Juncus bulbosus* var. *fluitans* above 40% level for oligotrophic waters and *Myriophyllum* or *Elodea canadensis* above 40% level or presence of *Elodea nuttallii* for mesotrophic waters is indicative of a site in unfavourable condition.
	Non-native plants	Non-native species should be absent or present at low frequency. No introductions of non-native species	e.g. Presence of *Crassula helmsii* is indicative of a site moving out of favourable condition; dominance of *C. helmsii* is indicative of a site in unfavourable condition.

*Macrophyte community structure	Distribution Extent Structure	Characteristic zones of vegetation should be present Maintain at least the present maximum depth distribution of *Isoetes* Maintain at least the present community structure	Characteristic zonation with increasing depth should be: *Littorella,* then overlapping zones of *Littorella* with *Lobelia,* then *Isoetes* ***L. uniflora*** **and** ***L. dortmanna*** **dominant in depths <1.5 m;** ***Isoetes*** **dominant > 1.5 m.** ***Isoetes*** **has been recorded in Waste Water at depths of 7 m. It is very sensitive to wave action, setting a shallow depth limit particularly in exposed sites.**
*Water quality	Water Chemistry	Maintain oligotrophic/mesotrophic conditions The pH/ANC, and nutrient levels (P and N) should be stable and appropriate for the interest feature	As a guide Stable nutrient levels: TP target/limit: Oligotrophic = 10 μg L^{-1} Stable nutrient levels: TP target/limit: Mesotrophic = 10 μg L^{-1} Stable pH values: pH – 5.5 to circumneutral Adequate dissolved O_2 (>5 μg L^{-1}) There is a wide clinal range of community types embraced in this feature. Water quality targets should be set for individual SACs and an acceptable range established. The acceptable range of chemical conditions (especially total P, other forms of phosphorus, pH/ANC, and where appropriate NO_3-N,) should be set for individual SACs from recent or historical water chemistry data Check for changes in catchment land-use in the catchment causing

			diffuse pollution and/or siltation and check point sources of pollution. Aerially applied agro-chemicals have a high potential to change plant communities, and move them out of favourable condition. Other methodologies involving trophic scoring can contribute to the assessment of favourable condition. There is a need to develop a UK-wide lake environment monitoring protocol, which includes biology, water chemistry, nutrients, aesthetic conditions and toxic substances.
Hydrology	Hydrological regime	No deterioration in hydrological regime compared to the baseline.	Natural flushing rate and seasonal pattern of fluctuation need to be considered. Maintain flushing rate of system. Modifications of inflows and outlets or changes in hydrology (e.g. from flood control regimes, abstraction and gravel removal) can lead to unnatural changes in lake levels. *L. uniflora* can tolerate extreme inter-annual fluctuations in water level and long periods of exposure. *L. dortmanna* is tolerant of short periods of exposure but intolerant of desiccation.
Lake substrate character	Shore line and substrate	Maintain the natural shoreline of the lake. Substrate should be	Substrate is typically sand, gravel, stones and boulders with low organic content but sometimes locally high peat content. Sediment quality and quantity when enriched can cause excessive growths of

		natural and characteristic of lake type.	*Juncus bulbosus* var. *fluitans* or growths of algae.
Sediment load	Sediment load	Minimal	Increases in siltation could result from increased lake productivity, changes in catchment land-use (particularly over-grazing), lake level fluctuations, climatic fluctuations or changes in sewage treatment.

Aspects of environmental disturbance to be noted as an accompaniment to assessing favourable condition

Objective	Specified assessment method (if appropriate)	Comment
Minimal negative impact from artificial structures Minimal negative impact from recreation Direct application of lime to the water column as an acidification amelioration strategy should not be carried out No impacts from fish farming		Artificial structures could include boat-mooring facilities, dams, fish reefs. Negative impacts from recreational activities can include enrichment caused by ground baiting, introduction of bottom feeding fish and other organisms not characteristic of the habitat, increased disturbance to SACs from water-sports. Efforts should be directed towards reducing atmospheric emissions and implementing catchment management strategies, especially in relation to coniferous forestry.

Catchment area changes affecting the lake, such as flood defences and infrastructure schemes should be considered.		

PETTIGOE PLATEAU - SPECIAL PROTECTION AREA (SPA)

UK9020051

CONSERVATION OBJECTIVES

Document Details

Title	Pettigoe Plateau SPA Conservation Objectives
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Version	Date	Summary of Changes	Initials	Changes Marked
V1	19/11/1996	Internal working document	IE	
V1.1	August 2013	Review	IE	
V2.0	February 2015	Draft	IE	Complete review

Site relationship

To fully understand the site conservation requirements for this site it may be necessary to also refer to other site Conservation Objectives

This SPA overlaps with Pettigoe Plateau SAC

The SPA also matches the boundary of the Pettigoe Plateau Ramsar site.

See also Boundary Rationale

The SPA is also close to, or adjoins, European designations in the Republic of Ireland. These are Lough Golagh and Breesy Hill SAC and Tamur Bog SAC.

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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, terrestrial/inter-tidal 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).

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.

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

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 GENERAL INFORMATION

COUNTY: Fermanagh

G.R. H010 650 AREA: 1270 ha.

5 SUMMARY SITE DESCRIPTION

Pettigoe Plateau lies between Beleek and Pettigoe to the north of the western tip of Lower Lough Erne, Co. Fermanagh. The Plateau, with its mosaic of lakes, peatlands and forests extends across the border into Co. Donegal. The area of blanket bog has a wide range of the structural features associated with this habitat including pool complexes, acid flushes, basin mires, ladder fens and bog plains. A number of notable lakes are also present.

5.1 BOUNDARY RATIONALE

The SPA boundary is coincident with that of the ASSI, SAC and Ramsar boundaries. The boundary of Pettigoe Plateau has been determined on the basis of habitat and has been drawn to include all areas of high quality blanket bog and associated semi-natural habitats, including cutover bog, wet and dry heath, acid flushes, flushed and wet grassland and dry grassland. Some of the peatland within the SAC has been modified to varying degrees, the semi-natural blanket bog vegetation remains in comparatively good condition.

The border between Co. Donegal and Co. Fermanagh demarcates about one third of the boundary of Pettigoe Plateau SAC. The remaining two thirds of the boundary is generally marked by the edge of the enclosed land that surrounds the open peatland. However, sometimes the peatland edge loses quality and does not justify inclusion within the SAC boundary. Separation between areas included within the SAC and those more degraded areas that are excluded depends upon the judgment of the surveyor. This was based on a variety of factors, such as Sphagnum moss cover, bare peat, and grass: dwarf-shrub ratio, frequency of dung and poaching, burning and drainage.

6 SPA SELECTION FEATURES

Feature Type (i.e. habitat or species)	**Feature**	**Designation Population**[1]	**Population at time of designation (ASSI)**	**Population at time of designation (SPA)**	**SPA Review population**
Species	Golden Plover breeding population [a]	12 pairs	12	12	12
Habitat[2]	Habitat extent				
Habitat[2]	Habitat quality[3]				

Table 1. List of SPA selection features.

[1] Designation population given as mean of survey totals 1987 and 1995

[2] Habitat is not a selection feature but is a factor and is more easily treated as if it were a feature.

[3] Habitat quality will be assessed in the context of the Pettigoe Plateau cSAC

Notes on SPA features – may not be applicable to all SPAs

The above table lists all relevant qualifying species for this site. As the identification of SPA features has and continues to evolve, species may have different status but all should be considered in the context of any HRA process. Ultimately all SPAs will be renotified to formalise species features.

[a] – species cited in current SPA citation and listed on current N2K dataform

[b] – species selected post SPA designation through UK SPA Review 2001

[c] – species highlighted as additional qualifying features through the UK SPA Review 2015 or the UK marine SPA programmes.

6.1 ADDITIONAL ASSI SELECTION FEATURES

Feature Type (i.e. habitat, species or earth science)	**Feature**	**Size/ extent/ pop[.]**
See SAC conservation objectives for ASSI feature details		

Table 2. List of ASSI features, additional to those that form all or part of SPA selection features. These will be referred to in ANNEX II.

7. CONSERVATION OBJECTIVES

The Conservation Objectives for this site are:

To maintain each feature in favourable condition.

For each feature there are a number of component objectives which are outlined in the tables below. Component objectives for Additional ASSI Selection Features are not yet complete. For each feature there are a series of attributes and measures which form the basis of *Condition Assessment*. The results of this will determine whether a feature is in favourable condition, or not. The feature attributes and measures are found in the attached annexes.

8 PETTIGOE PLATEAU SPA CONDITION ASSESSMENT 2014

Species	2006	CSM	5 yr mean	% CSM	Status
Golden plover	4	12	4	33.33	Unfavourable

9 SPA SELECTION FEATURE OBJECTIVES

To maintain or enhance the population of the qualifying species
To maintain or enhance the range of habitats utilised by the qualifying species
To ensure that the integrity of the site is maintained;
To ensure there is no significant disturbance of the species and
To ensure that the following are maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species

9 SPA SELECTION FEATURE OBJECTIVES

Feature	Component Objective
Golden Plover breeding population	As above
Golden Plover breeding population	Fledging success sufficient to maintain or enhance population
Habitat	Maintain the area of natural and semi-natural habitats used or potentially usable by notified species, within the SPA, subject to natural processes.

Table 3. List of SPA Selection Feature Component Objectives

9.1 ADDITIONAL ASSI SELECTION FEATURE OBJECTIVES

Feature	Component Objective
See SAC conservation objectives for ASSI feature details	

Table 4. List of Additional ASSI Selection Feature Objectives

10. MANAGEMENT CONSIDERATIONS

See also Views About Management for relevant ASSI

Owner/Occupier's – As of October 1995 there were a total of 20 landowners within the site boundary. Landowners include the Department of Agriculture for Northern Ireland (DANI) Forest Service, the Department of Environment for Northern Ireland (DoE (NI)) Environment and Heritage Service (NIEA) and a number of private individuals. Grazing rights generally lie with the land as do Turbary rights which account for approximately 10% of the total area of the site. Sporting rights have not been established within the site boundary. DoE (NI) owns a small section of the site which is proposed as the Tullywannia National Nature Reserve (NNR), and, although the site has not been designated as yet, it is managed by NIEA as an NNR.

11. MAIN THREATS, PRESSURES, ACTIVITES WITH IMPACTS ON THE SITE OR SITE FEATURES

Notifiable Operations **-** Carrying out <u>any</u> of the Notifiable Operations listed in the schedule could affect the site. The list below is not exhaustive, but deals with the most <u>likely</u> factors that are either affecting Pettigoe Plateau SPA, or could affect it in the future. Although, features 1, 2, 3, 4 etc, are the qualifying SPA features, factors affecting ASSI features are also considered.

<u>Site/feature management issues</u>

No	Issue	Threat/comments	Local considerations	Action
19	Habitat extent and quality-breeding	Alteration of habitat area or quality through inappropriate use or absence of site management.	Site is SAC so management will seek to achieve appropriate peatland vegetation community structure. Evidence suggests Golden Plover favour cut-over areas within the site.	Assess needs of breeding species. Liaise with owner or appropriate authority to adjust or introduce site management if necessary.
23	Predation.	Mainly of concern on bird breeding sites.	Thought to be a major factor for breeding wader success.	Must be dealt with as part of wider countryside management considerations. Carry out appropriate site management.
24	Recreational activities.	Disturbance is the main consideration. Apart from disturbance of birds themselves, breeding birds are vulnerable to disturbance as absence of adults can often result in predation or chilling of young with a reduction/loss in fledging success.	Informal walking undertaken. Not thought to be significant.	Liaise with local authorities and other managing parties.
25	Research	Census and ringing activities	Assessed as part of	Census and ringing

No	Issue	Threat/comments	Local considerations	Action
	activities.	especially have the potential to impact on bird populations, particularly at breeding sites.	breeding wader and rare breeding bird surveys.	activities to be undertaken by competent individuals, appropriately trained. In case of ringers, appropriate license must be held.

Table 5. List of site/feature management issues

12. MONITORING

Monitoring of our Special Protection Areas takes place at a number of levels, using a variety of methods. Methods for both Site Integrity Monitoring and Condition Assessment can be found in the Monitoring Handbook (To be written).

In addition, detailed quality monitoring or verification monitoring may be carried out from time to time to check whether condition assessment is adequate to detect long-term changes that could affect the site. This type of quality monitoring may involve assessment of aerial photographs to determine site morphological changes. Methodology for this is being developed.

12.1 MONITORING SUMMARY

1. Monitor the integrity of the site (Site Integrity Monitoring or SIM) – to ensure compliance with the SPA/ASSI schedule and identify likely processes of change (e.g., changes to grazing regime, afforestation, peat-cutting). This SIM should be carried out once a year.

2. Monitor the condition of the site (Condition Assessment) - Monitor the key attributes for each selection feature (species, assemblage, habitat, etc). This will detect if the features are in favourable condition or not. See Annexes I and II for SPA and Additional ASSI Features respectively.

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 appropriate assessment that may be needed. It should be noted that appropriate assessments are a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

13. ADDITIONAL MONITORING ACTIONS UNDERTAKEN FOR SITES IN UNFAVOURABLE CONDITION

Monitoring actions set out in section 6 and Annex 1 will use, amongst other attributes, bird population data to determine site condition. In the event of a significant population decline being detected, a series of subsequent actions will be initiated. The

following list is not exhaustive, actions will be site dependant, but the order of these points IS hierarchical i.e. consider point 1, then 2, etc.

1. Assess the site population in a wider geographical context – Northern Ireland, Ireland, UK, world. Refer to BTO ALERT limits etc. Liaise with other competent bodies to meaningfully assess wider pattern. No site action if site decline mirrors regional pattern the cause of which is not related to the site. Action may be required at regional or larger scale. If the cause of the regional population decline (e.g. eutrophication) is found at the site then action may be necessary, but this may need to form part of a network of strategic species action. Further research may be required.
2. Assess the site population in a wider geographical context – Northern Ireland, Ireland, UK, Europe, world. Determine if site losses are balanced by gains elsewhere e.g. breeding terns. Review site condition to determine if losses are due to site deterioration. Determine if possible whether population has relocated within SPA series (national, biogeographical, European). Note that the reasons for such locational changes may not be readily identifiable. Further research may be required.
3. For passage/wintering species assess breeding information. No site action if site decline is due to breeding ground failure, unless breeding ground failure is related to poor adult condition resulting from factors affecting wintering / passage birds.
4. Determine whether a major incident has affected the site e.g. toxic impact on prey items, predation event or geographical shift in available prey. Ability to respond to impacts may be limited.
5. Assess condition of principal site habitats e.g. vegetational composition and structure, change in habitat balance e.g. mudflats reduced by encroaching mussel beds.
6. Assess prey availability. Issues to consider are both within site e.g. water quality, broad site management, and without site e.g. climatically driven factors.
7. Assess whether there have been any changes in any other site features or management practices (see Table 3) that may have affected populations of site selection features.
8. Long-term site value must be considered even when it is found to be in unfavourable condition for a number of reporting cycles. This is particularly important for breeding seabird and wader sites where ongoing appropriate management may ultimately encourage re-establishment of a favourable population.

8. SELECTION FEATURE POPULATION TRENDS

A summary statement of site population trends, together with wider geographical trends. Date of completion is given as well as information sources used. Due to a lack of data site trends are generally limited to terms such as 'consistent increase/decline', 'variable with overall increase/decline', 'no discernable trend'. Other trends are also generally limited to terms such as 'consistent increase/decline', 'variable with overall increase/decline', 'no discernable trend'.

SPECIES	SITE TREND	NI TREND	IRISH TREND	UK TREND	COMMENTS
Golden Plover (breeding)	No discernible trend (due principally to lack of data)	Data unavailable	Data unavailable	No discernible trend (1994-99 Breeding Bird Survey)	

ANNEX I
Feature (SPA) – Breeding waders

* = primary attribute. One failure among primary attribute = unfavourable condition
# = optional factors – these can be in unfavourable condition without the site being in unfavourable condition

Attribute	Measure	Targets	Comments
* Golden Plover breeding population	Survey using Brown & Shepherd Method (see Gilbert *et al*., 1998) – 2002 onwards. Determine number of breeding pairs. Calculate new population mean.	No significant decrease in breeding population against national trends	Requirement that data is collected once every reporting cycle. Ideally the population will be maintained above 1% of the national population. Mean population greater than 6 pairs (i.e. within 50% of designation population) or above minimum historical count
# Golden Plover fledging success	Determine number of fledglings raised and add to total number of fledglings raised over previous four years and divide by five to obtain average. This should remove variation from season to season, e.g. in response to bad weather.	>1 fledgling per pair successfully raised per year over five year period	Appropriate level of fledgling survival to be determined

NB 1. Whilst monitoring of breeding productivity is desirable, it is likely to be very difficult to carry out as the young of Golden Plover are both very elusive and nidifugous. The high intensity of surveys required to estimate productivity might also have detrimental disturbance impacts on the breeding population.
NB 2. The Brown & Shepherd Method is recommended for population surveys despite the use of a slightly different method previously. The Brown & Shepherd method is more efficient and is now the standard method for the survey of upland breeding waders in the UK (and will therefore allow better comparison with other sites).

Non-Avian Factors – habitat

Attribute	Measure	Targets	Comments
* Habitat extent	Area of natural and semi-natural habitat	Maintain the area of natural and semi-natural habitats used by notified species, within the SPA, subject to natural processes.	Monitor once every reporting cycle by aerial photography.
# Habitat quality	To be assessed as part of SAC monitoring		Evaluate habitat quality should bird populations decline due to on site factors. Map any changes in area. This may include mapping areas with different vegetation structures where this would lead to different usage by notified species.

ANNEX II

Feature (ASSI) –
See SAC conservation objetives

RIVER FAUGHAN & TRIBUTARIES SAC
UK0030361

CONSERVATION OBJECTIVES

Document Details

Title	*River Faughan & Tributaries SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
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Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	January 2015	Complete review	RMK
V3	July 2017	Edit and minor correction	PC

Site relationships

To fully understand the conservation requirements of this site, it is necessary to also refer to the Conservation Objectives for Lough Foyle SPA.

The River Faughan & Tributaries SAC boundary adjoins the boundary of Lough Foyle SPA.

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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: LONDONDERRY

GRID REFERENCE: IC 51660776

UPPER G.R.: IC 53580099
IC 54300028
IC 60600062
IC 58690085
IC 48570631
IC 56621256

LOWER G.R.: IC 48892002

AREA: 293.27 ha

LENGTH: 62 km

5. SUMMARY SITE DESCRIPTION

The area is of interest because of the physical features of the river and its associated riverine flora and fauna. The River Faughan and Tributaries SAC includes the River Faughan and its tributaries the Burntollet River, Bonds Glen and the Glenrandal River (and its tributary the Inver River).

In total, the area encompasses approximately 60km of watercourse and is notable for the physical diversity and naturalness of the banks and channels, especially in the upper reaches, and the richness and naturalness of its plant and animal communities, in particular the population of Atlantic Salmon *Salmo salar*, which is of international importance and the widespread and common occurrence of Otter *Lutra lutra* in the catchment. Upland Oak Woodland is also well-developed in places along the valley sides of the River Faughan and its tributaries.

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

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 River Faughan and Tributaries, the qualifying SAC/ASSI features are its nationally important population of Salmon, and its regionally important Otter population.

The upper limits for all the tributaries and sub-tributaries are currently generally determined by the known limits of good spawning and nursery habitat or woodland. The upper limit is typically indicated on the ground by a physical feature such as a bridge. The downstream limit of the site is determined by the tidal limit which is also the boundary of Lough Foyle SPA.

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 ASSI has limited adjacent habitat. Therefore, the boundary is often restricted to the top of the riverbank.

Although fragmented, semi-natural woodland is present throughout the site, with the main blocks found at Ness and Ervey Woods, both Country Parks on the Burntollet River, and Bonds Glen Wood on the Bonds Glen. These woodlands were previously designated as ASSIs for their woodland interest and have been included within the River Faughan and Tributaries SAC. Other significant stands of woodland occur along the valley sides of the Faughan and Glenrandal Rivers. These woodlands and the interconnecting woodland strips which run along the river banks vary in the extent that they are fenced.

Due to the size of the area, the boundary was largely derived from ortho-rectified colour aerial photographs. Some information on adjacent habitats was derived from previous surveys.

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.

5. SAC SELECTION FEATURES

Feature Type	Feature	Global Status	Size/ extent/ pop~
Species	Atlantic Salmon *Salmo salar*	B	1,000-10,000
Habitat	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	C	96ha
Species	Otter *Lutra lutra*	C	C
Species	Sea Lamprey *Petromyzon marinus*	D	P
Species	Brook Lamprey *Lampetra planeri*	D	P
Species	River Lamprey *Lampetra fluviatilis*	D	P

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 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 River Faughan & Tributaries SAC.

6.1 ASSI SELECTION FEATURES

River Faughan & Tributaries ASSI

Feature Type	Feature	Size/ extent/population
Habitat	Oakwood	96 ha
Species	Atlantic Salmon *Salmo salar*	
Species	Otter *Lutra lutra*	
Earth Science	Dalradian series	

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The *Conservation Objective* for this site is:

To maintain (or restore where appropriate) the

- Atlantic Salmon *Salmo salar*
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- 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
Atlantic Salmon *Salmo salar*	B	Maintain and if possible expand existing population numbers and distribution (preferably through natural recruitment), and improve age structure of population.
		Maintain and if possible enhance the extent and quality of suitable Salmon habitat - particularly the chemical and biological quality of the water and the condition of the river channel and substrate.
Old Sessile Oak Woodlands with *Ilex* and *Blechnum* in the British Isles	C	Maintain and where feasible expand the extent of existing oak woodland but not at the expense of other SAC (ABC) features. (There are areas of degraded heath, 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.
Otter *Lutra lutra*	C	Maintain and if possible increase population numbers and distribution.
		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
Oakwood	See SAC Selection Feature Objective Requirements table.
Atlantic Salmon *Salmo salar*	See SAC Selection Feature Objective Requirements table.
Otter *Lutra lutra*	See SAC Selection Feature Objective Requirements table.
Earth Science – Daldarian series	Maintain extent and quality of exposure, together with access to the feature subject to natural processes.

10. MANAGEMENT CONSIDERATIONS

Ownership

There are several hundred individuals or organisations with ownership or other rights associated with the area.

Adjoining Land Use

The River Faughan and its tributaries, in the main, flow through improved or semi-improved pasture used for silage and grazing with the channel generally fenced from the surrounding land at least along one bank top. Along the lower reach of the River Faughan below Derry City the main adjacent agricultural uses include tilled land and silage production, in addition to stock grazing. A number of large commercial sand quarries are also located along this lower reach on the eastern side 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 River Faughan & Tributaries, or could affect it in the future.
Although **Salmon *Salmon salar,* Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles 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.

River

Water Quality/Eutrophication:
Water quality is probably the most important single factor for the SAC/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 system is 28,271ha and consists of 6 sub-catchments. The designation only includes the main channels of the River Faughan and its tributaries, the Burntollet River, Bonds Glen and the Glenrandal River (and its tributaries the Inver River) but has excluded several other tributaries.

Analysis of biological water quality monitoring data from 2003 to 2006 indicates that water quality is good to very good on most rivers although there does seem to be a fluctuation in quality over this period in the middle and lower reaches of the River Faughan while the Burngibbagh and Foreglen Rivers are a cause for concern. Chemical water quality monitoring data however indicates that water quality is good to very good on all rivers.

A significant portion of the upper catchments of the Burntollet River is afforested; there is a potential for enrichment of the river during forestry operations (planting and fertiliser application).

There are at least 7 sewage works within the catchment varying in size and the degree of treatment they provide. There are also numerous septic tanks.

Stock have open access to the channel along many sections of the River Faughan and its tributaries and have caused poaching of the bank and channel. This represents another possible source of enrichment.
ACTION: Review Water Order consents
ACTION: Reduce enrichment of the water column by minimising point source pollution and through a catchment-wide campaign, encourage land owners to avoid excessive fertiliser inputs, thus reducing diffuse pollution. Reassess occurrence of consented and unconsented discharges to establish extent and significance of impacts and therefore focus actions for reducing such impacts. Restrict stock access to less sensitive watering points, introduce buffer strips (where currently absent) and extend elsewhere. Increase the amount of fencing along riverbanks.

Channel & Bank Modification:
The River Faughan was originally designated for drainage in 1947. A total length of 11.25km was designated at this time. Further designation was required in 1963 covering a total of 19.75km of the river. This was primarily to improve flood defences to existing commercial properties. The limit of designation is upstream of Killycor Bridge (C570 057). Upstream of this point, there has been no in-channel works and the channel and banks are presumed to be natural.

The work that has been carried out on the River Faughan has been mainly floodbanking, though there has been some resectioning in the middle reaches.
ACTION: Future in-river and bankside works should be minimised as they reduce habitat and species diversity. 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.

The River Faughan and some of its tributaries have undergone fisheries modifications with the installation of weirs and deflectors as part of habitat enhancement schemes, resulting from the 'Salmonid Enhancement Programme'. Such enhancement schemes should be thoughtfully planned as properly executed 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. 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 DARD Fisheries Division and Environmental Protection to co-ordinate action.

Substrate Siltation
A portion of the catchment is afforested (especially the upper catchment of the Burntollet River), with a potential risk of sediment release during forestry operations, especially clear-felling.
ACTION: Liase with Forest Service during felling and re-stocking programmes to minimise potential impacts (including potential eutrophication from planting and fertiliser application).
A number of large commercial sand and gravel pits located near to the main river channel and some of its tributary rivers are potential polluters to water quality with escape or release of sand wash resulting in siltation of the riverbed downstream.
ACTION: Monitor and control sediment input levels in tributaries and immediately downstream of sandpits.

Where the bank and channel of the river are accessible to stock, damage to both the 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, introduce buffer strips (where currently absent) and extend elsewhere. Increase the amount of fencing along riverbanks.

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Water Abstraction
A natural flow regime is essential for the maintenance of main selection features. There are several extraction sites along the river. Proposals for further water extraction in the area will require very careful environmental assessment.
ACTION: Review existing Water abstraction consents.

Fly-tipping
Small-scale fly tipping has occurred in places along the river banks and in the river channel, as well as in adjacent woodland.
ACTION: Where practical, remove dumped material from the banks, channel and adjoining woodland to prevent the build up of debris and discourage further tipping.

Alien species
Japanese Knotweed *Fallopia japonica*, Giant Hogweed *Heracleum mantegazzianum* and Indian Balsam *Impatiens glandulifera* are present along the riverbanks of the major rivers.
ACTION: Eradication of these is recommended in the lower Faughan area to reduce influence and prevent spread throughout catchment.

WOODLAND

Grazing/Poaching/Tree barking and Browsing
Free access to some parts of the woodland by domestic stock and feral goats is causing direct damage to the ground flora community by poaching and trampling. Grazing and bark-stripping is preventing regeneration and will increasingly cause a detrimental change in the woodland structure and composition with time. Information on current grazing levels of domestic stock within privately owned woodland is not readily available. No information on the current population of goats is available.
ACTION: Evaluate the current domestic stocking levels of the wood and reduce numbers to a sustainable level. In some cases it may be necessary, under a management agreement, to exclude stock altogether by fencing off woodland. Undertake a census of the current feral goat populations and if necessary initiate control measures to reduce numbers to acceptable levels.

Invasion by exotics
Exotic species are localised. They vary in the degree of impact they have and the threat they pose. Very invasive species such as Sycamore *Acer pseudoplatanus* are seen as posing a current threat. Others are not seen as an immediate threat

due to their limited occurrence (e.g. Horse Chestnut *Aesculus hippocastanum*) or slow rate of spread (e.g. Beech *Fagus sylvatic*a).
ACTION: The most invasive species require management to control their spread, which in most cases will require the current seed source to be removed from site. Those species not posing a threat at present should be monitored and in the long-term controlled if required.

Dead Wood Removal
Dead wood should be left *in situ* if safe or practical to do so. This provides valuable habitat for fungi, invertebrates etc. Removal of wood for fire-wood should be discouraged.
ACTION: Through liaison and monitoring ensure there is no removal of dead wood from the site.

Woodland Clearance/Felling
Prevented by Notifiable Operations schedule.
ACTION: Undertake Site Integrity Monitoring (SIM) to ensure compliance with Notifiable Operations schedule.

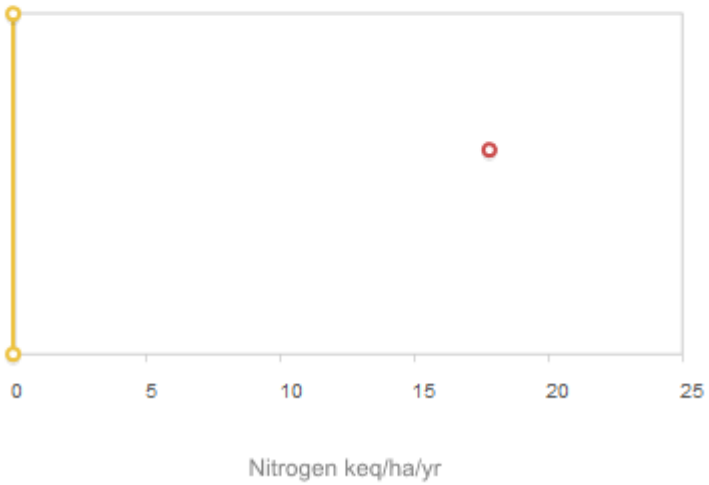
Fly-tipping
Localised fly-tipping occurs throughout the site but is extensive in a number of locations.
ACTION: Ensure removal of dumped material from the woods to prevent the build up of debris and discourage further fly-tipping. If fly-tipping persists, woodland areas adjacent to roads should be fenced off to prevent further occurrences.

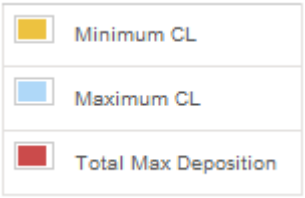
EARTH SCIENCE

Geological sampling. The extent of the feature means that the site is unlikely to be damaged by responsible geological sampling.
ACTION: to be assessed during SIM exercises.

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 the River Faughan & Tributaries SAC.

Feature: Salmo salar - Atlantic salmon
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 17.8 Minimum: 6 Average: 10.6





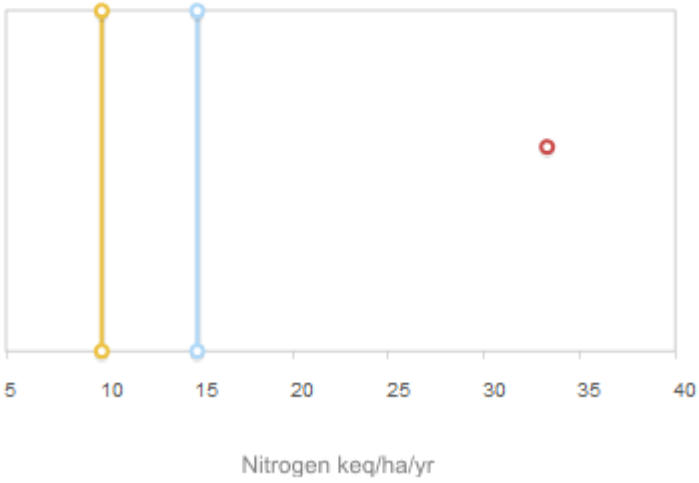
Feature: Old sessile oak woods with Ilex and Blechnum in the British Isles

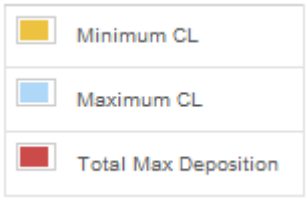
Critical Load Class: Acidophilous Quercus-dominated woodland

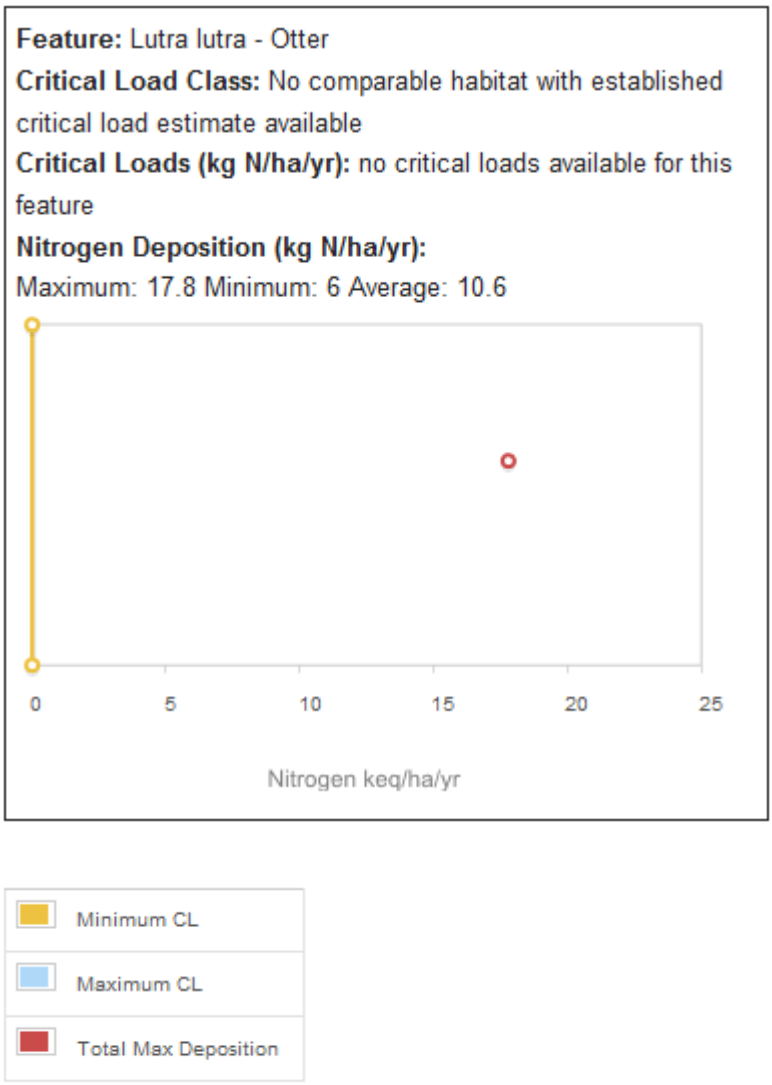
Critical Loads (kg N/ha/yr): 10-15

Nitrogen Deposition (kg N/ha/yr):

Maximum: 33.3 Minimum: 21.4 Average: 26.2







(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. 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. 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.

12.1 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. 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 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 <u>not by itself</u> 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 I

SAC Feature 1 – Atlantic salmon (*Salmo salar*)

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

Attribute	Measure	Targets	Comments
*Population dynamics	Number	Stable or increasing	
	Adult Run	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.	Management target and Conservation limit have been set for this river by the Loughs Agency Expectation needs to be tempered by the intrinsic ability of the river type to support salmon. Fish classification schemes operated regionally and nationally should permit an interpretation of performance.
	Juvenile population densities	These should not differ significantly from those expected for the river type/reach under conditions of high physical and chemical quality.	

	Biological disturbance: Introductions	The population should be naturally self-sustaining. There should be a presumption against stocking of salmon unless it is agreed to be necessary as an emergency interim measure to maintain population viability whilst underlying ecological problems are being addressed. No introduction or stocking of other species or sub-species at excessively high densities in salmon spawning and nursery areas. Effective screening on all fish farm intakes and discharges.	The nature conservation aim is to provide conditions in the river that support a healthy and natural population, achieved through habitat protection/restoration and the control of exploitation as necessary. 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 stocked and naturally produced individuals, disease introduction and genetic alterations to the population. For these reasons, consideration of stocking is only justifiable in cases where population viability is threatened. Stock must come from within the same catchment area. The presence of artificially high densities of other fish creates unacceptably high levels of predatory and competitive pressure on juvenile salmon. Escapes from fish farms are a form of uncontrolled introduction and should be prevented.
*Population dynamics	Exploitation	All exploitation should be sustainable without compromising any components of the stock.	Controls on exploitation should include migratory passage to the SAC within territorial waters, including estuarine and coastal net fisheries, as well as exploitation within the SAC from rod fisheries.
*Physical integrity	Disturbance of habitat	No artificial barriers significantly impairing adults from reaching existing and historical spawning grounds and smolts from reaching the sea.	In all river types, artificial barriers should be made passable. Natural barriers to potentially suitable spawning areas should not be circumvented.

	River morphology	Maintain and where necessary restore the characteristic physical features of the river channel, banks and riparian zone.	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 the species. The close 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 impact are not acceptable within the SAC, whilst restoration *may/will* be needed in some reaches.
	River Substrate	Clean gravels should dominate channels. <10% fines in top 30cm of spawning gravels	Elevated levels of fines can interfere with egg and fry survival through suffocation of eggs and loss of interstitial refuges for fry. Sources of fines include run-off from arable land, land (especially banks) trampled by livestock, sewage and industrial discharges.
*Water quantity	Flow	Flow regime should be characteristic of the river. As a guideline, at least 90% of the naturalised daily mean flow should remain in the river throughout the year Existing flow criteria already laid down for salmon should also be complied with.	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 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.

*Water quality:	Biological class. Environmental Protection's General Quality Assessment scheme. Assess every year.	'A'	Generally, water quality should not be injurious to any life stage. A wide range of water quality parameters can affect the status of interest features, but standard biological monitoring techniques provide a reasonably integrated picture in relation to many parameters. The river quality classifications used in all parts of the UK have a biological component. All classified reaches within the site that contain, or should contain, the interest feature under conditions of high environmental quality should comply with the targets given.
	Ecosystem Class. Environmental Protection's General Quality Assessment scheme. Assess every year	"A"	The River Ecosystem Classification 1995 sets standards for dissolved oxygen, biochemical oxygen demand, total and un-ionised ammonia, pH, copper and zinc. It therefore covers a number of water quality parameters that can cause problems within river systems. All classified reaches within the site that should contain the interest feature under conditions of high environmental quality should comply with the targets given.
	Soluble Reactive Phosphorus	Targets should be set in relation to river/reach type(s and should be near background levels) Annual mean <0.02mg/l - upland watercourses, <0.06mg/l mid-altitude watercourses on hard substrates and <0.2mg/l interim target for lowland rivers on clay substrates and large alluvial rivers.	The target of 25mgL^{-1} is based on the EC Freshwater Fish Directive. A more precautionary figure has been used for salmon to help protect substrates used for salmon spawning. The mg/l used here are indicative values for rivers in England. The equivalent for Northern Ireland will have to be defined
	Pollution	None	Pollutants such as silage or sheep dip can cause extreme mortality

	Suspended solids	Annual mean <10mgL^{-1} (spawning & nursery grounds) Annual mean <25mg L-1 (migratory passage)	Elevated levels of suspended solids can clog the respiratory structures of salmon.

SAC Feature 2 – Old Sessile Oak Woodlands with *Ilex* and *Blechnum* in the British Isles

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

Attribute	Targets	Method of Assessment	Comments
* Area of Oakwood	Maintain the extent of Oakwood at 138.7ha.	Visual estimate in 10x10m plots and 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 and 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 *Luzula sylvatica*.	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: *L. sylvatica* 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	Visual estimate in 10x10m plots.	

	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.
	Non–native invasive shrub	Visual estimate in	

	species should be present in less than 20% of plots, but never frequent.	10x10m plots.	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. *Galium aparine, Urtica dioica, Heracleum spp, Epilobium spp. Rumex obtusifolius* No more than occasional is equivalent to less than 40% occurrence in recorded plots.	Visual estimate in 10x10m plots.	
* Cover of *Pteridium* (% cover)	The mean cover of *Pteridium* 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) (DAFOR)	There should be no felling or coppicing of native trees or shrubs.	Visual estimate in 10x10m plots and 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.
Maintain the diversity of woodland species throughout the wood.	Record the % of plots with each of the acid woodland indicators (W11 & W17 communities)	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

	listed below:- *Vaccinium myrtillus,* *Blechnum spicant,* *Dicranum spp.,* *Luzula pilosa,* *Rhytidiadelphus loreus*		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:- *Sanicla europea,* *Geum urbanum,* *Polystichum setiferum,* *Aneomne nemorosa,* *Primula vulgaris.*	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:- *Carex remota,* *Ranunculus repens,* *Chrysosplenium oppositifolium,* *Filipendula ulmaria,* *Lysimachia nemorum.*	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.	

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

SAC Feature 3 – Otter *Lutra lutra*

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

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 data from other surveys or Ulster Museum, if available
	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	EP water quality scale	Water quality should be at least category A or B, according to EP guidelines, with no pollution incidents	Refer to Environment Protection 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 Agency for sample data if 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	

Attribute	Measure	Target	Notes
		development	
Flow rate	Mean annual flow rate	No reduction attributable to increased abstraction.	Refer to data from Rivers Agency if available
Site integrity	Total area	No reduction or fragmentation of area	

RIVER FOYLE & TRIBUTARIES SAC
UK0030320

CONSERVATION OBJECTIVES

Document Details

Title	*River Foyle & Tributaries SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
Date Effective From	*27/07/2017*
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Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	January 2015	Complete review	RMK
V3	July 2017	Minor edit	PC

Site Relationships

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

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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

GRID REFERENCE: IH 36768792

Upper G.R. IH07938403
IH09497610
IH10738760
IH29049358
IH40968624

Lower G.R. IC39091103

AREA: 773 ha

LENGTH: 120 km

5. SUMMARY SITE DESCRIPTION

The SAC includes the River Foyle and its tributaries i.e. that part of the River Finn which lies within Northern Ireland, the River Mourne and its tributary the River Strule (up to its confluence with the Owenkillew River) and the River Derg, along with two of its sub-tributaries, the Mourne Beg River and the Glendergan River. In total, the area encompasses 120km of watercourse and is notable for the physical diversity and naturalness of the banks and channels, especially in the upper reaches, and the richness and naturalness of its plant and animal communities. Of particular importance is the population of Atlantic Salmon *Salmo salar*, which is one of the largest in Europe. Research has indicated that each sub-catchment within the system supports genetically distinct populations.

The area is also important as a river habitat. In their upper catchments, the rivers are all fast-flowing spate rivers with dynamic flow regimes characterised by sequences of rapid, riffle and run. Although the banks may have been modified in the past, the channels are natural and composed of large cobble substrate with scattered boulders and sandy marginal deposits, while cobble side and point bars

and discrete sand deposits are common features. At the top end of the River Derg and its two tributaries, the aquatic flora reflect the highly acidic character of the water, with mosses and liverworts dominant. Beds of Stream Water Crowfoot *Ranunculus penicillatus* var. *penicillatus* occur where the flow is less dynamic. The River Foyle below Strabane is slow-flowing and is influenced by a tidal regime, rising and falling with the tidal cycle. Aquatic plants in the channel are extremely limited, particularly in the more saline areas; here, fucoids make up the main component.

Otter *Lutra lutra* is found throughout the system.

A small population of the now rare Freshwater Pearl Mussel *Margaritifera margaritifera* was still present in the Mourne River in the mid-nineties.

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

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 Foyle, the qualifying features are its internationally important population of Atlantic Salmon and its *Ranunculus* community, which is found in lower sections of the River Derg and Mourne Beg River and along the Strule and Mourne Rivers down to Strabane. The River Foyle is included downstream to provide a linkage to the sea.

Much of the River Finn system occurs within the Republic of Ireland and will be included within the Republic of Ireland SAC series.

Within Northern Ireland, the upper limits for all the tributaries and sub-tributaries are determined by the international border, except for the Strule where it joins with the Owenkillew River SAC. The downstream limit of the site is largely determined by the limit of saline influence (Directive refers to Salmon *in freshwater only*), but includes a small part of the migration corridor on the River Foyle.

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.

Due to the size of the area, the boundary was largely derived from video footage acquired during a helicopter flight. Some information on adjacent habitats was derived from previous surveys.

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

Feature Type	Feature	Global Status	Size/ extent/ pop~
Species	Atlantic Salmon *Salmo salar*	B	10,001-100,000
Habitat	Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation	B	16.44 ha
Species	Otter *Lutra lutra*	C	C
Species	Sea Lamprey	D	P
Species	River Lamprey	D	P
Species	Brook Lamprey *Lampetra planeri*	D	P
Species	Freshwater Pearl Mussel *Margaritifera margaritifera*	D	R

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 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 River Foyle & Tributaries SAC.

6.1 ASSI SELECTION FEATURES

River Foyle & Tributaries ASSI

Feature Type	Feature	Size/ extent/
Habitat	Series of river types present with corresponding macrophyte assemblages, ranging from ultra-oligotrophic, mesotrophic to estuarine types.	120km
Species	Atlantic Salmon *Salmo salar*	
Species	Otter *Lutra lutra*	

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The ***Conservation Objective*** for this site is:

To maintain (or restore where appropriate) the

- Atlantic Salmon *Salmo salar*
- Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-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
Atlantic Salmon *Salmo salar*	B	Maintain and if possible expand existing population numbers and distribution (preferably through natural recruitment), and improve age structure of population.
		Maintain and if possible enhance the extent and quality of suitable Salmon habitat - particularly the chemical and biological quality of the water and the condition of the river channel and substrate.
Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation	B	Maintain and if possible 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 *Lutra lutra*	C	Maintain and if possible increase population numbers and distribution.
		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,	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

ranging from ultra-oligotrophic to eutrophic and brackish types.	Maintain the diversity and quality of habitats associated with the river, e.g. bog, wet grasslands, scrub and oak woodland.
Atlantic Salmon *Salmo salar*	See SAC Selection Feature Objective Requirements table.
Otter *Lutra lutra*	See SAC Selection Feature Objective Requirements table

10. MANAGEMENT CONSIDERATIONS

Ownership

There are several hundred individuals or organisations with ownership or other rights associated with the area.

Adjoining Land Use

The Glendergan and upper reaches of the Derg and Mourne Beg rivers are generally unenclosed and flow through a predominantly upland peatland landscape used for rough grazing or commercial forestry. Along the mid and lower reaches of the Derg and Mourne Beg, the rivers flow through improved or semi-improved pasture used for silage and grazing.

The river is generally fenced from the surrounding land at least along one bank top. Along the Mourne and Strule, the main adjacent agricultural uses include tilled land and silage production, in addition to 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.

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 River Foyle & Tributaries, or could affect it in the future.

Although **Atlantic Salmon *Salmo salar,* Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-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.

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 system is 300,000ha, 78,000ha of which fall within the Republic of Ireland and consists of 27 sub-catchment areas in Northern Ireland. The designation only includes the main channels of the Strule, Mourne, Derg, Mourne Beg, Glendergan, Finn and Foyle rivers and has excluded several tributaries.

Analysis of biological water quality monitoring data from 1991 to 1998 indicates that water quality is good to very good on all rivers and there has been no deterioration in quality over this period. Chemical water quality monitoring data indicates that water quality is moderate in the Derg and its tributaries, but varies from moderate to poor in the Mourne and Strule.

A significant portion of the upper catchments of the 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 land owners to avoid excessive fertiliser inputs, thus reducing diffuse pollution. Restrict stock access to less sensitive watering points.

Channel & Bank Modification

A number of sections of the river channels have been extensively altered by man in the past. These modifications have changed the natural flow regime of the river, resulting in a reduction of the natural channel area available to aquatic vegetation or for spawning Atlantic Salmon. However, the river continues to recover from the effects of re-sectioning.

ACTION: Future in-river works should be minimised as they reduce habitat and species diversity. 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. 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 DARD Fisheries Division and Environmental Protection 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 tributary rivers has resulted in siltation of the riverbed downstream.
ACTION: Monitor and control sediment input levels in tributaries and immediately downstream of sandpits.

Where the bank and channel of the river are accessible to stock, damage to both the Atlantic 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.

NIEA is aware of two fish farms in the area, but they do not appear to be having any damaging effects on the river or the Atlantic Salmon population. Proposals for any further 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 that the effluent is adequately treated.
ACTION: Review existing Water Act consents.

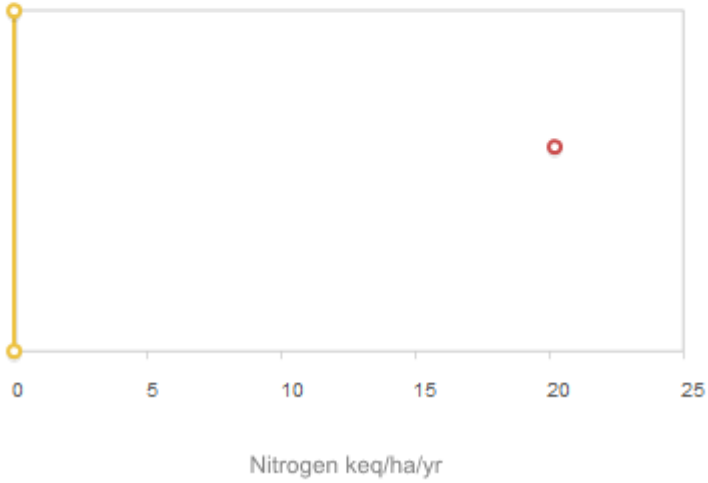
Water Extraction
A natural flow regime is essential for the maintenance of many of the selection features. There are several extraction sites along the river. Proposals for further water extraction in the area will require very careful environmental assessment.
ACTION: Review existing Water Act consents.

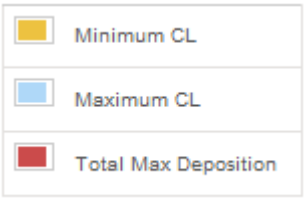
Fly-tipping
Small-scale fly tipping has occurred in places along the river banks and in the river channel, as well as in adjacent woodland.
ACTION: Where practical, remove dumped material from the banks, channel and adjoining woodland to prevent the build up of debris and discourage further tipping.

Alien species
Japanese Knotweed *Fallopia japonica*, Giant Hogweed *Heracleum mantegazzianum* and Indian Balsam *Impatiens glandulifera* are present along the riverbanks of the major rivers.
ACTION: Monitor and if necessary, control the spread of alien species.

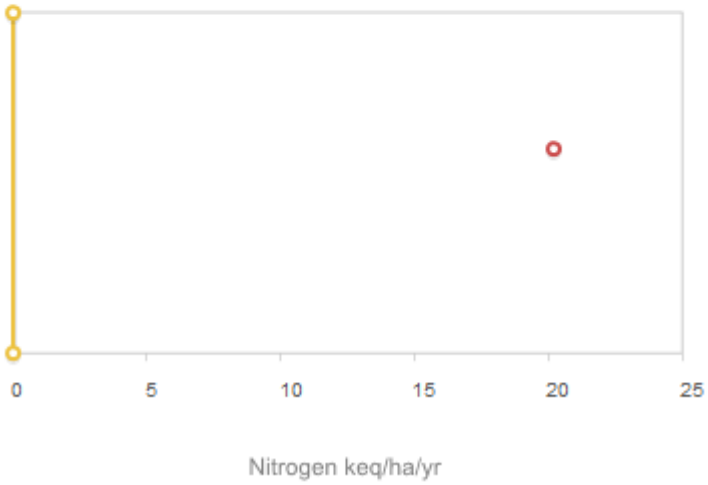
Nitrogen Deposition
Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be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

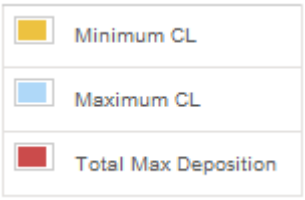
Feature: Salmo salar - Atlantic salmon
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 20.2 Minimum: 5.6 Average: 8.4



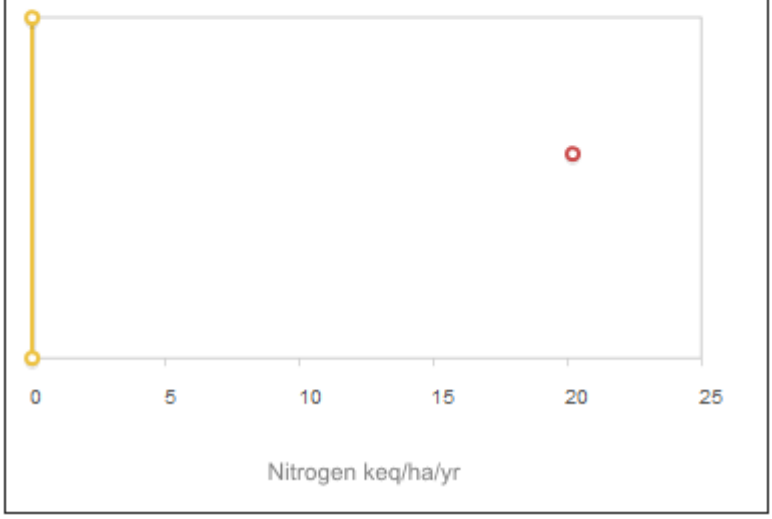


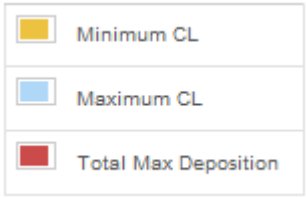
Feature: Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 20.2 Minimum: 5.6 Average: 8.4





Feature: Lutra lutra - Otter
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 20.2 Minimum: 5.6 Average: 8.4





(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. 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. 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.

12.1 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. Evaluation of 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 Freshwater Pearl Mussel colonies should be undertaken 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 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 I

SAC Feature 1 – Atlantic salmon (*Salmo salar*) (Status B)

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

Attribute	Measure	Targets	Comments
*Population dynamics	Number	Stable or increasing	
	Adult Run	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.	The Northern Ireland equivalent of Environment Agency MBAL (Minimum Biological Acceptable Level) should be set for each catchment. Expectation needs to be tempered by the intrinsic ability of the river type to support salmon. Fish classification schemes operated regionally and nationally should permit an interpretation of performance.
	Juvenile population densities	These should not differ significantly from those expected for the river type/reach under conditions of high physical and chemical quality.	

	Biological disturbance: Introductions	The population should be naturally self-sustaining. There should be a presumption against stocking of salmon unless it is agreed to be necessary as an emergency interim measure to maintain population viability whilst underlying ecological problems are being addressed. No introduction or stocking of other species or sub-species at excessively high densities in salmon spawning and nursery areas. Effective screening on all fish farm intakes and discharges.	The nature conservation aim is to provide conditions in the river that support a healthy and natural population, achieved through habitat protection/restoration and the control of exploitation as necessary. 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 stocked and naturally produced individuals, disease introduction and genetic alterations to the population. For these reasons, consideration of stocking is only justifiable in cases where population viability is threatened. Stock must come from within the same catchment area. The presence of artificially high densities of other fish creates unacceptably high levels of predatory and competitive pressure on juvenile salmon. Escapes from fish farms are a form of uncontrolled introduction and should be prevented.
*Population dynamics	Exploitation	All exploitation should be sustainable without compromising any components of the stock.	Controls on exploitation should include migratory passage to the SAC within territorial waters, including estuarine and coastal net fisheries, as well as exploitation within the SAC from rod fisheries.
*Physical integrity	Disturbance of habitat	No artificial barriers significantly impairing adults from reaching existing and historical spawning grounds and smolts from reaching the sea.	In all river types, artificial barriers should be made passable. Natural barriers to potentially suitable spawning areas should not be circumvented.

	River morphology	Maintain and where necessary restore the characteristic physical features of the river channel, banks and riparian zone.	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 the species. The close 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 impact are not acceptable within the SAC, whilst restoration *may/will* be needed in some reaches.
	River Substrate	Clean gravels should dominate channels. <10% fines in top 30cm of spawning gravels	Elevated levels of fines can interfere with egg and fry survival through suffocation of eggs and loss of interstitial refuges for fry. Sources of fines include run-off from arable land, land (especially banks) trampled by livestock, sewage and industrial discharges.
*Water quantity	Flow	Flow regime should be characteristic of the river. As a guideline, at least 90% of the naturalised daily mean flow should remain in the river throughout the year Existing flow criteria already laid down for salmon should also be complied with.	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 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.

*Water quality:	Biological class. Environmental Protection's General Quality Assessment scheme. Assess every year.	'A'	Generally, water quality should not be injurious to any life stage. A wide range of water quality parameters can affect the status of interest features, but standard biological monitoring techniques provide a reasonably integrated picture in relation to many parameters. The river quality classifications used in all parts of the UK have a biological component. All classified reaches within the site that contain, or should contain, the interest feature under conditions of high environmental quality should comply with the targets given.
	Ecosystem Class. Environmental Protection's General Quality Assessment scheme. Assess every year	"A"	The River Ecosystem Classification 1995 sets standards for dissolved oxygen, biochemical oxygen demand, total and un-ionised ammonia, pH, copper and zinc. It therefore covers a number of water quality parameters that can cause problems within river systems. All classified reaches within the site that should contain the interest feature under conditions of high environmental quality should comply with the targets given.
	Soluble Reactive Phosphorus	*Targets should be set in relation to river/reach type(s and should be near background levels)* Annual mean <0.02mg/l - upland watercourses, <0.06mg/l mid-altitude watercourses on hard substrates and <0.2mg/l interim target for lowland rivers on clay substrates and large alluvial rivers.	The target of 25mgL^{-1} is based on the EC Freshwater Fish Directive. A more precautionary figure has been used for salmon to help protect substrates used for salmon spawning. The mg/l used here are indicative values for rivers in England. The equivalent for Northern Ireland will have to be defined
	Pollution	None	Pollutants such as silage or sheep dip can cause extreme mortality

	Suspended solids	Annual mean <10mgL^{-1} (spawning & nursery grounds) Annual mean <25mg L-1 (migratory passage)	Elevated levels of suspended solids can clog the respiratory structures of salmon.

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

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

Attribute	Measure	Targets	Comments
*Population dynamics	Extent	Coverage should be characteristic of river type.	High cover of *Ranunculus spp* is not necessarily indicative of favourable condition.
	Reproduction *(only applies where control measures are implemented)*	*Ranunculus* should be able to flower and set seed, in suitable habitat.	Flowering outside the normal period and weed cutting or other activities that do not leave patches (at least 25% in every 100 metres of river) to flower and set seed are indicators of unfavourable condition. Use of herbicides should be avoided.
*Macrophyte assemblage	Composition	Characteristic plant species should dominate the assemblage. Indicators of unfavourable condition should be rare.	The absence of *Ranunculus* and high frequency of occurrence of blanketweed and other algae, or dominance of *Potamogeton pectinatus* are signs of unfavourable condition.
Water quantity	Flow	Flow regime should be characteristic of the river. As a guideline, at least 90% of the naturalised daily mean flow should remain in the river throughout the year.	
Physical integrity	River morphology	Maintain and where necessary restore [*to an extent characteristic of the river/reach*]	

	River substrate	Channels should be dominated by clean gravels. Maximum fines content should not be too great to prevent the establishment of new plants.	Siltation of riverine sediments, caused by high particulate loads and/or reduced scour within the channel, is a major threat to interest features. Elevated fines levels can interfere with the establishment of *Ranunculus* plants. Sources of fines include; run-off from arable land, land (especially banks) trampled by livestock, sewage and industrial discharges.
*Water quality:	Biological class. Environment Protection's General Quality Assessment scheme. Assess every ? years.	'A'	
	Ecosystem Class. Environment Protection's General Quality Assessment scheme. Assess every ? years	'A'	
	Suspended solids	Annual mean <10mg L-1	
	Soluble Reactive Phosphorus	*Targets should be set in relation to river/reach types (and should be near background levels)* <0.02mg/l - upland watercourses <0.06mg/l mid-altitude watercourses on hard substrates	

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

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

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 data from other surveys or Ulster Museum, if available
	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	EP water quality scale	Water quality should be at least category A or B, according to EP guidelines, with no pollution incidents	Refer to Environment Protection 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 Agency for sample data if 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	

Attribute	Measure	Target	Notes
		development	
Flow rate	Mean annual flow rate	No reduction attributable to increased abstraction.	Refer to data from Rivers Agency if available
Site integrity	Total area	No reduction or fragmentation of area	

RIVER ROE & TRIBUTARIES SAC
UK0030360

CONSERVATION OBJECTIVES

Document Details

Title	*River Roe & Tributaries SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
Date Effective From	*27/07/2017*
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Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	January 2015	Complete review	RMK
V3	July 2017	Minor edit	PC

Site relationships

To fully understand the conservation requirements of this site, it is necessary to also refer to the Conservation Objectives for Lough Foyle SPA.

The River Roe & Tributaries SAC boundary adjoins the boundary of Lough Foyle SPA and Banagher Glen SAC.

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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: LONDONDERRY

GRID REFERENCE: IC 687159

Upper G.R.: IC 77320426
IC 75122702
IC 74371310
IC 64771430
IC 64751383
IC 66841206
IC 65790233
IC 62720257
IC 66830620
IC 71040630
IC 70520673
IC 74270596

Lower G.R.: IC 67022964

AREA: 408 ha

LENGTH: 87 km

5. SUMMARY SITE DESCRIPTION

The area is of special scientific interest because of the physical features of the river and its associated riverine flora and fauna. The River Roe and Tributaries ASSI includes the River Roe and its tributaries the Curly River, the Gelvin River, the Bovevagh River (and its tributary the Altahullion Burn), the Wood Burn, the Owenbeg (and is tributary the Clogherna Burn), the Owenrigh River, the Black Burn (and its tributary the Currawable Burn) and the Owenalena River. In total, the area encompasses approximately 87km of watercourse and is notable for the physical diversity and naturalness of the banks and channels, especially in the upper reaches, and the richness and naturalness of its plant and animal

communities, in particular the population of Atlantic Salmon *Salmo salar*, which is of international importance and in the extent of Upland Oakwood present.

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

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 Roe, the qualifying features are its internationally important population of Atlantic Salmon *Salmo salar*, its *Ranunculus* community, which is found in middle and lower reaches of the River Roe and its regionally important old sessile oak woodland.

The upper limits for all the tributaries and sub-tributaries are determined by the known limits of good spawning and nursery habitat or woodland, except for the Owenrigh River which starts at the lower end of Banagher Glen SAC. The upper limit is indicated on the ground by a physical feature such as a bridge or where two tributaries meet. The downstream limit of the site is determined by the tidal limit which is also the boundary of Lough Foyle SPA.

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.

Due to the size of the area, the boundary was largely derived from auto-rectified colour aerial photographs. Some information on adjacent habitats was derived from previous surveys.

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

Feature Type	Feature	Global Status	Size/ extent/ pop~
Species	Atlantic Salmon *Salmo salar*	B	1,000-10,000
Habitat	Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation	C	20km or 20% of channel length
Habitat	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	C	145.45ha
Species	Otter *Lutra lutra*	C	C
Species	Sea Lamprey	D	P
Species	Brook/River Lamprey	D	P

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 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 River Roe & Tributaries SAC.

6.1 ASSI SELECTION FEATURES

River Roe & Tributaries ASSI

Feature Type	Feature	Size/ extent/
Habitat	Series of river types present with corresponding macrophyte assemblages, ranging from ultra-oligotrophic, mesotrophic to estuarine types.	98km
Habitat	Oakwood	145.45 ha
Species	Atlantic Salmon *Salmo salar*	
Species	Otter *Lutra lutra*	

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The ***Conservation Objective*** for this site is:

To maintain (or restore where appropriate) the

- Atlantic Salmon *Salmo salar*
- Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- 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
Atlantic Salmon *Salmo salar*	B	Maintain and if possible expand existing population numbers and distribution (preferably through natural recruitment), and improve age structure of population.
		Maintain and if possible enhance the extent and quality of suitable Salmon habitat - particularly the chemical and biological quality of the water and the condition of the river channel and substrate.
Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation	C	Maintain and if possible 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 Woodlands with *Ilex* and *Blechnum* in the British Isles	C	Maintain and where feasible expand the extent of existing oak woodland but not at the expense of other SAC (ABC) features. (There are areas of degraded heath, 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.
Otter *Lutra lutra*	C	Maintain and if possible increase population numbers and distribution.
		Maintain the extent and quality of suitable Otter habitat, in particular the chemical and biological quality of the water and all associated wetland habitats

9.1 ADDITIONAL ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Series of river types present with corresponding macrophyte assemblages, ranging from ultra-oligotrophic to eutrophic and brackish 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.
Oakwood	See SAC Selection Feature Objective Requirements table.
Atlantic Salmon *Salmo salar*	See SAC Selection Feature Objective Requirements table.
Otter *Lutra lutra*	See SAC Selection Feature Objective Requirements table.

10. MANAGEMENT CONSIDERATIONS

Ownership

There are several hundred individuals or organisations with ownership or other rights associated with the area.

Adjoining Land Use

The upper reaches of the River Roe, Curly River, Owenbeg River and Clogherna Burn are generally unenclosed and flow through a predominantly upland peatland landscape used for rough grazing or commercial forestry. Along the Owenrigh River, the Gelvin River, the Bovevagh River (and its tributary the Altahullion Burn), the Black Burn (and its tributary the Currawable Burn), along the middle reaches of the River Roe and along the middle and lower reaches of the Curly River, Owenbeg River and Clogherna Burn, the rivers flow through improved or semi-improved pasture used for silage and grazing. The river is generally fenced from the surrounding land at least along one bank top. Along the lower reaches of the River Roe the main adjacent agricultural uses include tilled land and silage production, in addition to stock grazing.

Woodland is fragmented throughout the site with the main block found at the Roe Valley Country Park. Other significant stands occur along the valley sides of the Curly River, the Bovevagh River (and its tributary the Altahullion Burn), the Black Burn (and its tributary the Currawable Burn) and the upper reach of the Owenbeg River. These woodlands and the interconnecting woodland strips which run along the river banks vary in the extent that they are 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 River Roe & Tributaries, or could affect it in the future.

Although **Atlantic Salmon *Salmo salar,* Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation, Old Sessile Oak Woodlands with *Ilex* and *Blechnum* in the British Isles 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.

RIVER

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 system is 38,532ha, and consists of 8 sub-catchments. The designation only includes the main channels of the River Roe and its tributaries the Curley River, the Gelvin River, the Bovevagh River (and its tributary the Altahullion Burn), the Owenbeg (and its tributary the Clogherna Burn), the Owenright River, the Black Burn (and its tributary the Currawable Burn) and the Owenalena River but has excluded several other tributaries.

Analysis of biological water quality monitoring data from 1999 to 2002 indicated that water quality was good to very good on all rivers although there did seem to be deterioration in quality over this period in the middle and lower reaches of the River Roe and in the Owenbeg River. Chemical water quality monitoring data indicates that water quality is generally good although again there has been a moderate deterioration in quality in the lower reaches of the River Roe.

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

There are at least 10 sewage works within the catchment varying in size and the degree of treatment they provide. There are also numerous septic tanks.

Stock have open access to the channel along many sections in the upper reaches of the River Roe and its tributaries 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 land owners to avoid excessive fertiliser inputs, thus reducing diffuse pollution. Restrict stock access to less sensitive watering points.

Channel & Bank Modification
The River Roe was originally designated in 1947. A total length of 30.5km was designated at this time. The limits of designation are upstream of the junction of the Owenreagh River with the River Roe south of Dungiven and downstream of Lough Foyle, 5 miles north-west of Limavady. The work that has been carried out on the River Roe has been mainly flood banking for a large percentage of its designated length, though there has been some re-sectioning around the Dungiven area and regrading the middle and lower reaches of the river.
Some of these modifications have changed the natural flow regime of the river, resulting in a reduction of the natural channel area available to aquatic vegetation or for spawning Atlantic Salmon. However, the river continues to recover from the effects of re-sectioning.
ACTION: Future in-river works should be minimised as they reduce habitat and species diversity. 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.

The River Roe and many of its tributaries have undergone fisheries modifications with the installation of weirs and deflectors as part of habitat enhancement schemes, resulting from the 'Salmonid Enhancement Programme'. Such enhancement schemes should be thoughtfully planned as properly executed 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. 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 DARD Fisheries Division and Environmental Protection to co-ordinate action.

Substrate Siltation
A significant portion of the catchment is afforested (especially the upper catchments), with a potential risk of sediment release during forestry operations, especially clear-felling.
ACTION: Liase 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 tributary rivers has resulted in siltation of the riverbed downstream.
ACTION: Monitor and control sediment input levels in tributaries and immediately downstream of sandpits.

Where the bank and channel of the river are accessible to stock, damage to both the Atlantic 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 stream flow, 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 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 that the effluent is adequately treated.
ACTION: Review existing Water Act consents.

Water Extraction
A natural flow regime is essential for the maintenance of many of the selection features. There are several extraction sites along the river. Proposals for further water extraction in the area will require very careful environmental assessment.
ACTION: Review existing Water Act consents.

Fly-tipping
Small-scale fly tipping has occurred in places along the river banks and in the river channel, as well as in adjacent woodland.
ACTION: Where practical, remove dumped material from the banks, channel and adjoining woodland to prevent the build up of debris and discourage further tipping.

Alien species
Japanese Knotweed *Fallopia japonica*, Giant Hogweed *Heracleum mantegazzianum* and Indian Balsam *Impatiens glandulifera* are present along the riverbanks of the major rivers.
ACTION: Monitor and if necessary, control the spread of alien species.

WOODLAND

Grazing/Poaching/Tree barking and Browsing
Free access to some parts of the woodland by domestic stock and feral goats is causing direct damage to the ground flora community by poaching and trampling. Grazing and bark-stripping is preventing regeneration and will increasingly cause a detrimental change in the woodland structure and composition with time. Information on current grazing levels of domestic stock within privately owned woodland is not readily available. No information on the current population of goats is available.
ACTION: Evaluate the current domestic stocking levels of the wood and reduce numbers to a sustainable level. In some cases it may be necessary, under a management agreement, to exclude stock altogether by fencing off woodland. Undertake a census of the current feral goat populations and if necessary initiate control measures to reduce numbers to acceptable levels.

Invasion by exotics
Exotic species are localised. They vary in the degree of impact they have and the threat they pose. Very invasive species such as Sycamore *Acer pseudoplatanus* are seen as posing a current threat. Others are not seen as an immediate threat due to their limited occurrence (e.g. Horse Chestnut *Aesculus hippocastanum*) or slow rate of spread (e.g. Beech *Fagus sylvatic*a).
ACTION: The most invasive species require management to control their spread, which in most cases will require the current seed source to be removed from site.
Those species not posing a threat at present should be monitored and in the long-term controlled if required.

Slumping/Landslides/Erosion
Sudden accidental discharge of water down the valley sides from Quarry sites adjacent to the valleys has resulted in a number of landslides and severe gully erosion in the past.

ACTION: Liaise with quarry owners to ensure there is no further accidental discharges of water that could cause erosion problems.

Dead Wood Removal

Dead wood should be left *in situ* if safe or practical to do so. This provides valuable habitat for fungi, invertebrates etc. Removal of wood for fire-wood should be discouraged.

ACTION: Through liaison and monitoring ensure there is no removal of dead wood from the site.

Woodland Clearance/Felling

Prevented by Notifiable Operations schedule.

ACTION: Undertake Site Integrity Monitoring to ensure compliance with Notifiable Operations schedule.

Fly-tipping

Localised fly-tipping occurs throughout the site but is extensive in a number of locations.

ACTION: Ensure removal of dumped material from the woods when practical to prevent the build up of debris and discourage further fly-tipping.

If fly-tipping persists, woodland areas adjacent to roads should be fenced off to prevent further occurrences.

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 the River Roe & Tributaries SAC.

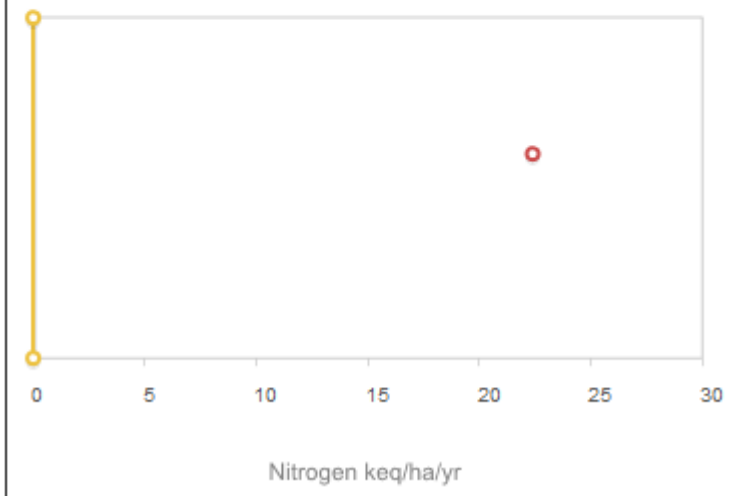
Feature: Salmo salar - Atlantic salmon

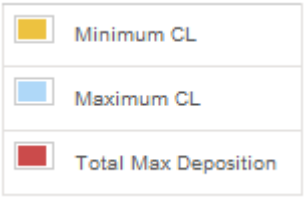
Critical Load Class: No comparable habitat with established critical load estimate available

Critical Loads (kg N/ha/yr): no critical loads available for this feature

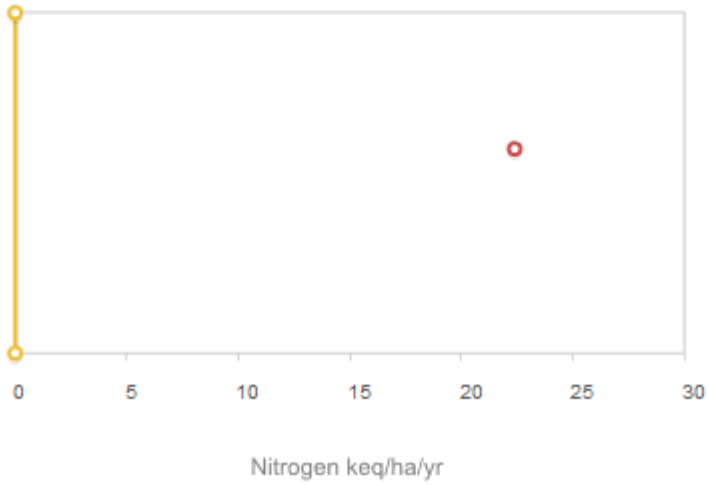
Nitrogen Deposition (kg N/ha/yr):

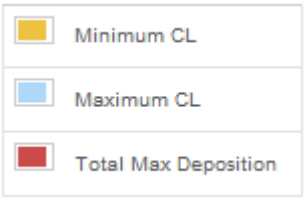
Maximum: 22.4 Minimum: 5.7 Average: 11.1





Feature: Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 22.4 Minimum: 5.7 Average: 11.1





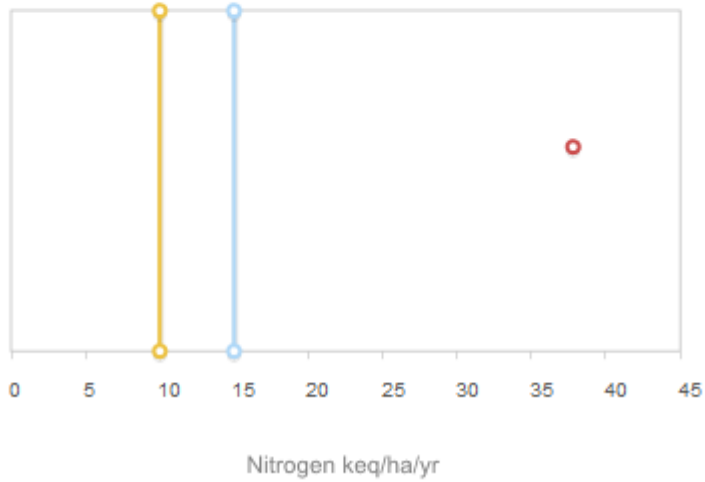
Feature: Old sessile oak woods with Ilex and Blechnum in the British Isles

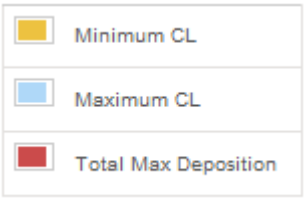
Critical Load Class: Acidophilous Quercus-dominated woodland

Critical Loads (kg N/ha/yr): 10-15

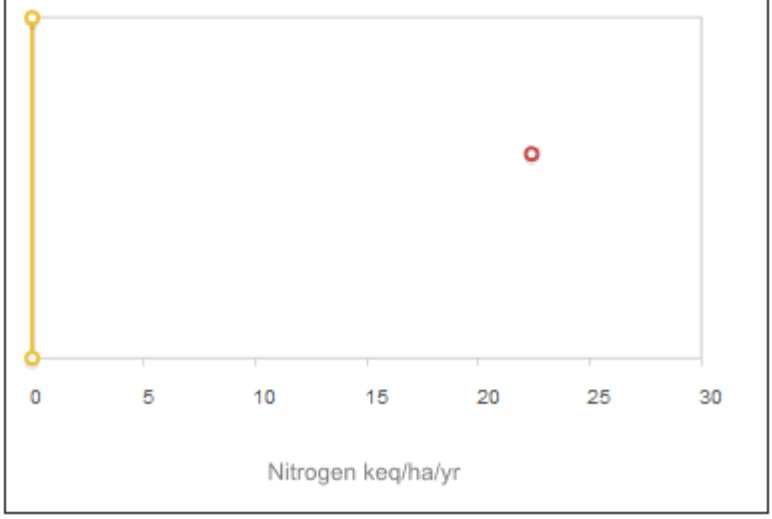
Nitrogen Deposition (kg N/ha/yr):

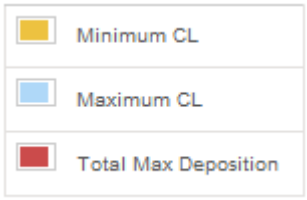
Maximum: 37.8 Minimum: 15.5 Average: 27.1





Feature: Lutra lutra - Otter
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 22.4 Minimum: 5.7 Average: 11.1





(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. 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. 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.

12.1 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. Evaluation of stocking densities would also be desirable, whilst a check for feral goat damage should be carried out throughout the site. 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 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 I

SAC Feature 1 – Atlantic salmon (*Salmo salar*) (Status B)

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

Attribute	Measure	Targets	Comments
*Population dynamics	Number	Stable or increasing	
	Adult Run	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.	The Northern Ireland equivalent of Environment Agency MBAL (Minimum Biological Acceptable Level) should be set for each catchment. Expectation needs to be tempered by the intrinsic ability of the river type to support salmon. Fish classification schemes operated regionally and nationally should permit an interpretation of performance.
	Juvenile population densities	These should not differ significantly from those expected for the river type/reach under conditions of high physical and chemical quality.	

	Biological disturbance: Introductions	The population should be naturally self-sustaining. There should be a presumption against stocking of salmon unless it is agreed to be necessary as an emergency interim measure to maintain population viability whilst underlying ecological problems are being addressed. No introduction or stocking of other species or sub-species at excessively high densities in salmon spawning and nursery areas. Effective screening on all fish farm intakes and discharges.	The nature conservation aim is to provide conditions in the river that support a healthy and natural population, achieved through habitat protection/restoration and the control of exploitation as necessary. 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 stocked and naturally produced individuals, disease introduction and genetic alterations to the population. For these reasons, consideration of stocking is only justifiable in cases where population viability is threatened. Stock must come from within the same catchment area. The presence of artificially high densities of other fish creates unacceptably high levels of predatory and competitive pressure on juvenile salmon. Escapes from fish farms are a form of uncontrolled introduction and should be prevented.
*Population dynamics	Exploitation	All exploitation should be sustainable without compromising any components of the stock.	Controls on exploitation should include migratory passage to the SAC within territorial waters, including estuarine and coastal net fisheries, as well as exploitation within the SAC from rod fisheries.
*Physical integrity	Disturbance of habitat	No artificial barriers significantly impairing adults from reaching existing and historical spawning grounds and smolts from reaching the sea.	In all river types, artificial barriers should be made passable. Natural barriers to potentially suitable spawning areas should not be circumvented.

	River morphology	Maintain and where necessary restore the characteristic physical features of the river channel, banks and riparian zone.	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 the species. The close 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 impact are not acceptable within the SAC, whilst restoration *may/will* be needed in some reaches.
	River Substrate	Clean gravels should dominate channels. <10% fines in top 30cm of spawning gravels	Elevated levels of fines can interfere with egg and fry survival through suffocation of eggs and loss of interstitial refuges for fry. Sources of fines include run-off from arable land, land (especially banks) trampled by livestock, sewage and industrial discharges.
*Water quantity	Flow	Flow regime should be characteristic of the river. As a guideline, at least 90% of the naturalised daily mean flow should remain in the river throughout the year Existing flow criteria already laid down for salmon should also be complied with.	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 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.

*Water quality:	Biological class. Environmental Protection's General Quality Assessment scheme. Assess every year.	'A'	Generally, water quality should not be injurious to any life stage. A wide range of water quality parameters can affect the status of interest features, but standard biological monitoring techniques provide a reasonably integrated picture in relation to many parameters. The river quality classifications used in all parts of the UK have a biological component. All classified reaches within the site that contain, or should contain, the interest feature under conditions of high environmental quality should comply with the targets given.
	Ecosystem Class. Environmental Protection's General Quality Assessment scheme. Assess every year	"A"	The River Ecosystem Classification 1995 sets standards for dissolved oxygen, biochemical oxygen demand, total and un-ionised ammonia, pH, copper and zinc. It therefore covers a number of water quality parameters that can cause problems within river systems. All classified reaches within the site that should contain the interest feature under conditions of high environmental quality should comply with the targets given.
	Soluble Reactive Phosphorus	*Targets should be set in relation to river/reach type(s and should be near background levels)* Annual mean <0.02mg/l - upland watercourses, <0.06mg/l mid-altitude watercourses on hard substrates and <0.2mg/l interim target for lowland rivers on clay substrates and large alluvial rivers.	The target of 25mgL^{-1} is based on the EC Freshwater Fish Directive. A more precautionary figure has been used for salmon to help protect substrates used for salmon spawning. The mg/l used here are indicative values for rivers in England. The equivalent for Northern Ireland will have to be defined
	Pollution	None	Pollutants such as silage or sheep dip can cause extreme mortality

	Suspended solids	Annual mean <10mgL^{-1} (spawning & nursery grounds) Annual mean <25mg L-1 (migratory passage)	Elevated levels of suspended solids can clog the respiratory structures of salmon.

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

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

Attribute	Measure	Targets	Comments
*Population dynamics	Extent	Coverage should be characteristic of river type.	High cover of *Ranunculus spp* is not necessarily indicative of favourable condition.
	Reproduction *(only applies where control measures are implemented)*	*Ranunculus* should be able to flower and set seed, in suitable habitat.	Flowering outside the normal period and weed cutting or other activities that do not leave patches (at least 25% in every 100 metres of river) to flower and set seed are indicators of unfavourable condition. Use of herbicides should be avoided.
*Macrophyte assemblage	Composition	Characteristic plant species should dominate the assemblage. Indicators of unfavourable condition should be rare.	The absence of *Ranunculus* and high frequency of occurrence of blanketweed and other algae, or dominance of *Potamogeton pectinatus* are signs of unfavourable condition.
Water quantity	Flow	Flow regime should be characteristic of the river. As a guideline, at least 90% of the naturalised daily mean flow should remain in the river throughout the year.	
Physical integrity	River morphology	Maintain and where necessary restore [*to an extent characteristic of the river/reach*]	

	River substrate	Channels should be dominated by clean gravels. Maximum fines content should not be too great to prevent the establishment of new plants.	Siltation of riverine sediments, caused by high particulate loads and/or reduced scour within the channel, is a major threat to interest features. Elevated fines levels can interfere with the establishment of *Ranunculus* plants. Sources of fines include; run-off from arable land, land (especially banks) trampled by livestock, sewage and industrial discharges.
*Water quality:	Biological class. Environment Protection's General Quality Assessment scheme. Assess every ? years.	'A'	
	Ecosystem Class. Environment Protection's General Quality Assessment scheme. Assess every ? years	'A'	
	Suspended solids	Annual mean <10mg L-1	
	Soluble Reactive Phosphorus	*Targets should be set in relation to river/reach types (and should be near background levels)* <0.02mg/l - upland watercourses <0.06mg/l mid-altitude watercourses on hard substrates	

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

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

Attribute	Targets	Method of Assessment	Comments
* Area of Oakwood	Maintain the extent of Oakwood at 138.7ha.	Visual estimate in 10x10m plots and 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 and 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	Estimate within the	

	maintained between 20 - 50%	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 *Luzula sylvatica*.	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: *L. sylvatica* 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)	Non–native invasive canopy species should be present in less	Visual estimate in 10x10m plots.	The canopy of the Oak woodland should be largely comprised of Oak trees. Non-native species are

(presence/absence)	than 20% of plots, but never frequent.		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. *Galium aparine, Urtica dioica, Heracleum spp, Epilobium spp. Rumex obtusifolius* No more than occasional is equivalent to less than 40% occurrence in recorded plots.	Visual estimate in 10x10m plots.	
* Cover of *Pteridium* (% cover)	The mean cover of *Pteridium* 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) (DAFOR)	There should be no felling or coppicing of native trees or shrubs.	Visual estimate in 10x10m plots and 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.

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:- *Vaccinium myrtillus,* *Blechnum spicant,* *Dicranum spp.,* *Luzula pilosa,* *Rhytidiadelphus loreus*	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:- *Sanicla europea,* *Geum urbanum,* *Polystichum setiferum,* *Aneomne nemorosa,* *Primula vulgaris.*	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:- *Carex remota,* *Ranunculus repens,* *Chrysosplenium oppositifolium,* *Filipendula ulmaria,* *Lysimachia nemorum.*	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.	

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

Feature 4 (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 data from other surveys or Ulster Museum, if available
	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	EP water quality scale	Water quality should be at least category A or B, according to EP guidelines, with no pollution incidents	Refer to Environment Protection 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 Agency for sample data if 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	Refer to data from Rivers Agency if

Attribute	Measure	Target	Notes
		attributable to increased abstraction.	available
Site integrity	Total area	No reduction or fragmentation of area	

SLIEVE BEAGH – MULLAGHFAD – LISNASKEA - SPECIAL PROTECTION AREA (SPA)

UK9020302

CONSERVATION OBJECTIVES

Document Details

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V1	28/03/2006	Internal working document	IE	
V1.1	August 2013	Review	IE	
V2.0	February 2015	Draft	IE	Complete review

Site relationship

To fully understand the site conservation requirements for this site it may be necessary to also refer to other site Conservation Objectives

This SPA overlaps with Slieve Beagh SAC

The SPA also includes the Slieve Beagh Ramsar site.

See also Boundary Rationale

The SPA is also close to, or adjoins, European designations in the Republic of Ireland. This is Slieve Beagh SPA.

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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, terrestrial/inter-tidal 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).

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.

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

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 GENERAL INFORMATION

COUNTY: Armagh/Fermanagh

G.R. H525 435
AREA: 8936ha.

5 SUMMARY SITE DESCRIPTION

The Slieve Beagh SPA comprises an area of land extending between Slatbeg in the north-east and Coolnasillagh in the south-west and incorporating the Slieve Beagh massif, Mullaghfad Forest and Lisnaskea Forest. Slightly more than half the south-eastern boundary is formed by the border with the Republic of Ireland. Habitat within the site is a mosaic of upland heath, blanket bog, commercial forestry and largely unimproved grassland.

5.1 BOUNDARY RATIONALE

The boundary determination process for the Slieve Beagh SPA has taken into account the distribution of Hen Harrier nesting attempts and site-fidelity over the past 15 years together with foraging distribution, habitat availability and current land-use.

All Hen Harrier nesting areas in the area used since 1997 are incorporated within the SPAs. In order to provide adequate foraging areas, the proposed boundary is based on a foraging radius of 2.5km around all confirmed and probable nest sites recorded in 1997, 1998 and 2004.

While the model used to define the boundary has generally resulted in the SPA comprising mainly unenclosed moorland and forest, it has been necessary to include some (mainly unimproved) pastureland. Inclusion of all such lands is supported by field data on nesting and foraging areas. The boundary line is based, as far as is possible, on physical features that should allow straightforward demarcation on the ground.

It is important to note that the SPA area does not include all lands used by foraging Hen Harrier during the breeding season. Information simply doesn't exist to allow all foraging areas to be identified and foraging ranges of individual birds are known to exceed 10km (based on studies outside Northern Ireland). It is known that some degraded habitats (e.g. degraded heath and semi-improved acid grasslands) do hold higher densities of prey species (e.g. Meadow Pipit – based on studies in England). Such habitats will not necessarily have been included in the SPA, notably were they are beyond the foraging radii figure used in the boundary selection model described above.

6 SPA SELECTION FEATURES

Feature Type (i.e. habitat or species)	**Feature**	**Designation Population**	**Population at time of designation (ASSI)**	**Population at time of designation (SPA)**	**SPA Review population**
Species	Hen Harrier breeding population [a]	10 pairs[1]	n/a	10 pairs	10 pairs
Habitat[2]	Habitat extent				
Habitat[2]	Habitat quality[3]				

Table 1. List of SPA selection features.

[1] Designation population given as 2004 survey total

[2] Habitat is not a selection feature but is a factor and is more easily treated as if it were a feature.

[3] Habitat quality will be assessed in the context of component SACs and ASSIs

Notes on SPA features – may not be applicable to all SPAs

The above table lists all relevant qualifying species for this site. As the identification of SPA features has and continues to evolve, species may have different status but all should be considered in the context of any HRA process. Ultimately all SPAs will be renotified to formalise species features.

[a] – species cited in current SPA citation and listed on current N2K dataform

[b] – species selected post SPA designation through UK SPA Review 2001

[c] – species highlighted as additional qualifying features through the UK SPA Review 2015 or the UK marine SPA programmes.

6.1 ADDITIONAL ASSI SELECTION FEATURES

Feature Type (i.e. habitat, species or earth science)	Feature	Size/ extent/ pop[·]
See conservation objectives for Slieve Beagh ASSI/SAC and Lough Corry ASSI for ASSI feature details		

Table 2. List of ASSI features, additional to those that form all or part of SPA selection features.

7 CONSERVATION OBJECTIVES

The Conservation Objectives for this site are:

To maintain each feature in favourable condition.

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

8 SLIEVE BEAGH – MULLAGHFAD – LISNASKEA SPA CONDITION ASSESSMENT 2014

Species	1998	2004	2010	CSM	5 yr mean	% CSM	Status
Hen Harrier	8	10	16	8	16	200.00	Favourable

9 SPA SELECTION FEATURE OBJECTIVES

To maintain or enhance the population of the qualifying species
Fledging success sufficient to maintain or enhance population
To maintain or enhance the range of habitats utilised by the qualifying species
To ensure that the integrity of the site is maintained;
To ensure there is no significant disturbance of the species and
To ensure that the following are maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species

Feature	Component Objective
Hen Harrier breeding population	As above
Hen Harrier breeding population	Fledging success sufficient to maintain or enhance population

Table 3. List of SPA Selection Feature Component Objectives

9.1 ADDITIONAL ASSI SELECTION FEATURE OBJECTIVES

Feature	Component Objective
See SAC conservation objectives for Slieve Beagh ASSI/SAC and Lough Corry ASSI for ASSI feature details	

Table 4. List of Additional ASSI Selection Feature Objectives

10 MANAGEMENT CONSIDERATIONS

See also Views About Management for relevant ASSI

Owner/Occupier's – As of March 2006 there were a total of XXX landowners within the site boundary. Landowners include the Department of Agriculture and Rural Development (DARD) Forest Service and a number of private individuals. Grazing rights generally lie with the land, as do Turbary rights which account for approximately XX% of the total area of the site. Sporting rights have not been established within the site boundary.

Forest Service activities – Forest Service are a major landowner within the site. Their activities are a significant factor in relation to the Hen Harrier population. The main issues are summarized in Table 3. At the time of designation, the Hen Harrier population in the SPA (and in Northern Ireland) is increasing. This, together with the fact that Hen Harrier are mobile species typically changing nest locations in response to local conditions, indicates that these species show a degree of flexibility. It will be impossible to retain existing conditions at nest sites within afforested lands due to commercial tree rotations. The broad objective will be to ensure a balanced mix of woodland stages with the longer term objective of using appropriate wider habitat management actions that promote nesting within the open moorland.

Forest Service activities will be assessed against SPA objectives through consultation on the relevant 5-year forestry plans and an annual review of selected work programmes against the most recent information available on nest locations. The latter action will be undertaken in conjunction with RSPB.

More recent survey data suggests that the population at site and Northern Ireland levels has stabilized with anecdotal evidence the both populations are now showing signs of decline. This appears to be mainly due to further loss of semi-natural habitat suitable for nesting, notably extensive stands of tall heather.

Grouse management – Hen Harrier populations are often seen as a threat to Red Grouse management. At present such management is very localized in Northern Ireland and undertaken at a small scale. Future expansion of shoots may bring conflicts with the objectives for the SPA. Such conflict can be minimized through appropriate liaison and, if necessary, provision of food dumps to reduce levels of predation of grouse by Hen Harrier.

Windfarms – all upland areas are currently of interest to the windfarm industry. While this activity falls within the planning system, the pressure on the uplands is

sufficient to merit specific comment. There is no presumption within the UK against such developments in SPAs supporting raptor or other bird populations.

Such developments represent a potential threat through loss of foraging habitat, disturbance to nest and roosting sites, risk of collision and providing access to previously remote areas.

Careful consideration is requires at the planning stage with windfarm and turbine location having regard to Hen Harrier distribution. Research and monitoring needs have been set out under guidance to planning team NIEA.

There is no unequivocal evidence that raptors can or cannot co-exist with windfarm developments. Pre-development assessments need to recognize variability between sites (studies are not necessarily transferable) together with the long term changes in breeding population populations (assessment may be undertaken at a low point) and historical changes in nest distribution within sites.

11. MAIN THREATS, PRESSURES, ACTIVITES WITH IMPACTS ON THE SITE OR SITE FEATURES

Site/feature management issues

Issue	Threat/comments	Local considerations	Action
Habitat extent and quality – natural and semi-natural habitat	Reduction of habitat area or quality through inappropriate use or absence of site management including reclamation for agricultural purposes..	Parts of site are SACs and ASSIs so management will seek to achieve appropriate vegetation community structure. Evidence suggests Hen Harrier favour managed forest within the site for nesting. Habitat management objective should be to encourage nesting in natural and semi-natural habitats	Assess needs of breeding species. Liaise with owner or appropriate authority to adjust or introduce site management if necessary.
Forestry areas – habitat	In general an expansion of forest represents a loss of foraging habitat. Objective should be to prevent loss of foraging habitat through expansion of forestry. Mixed stands of forest are however of value for nest selection and in providing some foraging. Existing rotation policy appears to offer good balance between areas supporting felled, young and old plantation.	Existing guidance should prevent any planting on peatland. Marginal semi-improved grasslands may come under threat from afforestation Balance of forestry management actions should be assessed against the site as a whole.	Liaise with Forest Service and private forestry sector.
Forestry areas – nest sites -	Forestry activities should be compatible	The importance of forested areas for nesting birds cannot	Liaise with Forest Service, private forestry sector, RSPB

Issue	Threat/comments	Local considerations	Action
forest management	with needs of breeding birds.	be underestimated. Existing forest practise should ensure management does not interfere with birds through the critical breeding period. To be informed by nest location data.	and other groups/individuals with information on nest sites.
Forestry areas – nest sites - disturbance	Disturbance to nesting birds through non-forestry activities on forestry property. Apart from disturbance of birds themselves, breeding birds, especially are vulnerable to disturbance as absence of adults can often result in predation or chilling of young with a reduction/loss in fledging success.	Selection of routes e.g. for public access or motorcar trials must take the needs of breeding birds into account.	Liaise with Forest Service, private forestry sector, local authorities and other relevant parties.
Predation.	Mainly of concern on bird breeding sites.	Thought to be a significant factor in determining Hen Harrier breeding success.	Must be dealt with as part of wider countryside management considerations. Carry out appropriate site management.
Research activities.	Census and ringing activities especially have the potential to impact on bird populations, particularly at breeding sites. These are however necessary for population monitoring and developing a better understanding of species ecology.	Assessed as part of regular programme of raptor monitoring.	Census and ringing activities to be undertaken by competent individuals, appropriately trained. In case of ringers, appropriate license must be held.

Table 5. List of site/feature management issues

12. MONITORING

Monitoring of our Special Protection Areas takes place at a number of levels, using a variety of methods. Methods for both Site Integrity Monitoring and Condition Assessment can be found in the Monitoring Handbook.

In addition, detailed quality monitoring or verification monitoring may be carried out from time to time to check whether condition assessment is adequate to detect long-term changes that could affect the site. This type of quality monitoring may involve assessment of aerial photographs to determine site morphological changes. Methodology for this is being developed.

12.1 MONITORING SUMMARY

1. Monitor the integrity of the site (Site Integrity Monitoring or SIM) – to monitor major changes in landuse within the site and identify relevant processes of change e.g. changes in grazing regimes, peat cutting. This SIM should be carried out once per year. Note that Forest Service will routinely review all relevant forestry

programmes with NIEA. state forestry activities need not be included in the SIM exercise.

2. Monitor the condition of the site (Condition Assessment) - Monitor the key attributes for each selection feature (species, assemblage, habitat, etc). This will detect if the features are in favourable condition or not. See Annex I for SPA 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 appropriate assessment that may be needed. It should be noted that appropriate assessments are a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

12.2 ADDITIONAL MONITORING ACTIONS UNDERTAKEN FOR SITES IN UNFAVOURABLE CONDITION

Monitoring actions set out in section 6 and Annex 1 will use, amongst other attributes, bird population data to determine site condition. In the event of a significant population decline being detected, a series of subsequent actions will be initiated. The following list is not exhaustive, actions will be site dependant, but the order of these points IS hierarchical i.e. consider point 1, then 2, etc.

1. Assess the site population in a wider geographical context – Northern Ireland, Ireland, UK, Europe. Liaise with other competent bodies to meaningfully assess wider pattern. No site action if site decline mirrors regional pattern the cause of which is not related to the site. Action may be required at regional or larger scale. If the cause of the regional population decline is found at the site then action may be necessary, but this may need to form part of a network of strategic species action. Further research may be required.
2. Assess the site population in a wider geographical context – Northern Ireland, Ireland, UK, Europe, world. Determine if site losses are balanced by gains elsewhere. Review site condition to determine if losses are due to site deterioration. Determine if possible whether population has relocated within SPA series (national, biogeographical, European). Note that the reasons for such locational changes may not be readily identifiable. Further research may be required.
3. Consider whether breeding populations could be affected by unfavourable factors outside the breeding season.
4. Determine whether a major incident has affected the site e.g. toxic impact on prey items, predation event or geographical shift in available prey. Ability to respond to impacts may be limited.
5. Assess condition of principal site habitats e.g. vegetational composition and structure, change in habitat balance.
6. Assess prey availability. Issues to consider are both within site broad site management, and without site e.g. climatically driven factors.

7. Assess whether there have been any changes in any other site features or management practices (see Table 3) that may have affected populations of site selection features.
8. Long-term site value must be considered even when it is found to be in unfavourable condition for a number of reporting cycles. This is particularly important for sites where ongoing appropriate management may ultimately encourage re-establishment of a favourable population.

13. SELECTION FEATURE POPULATION TRENDS

A summary statement of site population trends, together with wider geographical trends. Date of completion is given as well as information sources used. Due to a lack of data site trends are generally limited to terms such as 'consistent increase/decline', 'variable with overall increase/decline', 'no discernable trend'. Other trends are also generally limited to terms such as 'consistent increase/decline', 'variable with overall increase/decline', 'no discernable trend'.

SPECIES	SITE TREND	NI TREND	IRISH TREND	UK TREND	COMMENTS
Hen Harrier (breeding)	Increase	Increase	Increase	Increase (2004 Hen Harrier Survey)	

ANNEX 1

Feature (SPA) – Breeding Hen Harrier

* = primary attribute. One failure among primary attribute = unfavourable condition
# = optional factors. These can be in unfavourable condition without the site being in unfavourable condition

Attribute	Measure	Targets	Comments
* Hen Harrier breeding population	Breeding pairs	No significant decrease in breeding population against national trends	Population surveyed at least once per reporting cycle.
# Hen Harrier fledging success	Fledgling success	On average >1 fledgling per pair successfully raised.	Appropriate level of fledgling survival to be determined.

Non-Avian Factors – habitat

Attribute	Measure	Targets	Comments
* Habitat extent	Area of natural and semi-natural habitat	Maintain the area of natural and semi-natural habitats used or potentially usable by notified species, within the SPA, subject to natural processes.	Monitor once every reporting cycle by aerial photography.
# Habitat quality	To be assessed as part of SAC/ASSI monitoring		Evaluate habitat quality should bird populations decline due to on site factors. Map any changes in area. This may include mapping areas with different vegetation structures where this would lead to different usage by notified species.

SLIEVE BEAGH SAC
UK0016622

CONSERVATION OBJECTIVES

Document Details

Title	*Slieve Beagh SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
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Version	Date	Summary of Changes	Initials
V1.0	June 2013	Internal working document	PC
V2.0	Nov 2014	Complete review	RMK
V2.0	01/04/2015	Effective date of Version 2.0	PC
V2.1	11/10/2017	Removed wording '*excluding recently burnt areas*' from bare peat target in all relevant Annex tables	PMC

Site relationships

To fully understand the conservation requirements of this site, it is necessary to also refer to the Conservation Objectives for Slieve Beagh SPA.

Slieve Beagh SAC is contained within the larger Slieve Beagh SPA.

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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 Directive79/409/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, FERMANAGH

GRID REFERENCE: IH525445

AREA: 1900 ha

5. SUMMARY SITE DESCRIPTION

Slieve Beagh is an upland area lying approximately four miles south of Clogher in County Tyrone, with the southern most projection extending into County Fermanagh. The upland area also extends across the border into Co. Monaghan. Within Northern Ireland, the upland topography undulates to a maximum height of 380 m at Doocarn, but generally lies between 200 and 350 m. The blanket bog, which covers most of the area, is the third largest intact bog in Northern Ireland.

Peat depth is variable and consequently the peatland structure is highly diverse with hummock, lawn and pool complexes on the deepest peats grading into large expenses of blanketing peats on low gradients to heathland communities on the steepest and more exposed slopes. Typically, the peatland vegetation supports good *Sphagnum*-rich blanket bog vegetation with high dwarf-shrub cover. Several lakes, on site have characteristically un-enriched waters with some conforming to EU 'Habitats Directive' Annex I types.

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 boundary of Slieve Beagh was drawn to include all areas of intact peatland and associated semi-natural habitats, including cutover bog, wet and dry heath, acid flushes, flushed, wet and dry grassland, particularly along the streams that run through the area. A small area of woodland along the Corby Spink River, to the south of the peatland has also been included within the SAC boundary. It should be noted that although much of the peatland within the SAC has been modified to varying degrees, the semi-natural peatlands remain in comparatively good condition. Acidic grassland and large areas of degraded peatland were generally excluded.

The boundary around the entire SAC is defined as the edge of the high quality semi-natural blanket bog vegetation and associated habitats. However, in an upland environment, there are sometimes no clearly defined boundaries distinguishing high quality blanket bog vegetation from degraded and semi-improved habitats. Instead there is a gradual transition from good quality blanket bog vegetation to degraded and highly impacted peatland communities on the lower slopes. Therefore it may be quite difficult to find an appropriate physical boundary to mark the periphery of the interest features. Separation between areas included within the SAC boundary and those more degraded areas that are excluded depends upon the judgement of the surveyor. This was based on a variety of factors, such as *Sphagnum* moss cover, bare peat, and grass: dwarf-shrub ratio, frequency of dung and poaching, burning and drainage.

Much of the boundary of Slieve Beagh is demarcated by the upper extent of coniferous forests that are prevalent around much of the periphery of this upland area. The border between Northern Ireland and Co. Monaghan also forms a substantial portion of the boundary. The remaining boundaries follow a series of ditches, streams and fences to include the quality blanket bog and exclude severely degraded peatland vegetation and semi-improved lands. Although many of the boundaries are stock-proof fences, there are also numerous boundaries that although clearly apparent on the ground are not completely stock proof.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/extent/ population
Habitat	Active blanket bog	B	1112 ha
Habitat	Natural dystrophic lakes and pools	B	2> 4 ha lake, 2> 1 ha, 5< 1 ha total est. 15.3 ha
Habitat	European dry heaths	C	80 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 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 Slieve Beagh SAC.

6.1 ASSI SELECTION FEATURES

Slieve Beagh ASSI

Feature Type	Feature	Size/ extent/ population
Habitat	Blanket Bog	1112 ha
Habitat	Dystrophic Lakes	15.3 ha
Habitat	Dry Heath	80 ha
Species	Invertebrate 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 Blanket Bog
- Natural dystrophic lakes and pools
- European Dry Heaths

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.
Natural dystrophic lakes and pools	B	Maintain the open water area of ponds and lakes.
		Maintain the extent of pool complexes and the numbers of pools within.
		Maintain the lakes/ponds nutrients poor status and ensure it does not fluctuate outside normal limits.
		Characteristic aquatic vegetation to remain present.
		Minimal negative impacts from artificial structures.
		Minimal negative impacts from recreation.
		Identify the main areas of transition mires and quaking bog and describe and delineate them with more precision.

European dry heaths	C	Maintain the extent of existing European dry Heath vegetation.
		Maintain and enhance the quality of the European dry heath community types.
		Seek to expand the extent of the dry heath communities into degraded areas of species poor, dry acid grassland.
		Maintain the diversity and quality of other habitats of conservation interest, especially where these exhibit natural transition to the dry heath.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be the potential for dry heath rehabilitation.

9. ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Blanket Bog	See SAC Selection Feature Objective Requirements table.
Dystrophic Lakes	See SAC Selection Feature Objective Requirements table.
Dry Heath	See SAC Selection Feature Objective Requirements table.
Invertebrate Assemblage	To be finalised.

10. MANAGEMENT CONSIDERATIONS

Ownership

Slieve Beagh is a large site that is partly owned by Forest Service and partly in private ownership with more than 20 individuals owning various sections of the bog. An additional 65 or more individuals have turbary rights to cut peat for fuel within some of the management units and a number of individuals also have grazing rights over parts of the bog. Although Forest Service own approximately 600 ha., both grazing and turbary rights exist within their land ownership.

The current complexities of ownership, coupled with turbary, grazing and sporting rights makes a unified approach to site management more difficult.

Although the SAC is in multi-ownership, very little fencing had been carried out within the SAC boundary at the time of ASSI declaration. Therefore much of the land has been grazed in common. At the time of ASSI declaration in November 1994, there was evidence that grazing pressure by cattle was too high in places, particularly around the periphery with locally heavy poaching leading to degradation and erosion of the peatland surface.

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 Slieve Beagh, or could affect it in the future. Although Active Blanket Bog, Naturally Dystrophic Lakes and Pools and European Dry Heaths 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.

Peat Cutting.

There has been extensive peat cutting around the periphery of Slieve Beagh SAC in the recent past. Peat cutting by any method is a particularly damaging activity, including extrusion cutting which far from sparing surface vegetation, has very profound effects upon its ecology and hydrology. Just outside the SAC boundary to the north, there is an extensive area where peat has been extracted commercially. This operation has now been halted. Within the SAC, peat extraction has almost ceased although there are some localised areas where peat extraction by hand has been allowed to continue. There should be no peat cutting within the SAC.

ACTION: No peat cutting within the SAC.

Burning

Burning of the vegetation is evident in places right across the site, although whether this is an agricultural management practice or an incidental effect of turf cutting is often unknown. 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. Blanket bog should not be burnt. Dry heath may be burnt, but no more than once every 12-20 years, and not at all in areas where the gradient is > 25^{o} as this may result in erosion. Investigate the burning practice currently being carried out if possible and impress upon all landowners that burning the vegetation should not be carried out without prior authorisation from the Department. Burning of peatland should only be carried out under controlled conditions.

ACTION : No burning within the SAC

Drainage

There are a series of drains associated with many of the peat cuttings around the periphery of the SAC and many continue to carry water off the peat mass at an accelerated rate. All of these drains show up on the aerial photograph and are clearly apparent on the ground. Any major 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.

Grazing

The pattern and intensity of grazing, appears to be quite variable over much of the area. A large proportion of the blanket bog and heath communities retains a good cover of dwarf-shrub species and appears to be stocked at a reasonable level. Other areas however, particularly blanket bog communities, have suffered severe damage from poaching and overgrazing by cattle. Ideally, cattle should not be permitted on blanket bog because of the trampling damage caused. Shepherding is possibly one of the problems in the area. Because of the large extent of individual management units, the cattle tend to congregate and stay in a particular area. This causes localised overgrazing while much of the remaining blanket bog vegetation within the unit remains largely ungrazed.

ACTION: Where they are present, fences around the periphery of the SAC should be maintained to prevent cattle from outside the area straying into the SAC. Current management units should be identified and grazing levels should be established. If possible, cattle grazing on the blanket bog should be stopped. However, this may not be achievable in the short term. Where it occurs, overgrazing and poaching should be addressed by setting more appropriate grazing levels, excluding all grazing in the winter months between November and February inclusive and active shepherding of stock onto the drier heathland communities.

Supplementary stock feeding

Supplementary feeding causes localised overgrazing and poaching damage.

ACTION: Supplementary feeding should be avoided. If this not an option, it should be confined to less sensitive areas, whilst avoiding areas such as denuded slopes and pockets of deeper level peat which are vulnerable to wind

and gully erosion.

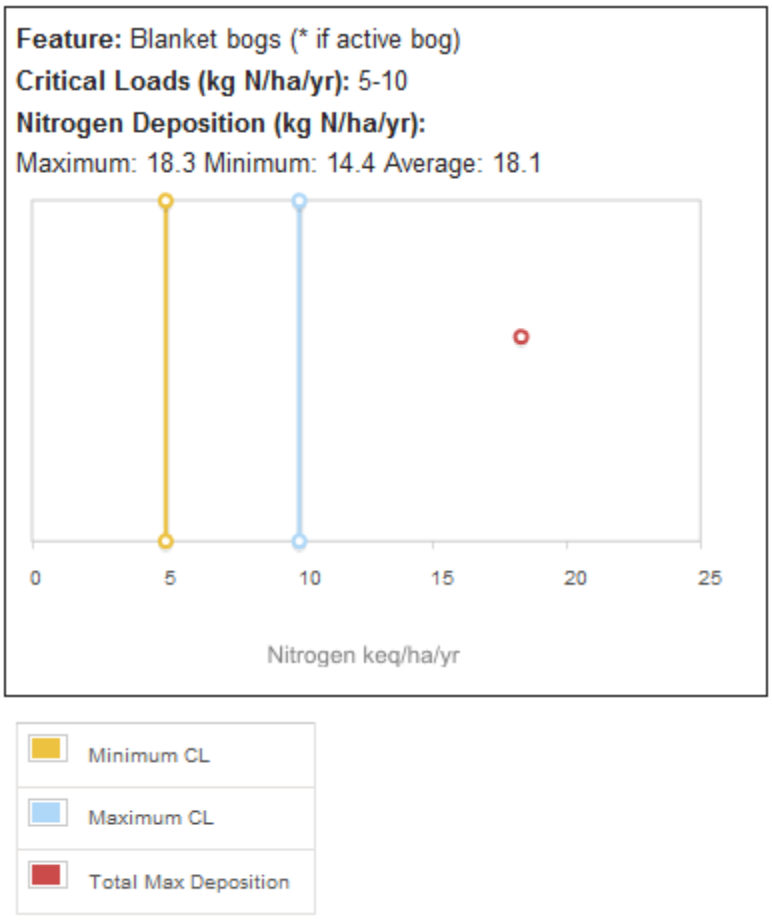
Afforestation

Preparation for afforestation involves disturbing the surface by draining, ploughing, or mounding. Establishment of the trees involves fertilisation, pest control and often liming. A successfully established plantation will shade the peat surface and intercept airborne pollutants. Peatland that has been subject to these operations has little potential to recover after harvesting. Forests surround Slieve Beagh SAC to the north, south and west.

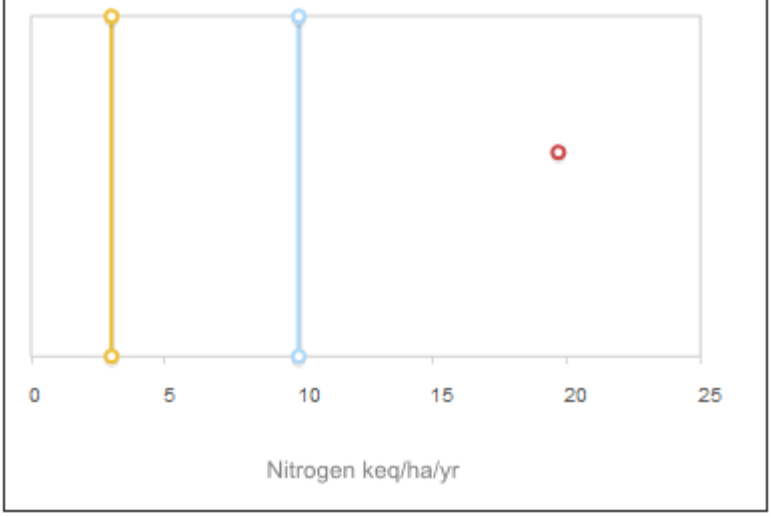
ACTION: Ensure there is no further afforestation of peatland within or on the periphery of the site. Liaise with the Forest Service to ensure their operations such as, drainage, wind blown fertiliser and lime etc, does not adversely affect the peatlands conservation interest.

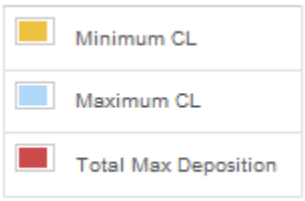
Nitrogen Deposition

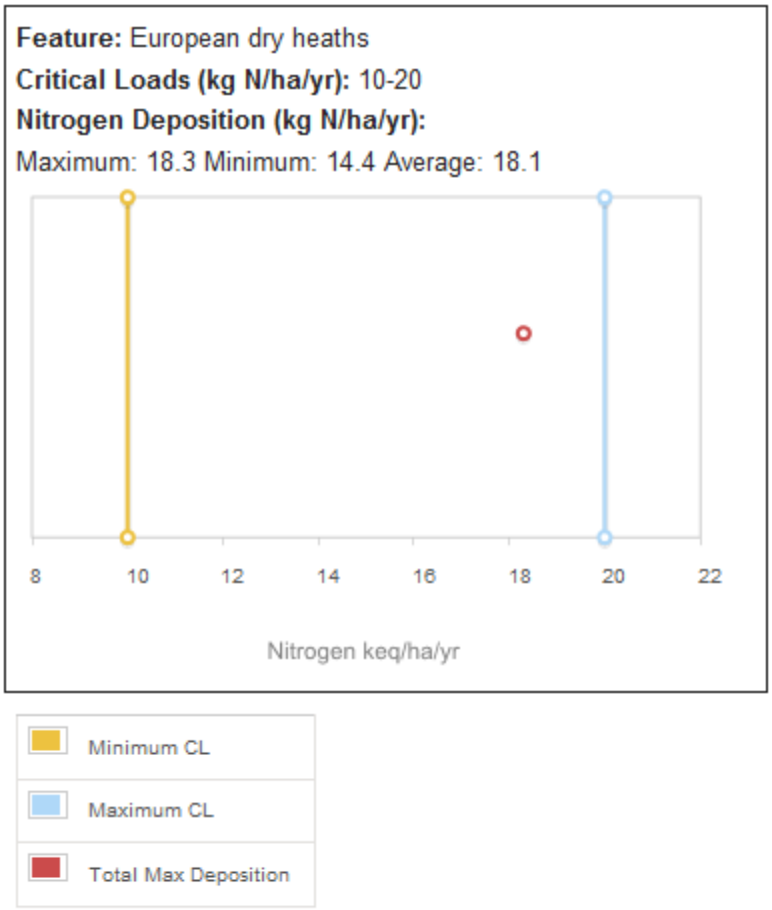
Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the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



Feature: Natural dystrophic lakes and ponds
Critical Loads (kg N/ha/yr): 3-10
Nitrogen Deposition (kg N/ha/yr):
Maximum: 19.7 Minimum: 15.8 Average: 19.1







(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.

Damaging recreational activities

Recreational activities such as the use of four-wheel drive vehicles can cause localised vegetation loss, that can cause significant erosion, particularly on vulnerable sloping areas.

ACTION: Ensure the restriction of damaging recreational activities such as the use of four-wheeled drive vehicles.

Fly-tipping

There are some very localised incidences of fly-tipping around the periphery of the site, situated in areas of past peat cutting.

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

Dumping/spreading of Alum sludge

The dumping of aluminium-based flocculent sludge (gibbsite) from Northern Ireland Water reservoir operations takes place annually onto Forest Service lands.

The waste does not contain plant nutrients in a significant quantity, but the habitat loss or stress at the spreading area is compounded by sludge accumulation in aquatic systems and the introduction of labile aluminium into the aquatic environment especially at low pH when the concentrations can reach toxic levels.

ACTION: The long-term objective will be to halt the spreading of sludge onto peatland communities adjacent to tracks within Forest Service ownership. Negotiations with Northern Ireland Water should be initiated to try to decide on a suitable alternative.

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 1112 ha. The blanket bog communities include M17 – *Scirpus cespitosus Eriophorum vaginatum* blanket mire, M18 – *Sphagnum papillosum* raised and blanket mire and M19 *Calluna vulgaris - Eriophorum vaginatum* blanket mire.	Visual estimate in 2x2 m plots and across the blanket bog using a combination of aerial photographs, SIM and Condition Assessment structured walk.	The blanket bog communities include M17 – *Scirpus cespitosus Eriophorum vaginatum* blanket mire, M18 – *Sphagnum papillosum* raised and blanket mire and M19 *Calluna vulgaris - Eriophorum vaginatum* 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.	The extent of pool and hummock systems should be	The extent of pool and hummock systems should be monitored using a combination of aerial photographs and Condition Assessment.

	Differentiation of *Sphagnum* species should be recorded with *S. cuspidatum* or *S. auriculatum* in the pools and *S. papillosum* and *S. capillifolium* forming the lawns and hummocks.	monitored using a 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 *Polytrichum* spp., *Campylopus* 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.
* *Sphagnum* cover/ abundance (% cover and frequency) Active Peat Formation (DAFOR)	*Sphagnum* 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	Visual estimate in 2x2 m plots.	A constant *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to measure the hydrological integrity of the blanket bog surface.

	be at least occasional. Species present should include a mixture of both thin species: - *S. capillifolium* and *S. tenellum* and the thick hummock forming species*:* - *S. papillosum* and *S. magellanicum* 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 *Narthecium ossifragum* or *Sphagnum* spp. are abundant and forming lawns.	Visual estimate in 2x2 m plots.	Ericoid (dwarf-shrub species) include *Calluna vulgaris*, *Erica tetralix*, *E. cinerea*, *Myrica gale*, *Vaccinium myrtillis and Empetrum nigrum*.
* 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 *Calluna vulgaris* 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 (DAFOR)	Scrub/tree encroachment should be no more than rare on the intact bog surface, or in the actively regenerating cutover areas.	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 *Rhododendron ponticum* 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 *Molinia caerulea* forming even swards over waterlogged areas with *Sphagnum* moss cover greater than 25%.	Visual estimate in 2x2 m plots.	Include true grasses, sedges, and rushes in this assessment. *Eriophorum vaginatum*, *Trichophorum cespitosum*, *Deschampsia flexuosa*, *Juncus squarrosus* or other graminoids (except *Molinia* 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	Visual estimate in 2x2 m plots.	The frequency of droppings, the extent of poaching and the presence of grazing induced *Calluna vulgaris*

	should occupy less than 5% of the blanket bog vegetation within any grazing unit.		growth forms indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.
Molinia caerulea Cover (%)	Where *Molinia caerulea* cover is greater than 50%, it should form an even (not tussocky) sward in waterlogged conditions with *Sphagnum* moss cover greater than 25%.	Visual estimate in 2x2 m plots.	*Molinia caerulea* 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.	*Sphagnum imbricatum* and *Sphagnum fuscum*, 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

Feature 2 (SAC) – Natural dystrophic lakes and pools (Status B)

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

Attributes	Measure	Target	Comment
Extent	Assessment against baseline map. Aerial photographs may be used.	No loss of extent of standing water	This attribute is to assess changes caused by active management, such as infilling or channel diversion. Changes due to drying out or successional change are covered under other attributes.
***Composition of macrophyte community**	Characteristic species composition	i). No loss of characteristic species present at the site (see Box 5)	In the UK dystrophic lakes are widespread in the north west and scarce in the south. These systems most often occur on blanket bog and may include isolated seasonal pools, random collections of irregularly shaped waters and ordered linear or concentric arrays of pools and small lochs. Dystrophic pools may also be found on raised bogs situated mainly on plains and valley bottoms. The water usually has a high humic acid content and is usually stained brown through exposure to peat. Some dystrophic lakes are completely devoid of all macrophytes, while others may be completely dominated by bryophytes. This does not necessarily indicate unfavourable condition. With increasing diversity the characteristic species are usually *Drepanocladus fluitans* and/or *Juncus bulbosus* as submerged macrophytes, with *Sphagnum* communities present around the edge or in the littoral zone. *Menyanthes trifoliata, Potamogeton polygonifolius* and *Nymphaea alba* may also be present and at richer sites, *Utricularia minor* and *Nuphar lutea.*

Attributes	Measure	Target	Comment
			There may be valid reasons why a characteristic species is not present at a site (such as biogeographic range or isolation from source populations) which need to be considered when applying targets to an individual site. As this interest feature covers a floristic range it is essential to establish which community type represents the feature for the site in question. If algal growth is excessive, check for inputs of point or diffuse sources of pollution. If mire communities surround the site, the mire vegetation will turn green in the presence of fertilisers. Increased growth of *Sphagnum* may indicate the occurrence of artificial acidification. Turbid water conditions can also give blue-green algae a competitive advantage in the phytoplankton, where artificial nutrient enrichment is taking place. *Juncus bulbosus* var. *fluitans* can naturally grow as the dominant plant i.e. > 40% cover in depths up to 1.75 m, and is not necessarily an indicator of a site in unfavourable condition.
	Negative indicator species	Non-native species should be absent or present at low frequency	Introduced species should be identified. A number of non-natives have such invasive potential that they should be assessed separately. Species of particular concern are: *Crassula helmsii*, *Hydrocotyle ranunculoide*s, *Myriophyllum aquaticum* and *Azolla filiculoide*s. If any of these species are present, a water body should be considered as being in unfavourable condition. This list is not exhaustive and should be updated as new threats become apparent. Colonisation since the previous field visit by *Elodea nuttallii* or

Attributes	Measure	Target	Comment
			Elodea canadensis at >5% frequency is indicative of unfavourable condition, as is dominance of naturalised non-native species, such as *E. canadensis*. Occurrence of such species, at >40% frequency in unproductive waters, is indicative of unfavourable condition. Excessive growths of filamentous algae on lake substrate or macrophytes are indicative of nutrient enrichment. Increased filamentous green algae may also indicate the occurrence of artificial acidification.
***Macrophyte community structure**	Distribution Extent Structure	Characteristic zones of vegetation should be present. Maximum depth distribution should be maintained. Maintain at least the present structure.	Zonation , depth distribution and structure will be site specific. Colonisation at depth may be limited by poor light penetration or unsuitable sediment type. Where present, well defined hydroseres should be maintained.
***Water quality**	Water Chemistry	Maintain dystrophic conditions The pH/ANC, and nutrient levels (P and N) should be stable and appropriate to the lake	As a guide Stable nutrient levels: TP target/limit: Dystrophic = 10 $\mu g\ L^{-1}$ Stable pH values: pH < 5.0 Adequate dissolved O_2 (>5 $\mu g\ L^{-1}$) Water should be acid and poor in available nutrients. It should be

Attributes	Measure	Target	Comment
		type Adequate dissolved oxygen levels for health of characteristic fauna. No excessive growth of cyanobacteria or green algae.	stained by dissolved humic material, and will usually be visibly brown. As there is a wide clinal range of community types embraced by this feature, the acceptable range of chemical conditions (especially total P, other P fractions, pH/ANC, and where appropriate NO_3-N,) should be set for individual SAC lakes, from recent or historical water chemistry data. Acceptable ranges of values for each variable should be established. Mean annual TP concentrations (based on at least quarterly measurements), or spring TP levels, should meet the targets appropriate for the lake type documented in the guidance, unless site-specific targets are available. If palaeolimnological techniques or hindcast modelling have been employed to reconstruct natural background TP concentrations for a particular lake these can be used to set targets, although it may be necessary to accept a small deviation from these background conditions. Alternatively, historical water chemistry data may exist for individual lakes. Where existing, site-specific TP concentrations are consistently lower than the standard appropriate for the habitat type, a lower target should be applied to prevent deterioration from current status. Phosphorus and nitrogen values can be very variable, P is often in excess and plant development is limited by unavailability of N in

Attributes	Measure	Target	Comment
			the peat. Check for changes in catchment land-use in catchment causing diffuse pollution and/or siltation and check point sources of pollution. Aerially applied agro-chemicals have a high potential to change plant communities, and move them out of favourable condition. Other methodologies involving trophic scoring can contribute to the assessment of favourable condition. As a guide, pH < 5.00. Note that where water column pH is 4.5 or less, alkalinity will be 0. Levels of dissolved oxygen should support the invertebrate and vertebrate taxa associated with this lake type. There should be no evidence of excessive blue-green or green algal blooms.
Hydrology	Hydrological regime	No deterioration in hydrological regime compared to the baseline.	Natural flushing rate and seasonal pattern of fluctuation need to be considered. Maintain flushing rate of system. Modifications of inflows and outlets (where present), the creation

Attributes	Measure	Target	Comment
			of outlets, or changes in hydrology from flood control regimes, abstraction, peat harvesting and gravel removal, can lead to unnatural changes in lake levels.
Lake substrate character	Shore line and substrate	Maintain the natural shoreline of the lake. Maintain natural and characteristic substrate for lake type.	Sediment quality and quantity when enriched can cause excessive growths of *Juncus bulbosus* var. *fluitans* or growths of algae.
Sediment	Sediment Load	Maintain natural sediment load	Increases in siltation could result from increased lake productivity, changes in catchment land-use (particularly over-grazing, peat harvesting), lake level fluctuations, climatic fluctuations or changes in sewage treatment.
Indicators of local distinctiveness	Maintain distinctive elements (e.g. rare plant or invertebrate species, habitat features) at current extent/levels and/or in current locations.		This attribute is intended to cover any site-specific aspects of this habitat feature (forming part of the reason for notification) which are not covered adequately by the previous attributes, or by separate guidance (e.g. for notified species features). For species of local distinctiveness, which are documented on citations, or for which records are held for individual lakes, references such as LACON (Palmer, in prep.) should be consulted for current lists of species rare in the constituent countries of GB, and in EA and SEPA areas. For "notable" species (e.g. nationally scarce plants), it is not intended that a target is set for detailed species monitoring. It is intended that a rapid indication of presence/absence and /or

Attributes	Measure	Target	Comment
			approximate extent should be provided. Allowing for natural fluctuations in population size. The same approach applies to "notable" habitats.

Aspects of environmental disturbance to be noted as an accompaniment to assessing condition: Natural dystrophic lakes and ponds

Objective	Specified assessment method (if appropriate)	Comment
No introduction of non-native plants		
Minimal negative impact from artificial structures		Artificial structures could include dams. Catchment area changes affecting the lake, such as land drainage and infrastructure schemes, should be considered.
No peat cutting within the vicinity of the water body		
Direct application of lime to the water column as an acidification amelioration strategy should not be carried out		Efforts should be directed towards reducing atmospheric emissions and implementing catchment management strategies, especially in relation to coniferous forestry

Box 5. Characteristic species of natural dystrophic lakes and ponds

Characteristic species	Associates
Utricularia spp.	*Sparganium angustifolium*
Sphagnum spp.	*Eleogiton fluitans*
Juncus bulbosus	*Drepanocladus spp.*
Nymphaea alba	
Menyanthes trifoliata	
Potamogeton polygonifolius	

ANNEX 1

Feature 3 (SAC) – European dry heaths (Status C)

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

Attributes	Targets	Method of Assessment	Comments
* Area of dry heath	Maintain the extent of dry heath at 80 ha. The dry heath communities include H10 - *Calluna vulgaris-Erica cinerea* and H12 - *Calluna vulgaris-Vaccinium myrtillus* heath. The extent and distribution of each community to be maintained.	Visual estimate in 2x2 m plots and across the dry heath using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Note that it may be possible to extend dry heath communities, provided this is into degraded areas and does not encroach into other habitats of scientific interest.
* Heath community diversity	Maintain the presence of the dry heath communities H7, H8, H10 etc. as established at base line survey.	Visual estimate in 2x2 m plots.	Repeat monitoring of plots using GPS should indicate whether dry heath communities have changed or been lost.
* Area of mosaic communities and associated semi-natural habitats	Maintain associated mosaic communities and semi-natural habitats.	Visual estimate in 2x2 m plots and across 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.

Dwarf-shrub height	Average ericoid height should be 15–35cm with at least 25% of the dry heath in the late mature/degenerate growth phase (greater than 35cm).	Visual estimate in 2x2 m plots.	On some areas of dry heath (especially on gentle slopes), the ericoid age structure will largely reflect recent burning patterns. However, in dry heath, burning should only be carried out occasionally under carefully controlled and monitored circumstances. A varied heather age structure is reflected in the height of heather.
* Bare peat, or ground covered by algal mats (% cover)	Bare peat etc. should occupy less than 2% of the dry heath surface overall.	Visual estimate in 2x2 m plots.	Bare peat (NOT exposed rock) or peat carpeted by *Polytrichum* spp., *Campylopus* spp. crust forming lichens or algal mats can occur as a consequence of constant burning and/or grazing. Bare peat here represents bare peat etc. within the dry vegetation rather than naturally eroded surfaces where exposed rock can form a natural part of the dry heath community.
* Ericaceous cover (% cover)	Dwarf-shrub cover should be greater than 75% over at least 75% of the dry heath community; and Mean dwarf-shrub cover should be greater than 75%	Visual estimate in 2x2 m plots.	
* Ericoid diversity	At least two species of dwarf-shrub at least present in 90% of plots.	Visual estimate in 2x2 m plots.	Ericoid (dwarf-shrub species) include *Calluna vulgaris*, *E. cinerea*, *Vaccinium myrtillis*, *Erica tetralix*, *Ulex gallii*, *Empetrum nigrum* and *Myrica gale*.
* Cover of *Ulex gallii* (% cover)	*Ulex gallii* cover should be less than 50% in plots within H8 stands.	Visual estimate in 2x2 m plots.	Mean percentage cover should be assessed for stands of H8 only – i.e. exclude plots in other heath communities from the calculations. Stands of H8 are generally restricted to the south-east of Northern Ireland.

* Cover of graminoids (% cover)	Total graminoid cover should be less than 33%.	Visual estimate in 2x2 m plots.	Include true grasses, sedges, and rushes in this assessment. *Nardus stricta, Deschampsia flexuosa*, *Juncus squarrosus* or other graminoids should not dominate over other species.
* Frequency and % cover of bryophytes and bushy lichens (esp *Cladonia* spp.) (DAFOR and % cover)	Bryophytes (excluding *Polytrichum* spp. and *Campylopus* spp. on bare ground) and/or Cladonia species should be at least frequent. At least frequent is equivalent to greater than 41% occurrence in recorded plots. Combined mean cover should be greater than 5%.	Visual estimate in 2x2 m plots.	Generally only bryophytes (mosses and liverworts) figure in this assessment, but occasionally bushy lichens can also be a prominent feature of the dry heath vegetation.
* Frequency and % cover of scrub/tree encroachment on dry heath communities (DAFOR and % cover)	Scrub/tree encroachment should be no more than occasional over the dry heath community. No more than occasional is equivalent to less than 40% occurrence in recoded plots. Mean cover should be less than 5%.	Visual estimate within a 10 m radius of plots and across the feature using a combination of aerial photographs and Condition Assessment structured walk.	Scrub encroachment should be checked using a combination of aerial photographs and Condition Assessment. Include invasive alien species in addition to *Betula pubescens, Prunus spinosa, Rubus* spp. Invasive exotic species such as *Rhododendron ponticum* should be removed immediately. Exclude *Ulex europaeus* (see below)

* Cover of Gorse *Ulex europaeus* (% cover)	Gorse (*Ulex europaeus)* cover should be less than 5%. During repeat surveys, Gorse cover should not exceed that of the baseline survey.	Visual estimate in 2x2 m plots and across the feature using a combination of aerial photographs and Condition Assessment structured walk.	Although a natural component of heath communities, Gorse can become invasive under both low and high grazing pressures. It is important to assess whether the relative quantities present in the site are increasing.
* Cover of Bracken (*Pteridium aquilinum*) encroachment (% cover)	Bracken cover less than 10% in dense canopy. During repeat surveys, Bracken cover should not exceed that of the baseline survey.	Visual estimate in 2x2 m plots and across the feature using a combination of aerial photographs and Condition Assessment structured walk.	Although a natural component of heath communities, Bracken can become invasive under both low and high grazing pressures. It is important to assess whether the relative quantities present in the site are increasing.
* Frequency and cover of undesirable agricultural grasses and weeds (DAFOR and % cover)	None of the following should be more than rare: *Cirsium arvense, C. vulgare, Senecio jacobaea, Urtica dioica, Plantago major, Phleum pratense, Trifolium repens, Holcus lanatus* and *Lolium perenne* No more than rare is equivalent to less than 20% occurrence in recorded plots. Combined mean cover of agricultural grasses and	Visual estimate in 2x2 m plot.	

	weeds less than 1%.		
* Management - Grazing (% cover)	Signs of moderate or heavy grazing should occupy less than 5% of the dry heath vegetation. The frequency of droppings, the extent of poaching, uprooting of dwarf shrubs and invasion by *Juncus squarrosus* etc. indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.	Visual estimate in 2x2 m plots.	
* Management - Burning (% cover)	Signs of recent burning should occupy less than 5% of the dry heath vegetation. Recent burning is represented by areas burnt within the last two years.	Visual estimate in 2x2 m plots and across feature using a combination of aerial photographs, SIM and Condition Assessment structured walk.	
Frequency and cover of erosion features associated with human impacts. (DAFOR and % cover)	No gully erosion or bare rock associated with more concentrated human impacts (ATV tracks or recreational activities). Man induced/enhanced erosion should occupy less than 2%	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 high mountain slopes. However, where natural erosion is exacerbated by human activity, mainly hill walking, the heath will not be in favourable condition, except where such erosion is very limited in nature.

	of the total area of dry heath other than very localised instances.		
Herb diversity	Herbs (excluding negative indicators) at least frequent. At least frequent is equivalent to greater than 41% occurrence in recorded plots.	Visual estimate in 2x2 m plots.	

Frequency -
1-20% = Rare
21-40% = Occasional
41- 60% = Frequent
> 60% = Constant

TEAL LOUGH SAC
UK0016608

CONSERVATION OBJECTIVES

Document Details

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V1.0	June 2013	Internal working document	PC
V2.0	Nov 2014	Complete review	RMK
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V2.1	11.10.2017	Removed wording '*excluding recently burnt areas*' from bare peat target in all relevant Annex tables	PMC

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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 Directive79/409/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 *Mylia 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 *Erica tetralix*	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 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 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.

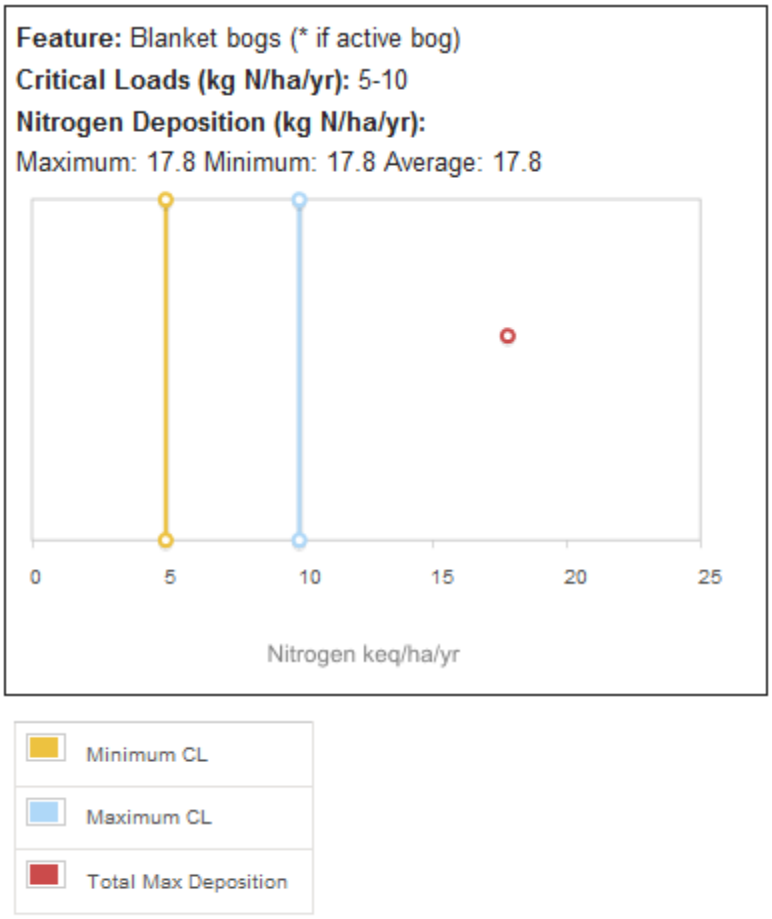
Afforestation

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 – *Scirpus cespitosus Eriophorum vaginatum* blanket mire, M18 – *Sphagnum papillosum* raised and blanket mire and M19 *Calluna vulgaris - Eriophorum vaginatum* blanket mire.	Visual estimate in 2x2 m plots and across the blanket bog using a combination of aerial photographs, SIM and Condition Assessment structured walk.	The blanket bog communities include M17 – *Scirpus cespitosus Eriophorum vaginatum* blanket mire, M18 – *Sphagnum papillosum* raised and blanket mire and M19 *Calluna vulgaris - Eriophorum vaginatum* 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 *Sphagnum*	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 *S. cuspidatum* or *S. auriculatum* in the pools and *S. papillosum* and *S. capillifolium* 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 *Polytrichum* spp., *Campylopus* 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.
* *Sphagnum* cover/ abundance (% cover and frequency) Active Peat Formation (DAFOR)	*Sphagnum* 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 *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to measure the hydrological integrity of the blanket bog surface.

	Species present should include a mixture of both thin species: - *S. capillifolium* and *S. tenellum* and the thick hummock forming species*:* - *S. papillosum* and *S. magellanicum* 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 *Narthecium ossifragum* or *Sphagnum* spp. are abundant and forming lawns.	Visual estimate in 2x2 m plots.	Ericoid (dwarf-shrub species) include *Calluna vulgaris*, *Erica tetralix*, *E. cinerea*, *Myrica gale*, *Vaccinium myrtillis and Empetrum nigrum*.
* 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 *Calluna vulgaris* 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.		*Rhododendron ponticum* 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 *Molinia caerulea* forming even swards over waterlogged areas with *Sphagnum* moss cover greater than 25%.	Visual estimate in 2x2 m plots.	Include true grasses, sedges, and rushes in this assessment. *Eriophorum vaginatum*, *Trichophorum cespitosum*, *Deschampsia flexuosa*, *Juncus squarrosus* or other graminoids (except *Molinia* 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 *Calluna vulgaris* growth forms indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.

Molinia caerulea Cover (%)	Where *Molinia caerulea* cover is greater than 50%, it should form an even (not tussocky) sward in waterlogged conditions with *Sphagnum* moss cover greater than 25%.	Visual estimate in 2x2 m plots.	*Molinia caerulea* 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.	*Sphagnum imbricatum* and *Sphagnum fuscum*, 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

TONNAGH BEG BOG SAC
UK0030325

CONSERVATION OBJECTIVES

Document Details

Title	*Tonnagh Beg Bog SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
Date Effective From	*01/04/2015*
Version Number	*V2*
Next Review Date	Nov 2020
Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	Nov 2014	Complete review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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

GRID REFERENCE: H413600

AREA: 55.6 ha

5. SUMMARY SITE DESCRIPTION

Tonnagh Beg Bog is among the best remaining examples of a lowland raised bog in the west of Northern Ireland. Typical of western bogs, the site is rather irregular in shape, with deep peat encircling a small drumlin of grassland on mineral soil.

The uncut surface has a well-developed microtopography, consisting of a pool complex interspersed by well-formed hummocks, wet lawns and a soakway. Despite some burning in the past, the surface has an extremely high *Sphagnum* moss cover and a notable *Sphagnum* moss hummock development.

The bog supports a very high frequency of the rare mosses, *Sphagnum imbricatum* and *S. fuscum*, which form well-developed hummocks over the wet surface. Cranberry *Vaccinium oxycoccus* is locally frequent, growing over the surface of the highest hummocks.

Hand cutting has been confined to the periphery of the site and around the central drumlin, leaving the majority of the bog intact. Recent burning has taken place over parts of the surface.

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 boundary of the area uses permanent man-made boundary features which are present all around the periphery. The boundary has been drawn to include all areas of intact lowland raised bog and associated semi-natural habitats, including cutover bog and birch scrub. The field in the centre of the bog has been excluded.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ population
Habitat	**Active raised bog**	**B**	**25.6 ha**
Habitat	Degraded raised bog still capable of regeneration	D	30 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 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 Tonnagh Beg Bog SAC.

6.1 ASSI SELECTION FEATURES

Tonnagh Beg Bog ASSI

Feature Type	Feature	Size/ extent/ population
Habitat	Lowland Raised Bog	55.6 ha

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

SAC 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

ASSI 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.

10. MANAGEMENT CONSIDERATIONS

Ownership
Tonnagh Beg Bog is owned by 12 owner/occupiers.

Adjoining Land Use
The land surrounding the area is intensively managed agricultural land in silage and grazing.

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 Tonnagh Beg 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 extensive hand cutting for many years around and through the centre of the bog. This has encroached significantly into the intact surface of the raised bog and split the intact area into two distinct blocks. Mechanical and hand cutting was ongoing on both the intact and cutover surface of the bog until declaration, with the majority of the cutting restricted to the western margin.
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 of bog vegetation tends 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 as many of the rarer and more prominent hummock-forming species (such as *S. imbricatum*) appear to be particularly susceptible to burning.
ACTION: No burning within the SAC.

Drainage
The dome remains largely intact but does have some active and occluded drains dissecting its surface, as does the cutover area. It is not thought that these are a current threat to the hydrological integrity of the area, but any water loss from the bog should be prevented, where feasible. 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 on the bog's hydrology.

ACTION: Block active drains where appropriate.

Grazing

Lowland raised bogs are not suitable for grazing, as the surface is fragile and easily damaged by poaching.

ACTION: Fences around the periphery of the bog should be maintained to prevent grazing occurring on the site.

Scrub Encroachment

Tree and scrub growth is limited to parts of the cutover bog. Further scrub encroachment into the actively regenerating cutover areas or onto the intact surface should be prevented.

ACTION: Monitor scrub encroachment and take remedial action if required. Remove any invasive exotic species, such as Rhododendron as a matter of urgency.

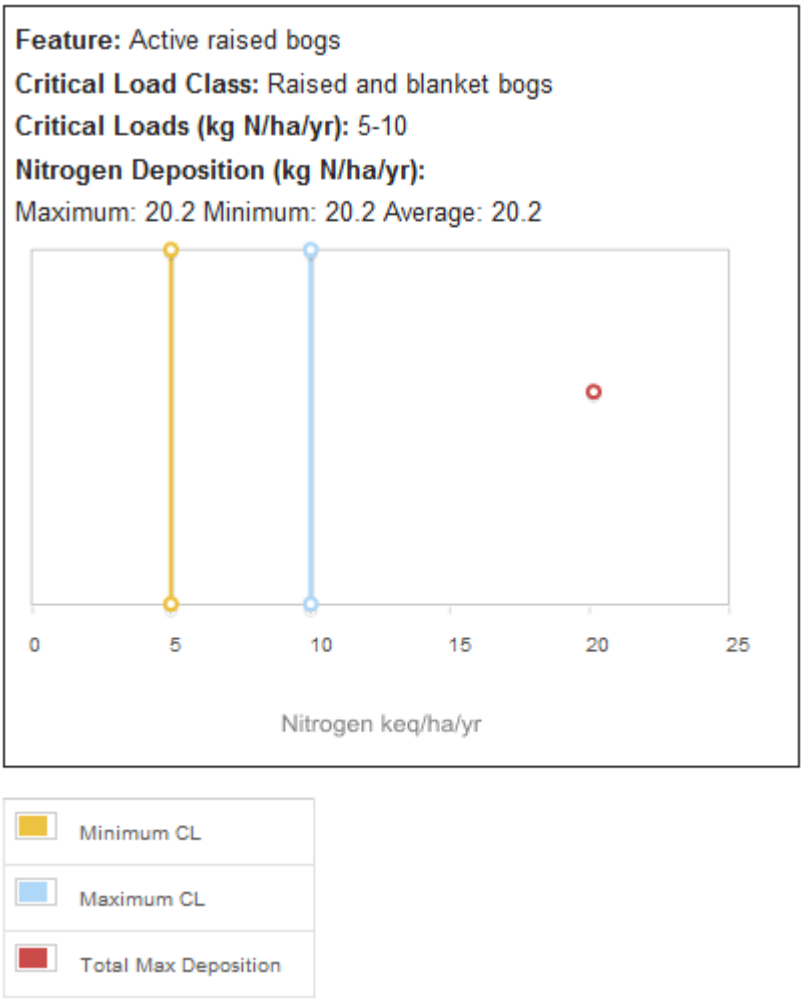
Fly-tipping

There were no incidents of fly-tipping or dumping recorded for the bog during the intial survey.

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

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 Tonnagh Beg 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.

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

- *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

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ANNEX I

Feature 1 SAC - Active raised bog

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

Attribute	Targets/Limits	Method of Assessment	Comments
Extent			
*Area of intact surface (ha)	Maintain the extent of intact bog surface at 25.6ha	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 *Erica tetralix-Sphagnum papillosum* raised and blanket mire community and M2, the *Sphagnum cuspidatum/recurvum* bog pool community dominated by *S. cuspidatum*.
*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 (bog woodland, fen, etc)	Visual estimate across the ASSI using a combination of aerial photographs, SIM and	Repeat monitoring using condition assessment, SIM, and aerial photographs should indicate whether

		Condition Assessment structured walk.	mosaics and associated habitats have changed or been lost.
Structure			
Dwarf-shrub height	Average ericoid height should be 15 – 35 cm.	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 10x10 m radius of the plot should be recorded. *S. cuspidatum* , *S. denticulatum S. magellanicum, Drosera, anglica, D. intermedia,* Menyanthes trifoliata.	Visual estimate within a 10x 10m radius of plots and 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.
Vegetation Composition – Positive Indicators			
**Sphagnum* Cover/Abundance (% cover and frequency)	Ombrotrophic *Sphagnum* moss species should have a minimum cover of 33% over at least 66% of the intact lowland raised bog surface.	Visual estimate in 2x2m plots.	A constant *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to

Active Peat Formation (DAFOR)	Thick, hummock forming species of sphagnum should be at least occasional.	Visual estimate in 2x2m plots.	measure the hydrological integrity of the intact bog surface.
*Ericaceous Cover (%) and frequency of *Erica tetralix* (DAFOR).	Ericoid cover should be maintained between 40% and 60% of the intact bog surface. *Erica tetralix* 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 *Calluna vulgaris* 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	
Vegetation Composition – Indicators of negative Change			
*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 10x10 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.
**Rhynchospora alba* Abundance (% cover)	*Rhynchospora alba* cover should be less than 10%.	Visual estimate in 2x2m plots	*Rhynchospora alba* 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.
**Myrica gale* Abundance (% cover)	*Myrica gale* 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.	Visual estimate in 2x2 m plots and 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.	Visual estimate in 2x2 m plots.	The frequency of droppings, the extent of poaching, uprooting of dwarf shrubs, invasion by *Juncus squarrosus* etc. and the presence of grazing induced *Calluna vulgaris* growth forms indicate moderate and heavy grazing.
Indicators of Local Distinctiveness			
* Presence of rare or scarce species specific to the site. *Sphagnum austinni* *Sphagnum fuscum*	Locally distinctive species recorded for the site should be at least present along the length of the Condition Assessment structured walk.	Name the species 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.

TULLY BOG SAC
UK0030326

CONSERVATION OBJECTIVES

Document Details

Title	*Tully Bog SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
Date Effective From	*01/04/2015*
Version Number	*V2*
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Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	Nov 2014	Complete review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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

GRID REFERENCE: H420755

AREA: 36 ha

5. SUMMARY SITE DESCRIPTION

Tully Bog is an isolated lowland raised bog lying in a shallow hollow within the former flood plain of the Lower Fairy Water River. The central intact dome is fairly well developed and supports a weak temporary pool system with a good hummock and hollow development on the bog plain.

There is a small raised drumlin in the centre of the bog, which is covered by a shallow layer of peat, where birch woodland has developed. Close to this, a linear pool with *S. cuspidatum* has formed in a deep, narrow fissure in the peat's surface. This may be the result of marginal cutting. *S. imbricatum* and *S. fuscum* are present.

Disturbance to the bog had been confined to cutting and occasional burning on both the intact core and cutover margins.

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 boundary uses permanent man-made features all around the periphery. The boundary has been drawn to include all areas of intact lowland raised bog and associated semi-natural habitats, including cutover bog and Birch scrub.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ population
Habitat	**Active raised bog**	**B**	**23.77 ha**
Habitat	Degraded raised bog still capable of regeneration	D	10.87 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 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 Tully Bog SAC.

6.1 ASSI SELECTION FEATURES

Tully Bog ASSI

Feature Type	Feature	Size/ extent/ population
Habitat	Lowland Raised Bog	36 ha

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/ASSI feature, there are a number of component objectives which are outlined in the tables 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 annexes.

8. SAC SELECTION FEATURE OBJECTIVE REQUIREMENTS

SAC 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

ASSI 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.

10. MANAGEMENT CONSIDERATIONS

Ownership
12 owners hold both mineral and sporting interests; DETI hold mineral interests and DARD hold sporting interests.

Adjoining Land Use
The land surrounding the site is intensively managed agricultural land in silage and grazing.

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 Tully 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 extensive hand cutting for many years around the periphery. Along the edge of the intact bog, the cut peat face is high in places, resulting in localised desiccation of the adjacent intact surface. Although the old hand cuttings now support either actively regenerating bog vegetation or birch wood, localised mechanised peat cutting has been carried out within the former in recent years at the northern end of the site. In one instance, mechanised cutting had encroached onto the intact surface of the bog. Peat cutting at the time of designation was not seen as problematical.
ACTION: No unauthorised peat cutting within the SAC.

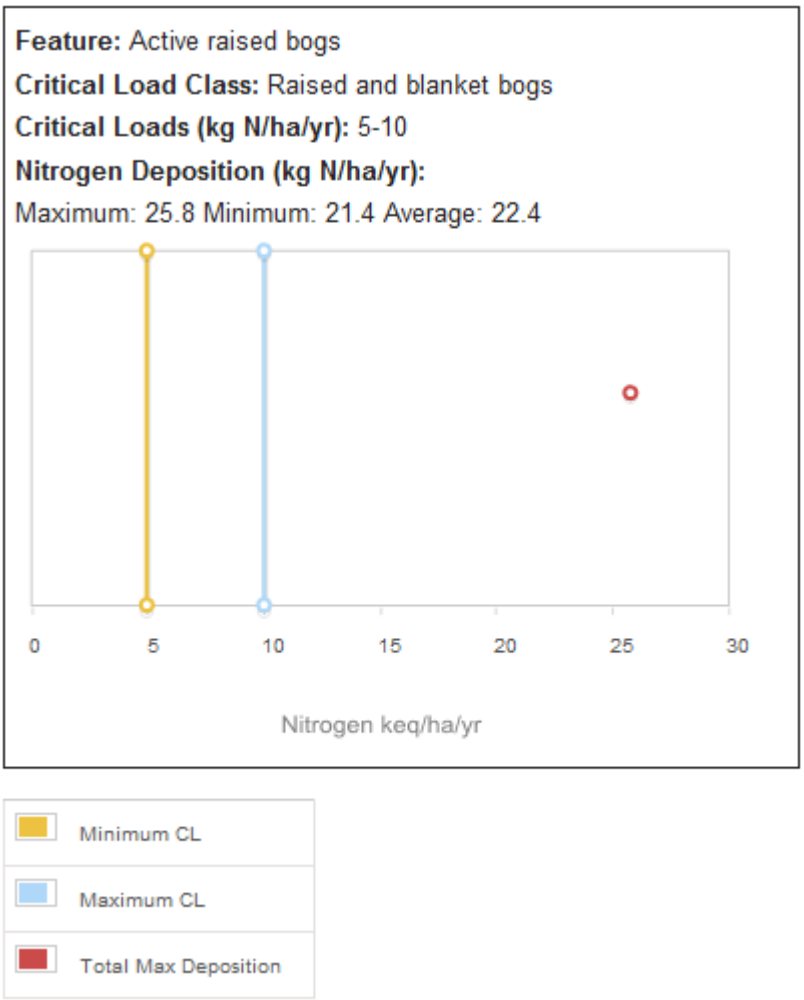
Burning
Burning of the vegetation has taken place occasionally. NIEA surveys reported some evidence of burning over most of the northern half; in a limited area the effect was described as severe. However, the most recent NIEA habitat survey concluded that the bog had recovered well. Excessive burning 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 as many of the rarer and more prominent hummock-forming species (such as *S. imbricatum*) appear to be particularly susceptible to burning.
ACTION: No burning within the SAC.

Drainage
The intact surface remains largely free of drains. However, there are a few old drains associated with the cuttings around the periphery. 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 on the bog's hydrology.
ACTION: Block active drains where appropriate.

Grazing
Lowland raised bogs are not suitable for grazing, as the surface is fragile and easily damaged by poaching.
ACTION: Fences around the periphery of the bog should be maintained to prevent grazing occurring on the site.

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 Tully 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.

Scrub Encroachment

Trees and scrub growth is extensive within the cutover bog extending right up to the periphery of the intact area in parts. In addition a localised stand of trees and shrubs is growing in the centre of the intact area due to the presence of mineral soil close to the surface here. Scattered birch scrub is extending out from this isolated stand onto the intact surface to the east. Scrub encroachment into the actively regenerating cutover areas, or onto the intact surface is undesirable and generally indicates drying out. Even where this is not the case, scrub can damage the bog vegetation through such factors as shading and leaf litter. In addition, tree roots may disrupt the hydrological function of the underlying acrotelm and catotelm, and act as nitrogen fixers (e.g. Birch), thus altering the chemical composition of the peat.

ACTION: Monitor scrub encroachment and take remedial action if required. Remove any invasive exotic species, such as Rhododendron as a matter of urgency.

Fly-tipping

There have been a few localised incidents of fly-tipping in the cutover area of the bog. A more serious problem occurs to the north of the bog where extensive infilling over a small area was carried out prior to designation. This infilling consists of hard-core infill which has now risen well above the surface of the bog. The dump was included within the site to prohibit further expansion. It has now been consented as a storage area as part of a Management Agreement.

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

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

- *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

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ANNEX 1

Feature 1
SAC Feature – Active raised bog

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

Attribute	Targets/Limits	Method of Assessment	Field Notes	Comments
Extent				
*Area of intact surface (ha)	Maintain the extent of intact bog surface (at 16.72 ha).	Visual estimate in 2x2 plots and across the intact raised bog using a combination of aerial photographs, SIM and Condition Assessment structured walk.	No loss of intact raised bog was observed during the condition assessment, but SIM and aerial photographs were not consulted.	Any loss of the current intact area is unacceptable. The active raised bog communities include M18 *Erica tetralix-Sphagnum papillosum* raised and blanket mire community and M2, the *Sphagnum cuspidatum/recurvum* bog pool community dominated by *S. cuspidatum*.

*Area of actively regenerating cutover bog (ha)	Maintain the current extent of actively regenerating cutover bog (7.05 ha). 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 (bog woodland, fen, etc)	Visual estimate across the ASSI using a combination of aerial photographs, SIM and Condition Assessment structured walk.	The condition of this attribute cannot be assessed until the next monitoring period.	Repeat monitoring using condition assessment, SIM, and aerial photographs should indicate whether mosaics and associated habitats have changed or been lost.
Structure				
Dwarf-shrub height	Average ericoid height should be 15 – 35 cm.	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. *S. cuspidatum* , *S. denticulatum S. magellanicum, Drosera, anglica, D. intermedia,* Menyanthes trifoliata.	Visual estimate within a 10m radius of plots and across the feature using a combination of aerial photographs and Condition Assessment structured walk.	The condition of this attribute cannot be assessed until the next monitoring period.	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. Tully Bog supports a weak temporary pool complex, but hummocks are well developed.

Vegetation Composition – Positive Indicators				
Sphagnum Cover/Abundance (% cover and frequency) Active Peat Formation (DAFOR)	Ombrotrophic *Sphagnum* 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.	Visual estimate in 2x2m plots. Visual estimate in 2x2m plots.	Species present should include a mixture of both thin species: - *S. capillifolium* and *S. tenellum* and the thick hummock forming species*:* - *S. papillosum* and *S. magellanicum* at least Occasional over the surface.	A constant *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to measure the hydrological integrity of the intact bog surface.
*Ericaceous Cover (%) and frequency of *Erica tetralix* (DAFOR).	Ericoid cover should be maintained between 40% and 60% of the intact bog surface. *Erica tetralix* 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 *Calluna vulgaris* 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		

Vegetation Composition – Indicators of negative Change				
*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.
**Rhynchospora alba* Abundance (% cover)	*Rhynchospora alba* cover should be less than 10%.	Visual estimate in 2x2m plots		*Rhynchospora alba* 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.
**Myrica gale* Abundance (% cover)	*Myrica gale* 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.	Visual estimate in 2x2 m plots and across the active bog surface using a combination of aerial photographs and Condition Assessment structured walk.	Recent burning is represented by areas burnt within the last two years.	
* 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.	Visual estimate in 2x2 m plots.		The frequency of droppings, the extent of poaching, uprooting of dwarf shrubs, invasion by *Juncus squarrosus* etc. and the presence of grazing induced *Calluna vulgaris* growth forms indicate moderate and heavy grazing.
Indicators of Local Distinctiveness				
* Presence of rare or scarce species specific to the site. *Sphagnum austinni* *Sphagnum fuscum*	Locally distinctive species recorded for the site should be at least present along the length of the Condition Assessment structured walk.	Name the species 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.

UPPER BALLINDERRY RIVER SAC
UK0030296

CONSERVATION OBJECTIVES

Document Details

Title	*Upper Ballinderry River SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
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V1	June 2013	Internal working document	PC
V2	January 2015	Complete review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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

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 it's 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 population 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 NIEA website (www.doeni.gov.uk/niea).

5.1 BOUNDARY RATIONALE

General

Selection of site boundaries is inconsistent throughout the proposed SAC River network with no standardised criteria currently in used. 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 guide lines 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 justifiability 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 where absent, and recognisable topographical or physical features such as break in bank top, slope, scrub or tree line were used.

6. SAC SELECTION FEATURES

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

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

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 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 Upper Ballinderry River SAC.

6.1 ASSI SELECTION FEATURES

Upper Ballinderry River ASSI

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 *Margaritifera margaritifera*	
Species	Otter *Lutra lutra*	

Table 2. List of ASSI features.

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 *Callitricho-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 *Margaritifera margartifera*	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.
		Insure host fish population is adequate for recruitment.
Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* 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 *Lutra lutra*	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 *Margaritifera margartifera*	See SAC Selection Feature Objective Requirements table.
Otter *Lutra lutra*	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 margartifera,* Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-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 that the effluent is adequately treated.

Water Extraction
The fish farm at Kildross Bridge (IH 765785) 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. Discharged water from the fish farm downstream of the weir near Kildross Bridge is likely to be having a significant impact on water quality (see above).

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 DARD Fisheries Division EP 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 down stream of the access points.

Live-stock 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 build up of debris and to discourage further fly-tipping.

Alien Species

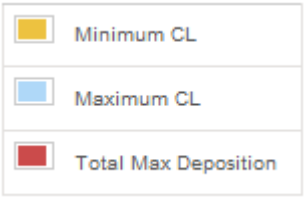
Giant Hogweed *Heracleum mantegazzianum* is present along the riverbanks in the lower reach of the river, close to Cookstown.

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

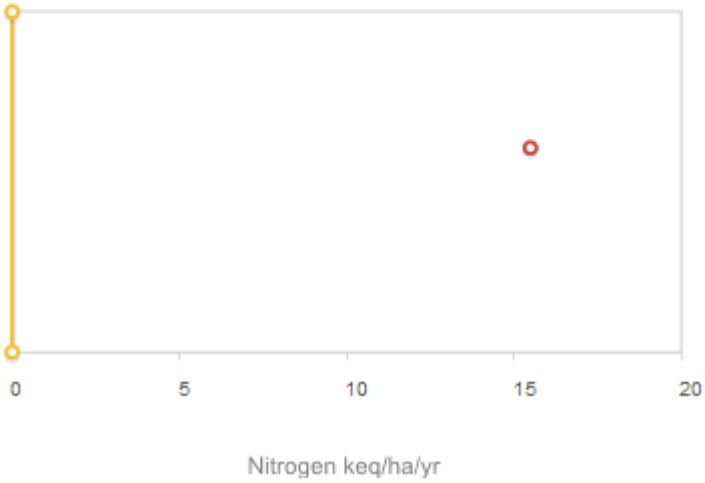
Nitrogen Deposition

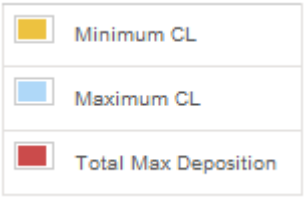
Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the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

Feature: Margaritifera margaritifera - Freshwater pearl mussel
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 15.5 Minimum: 10.6 Average: 12.9

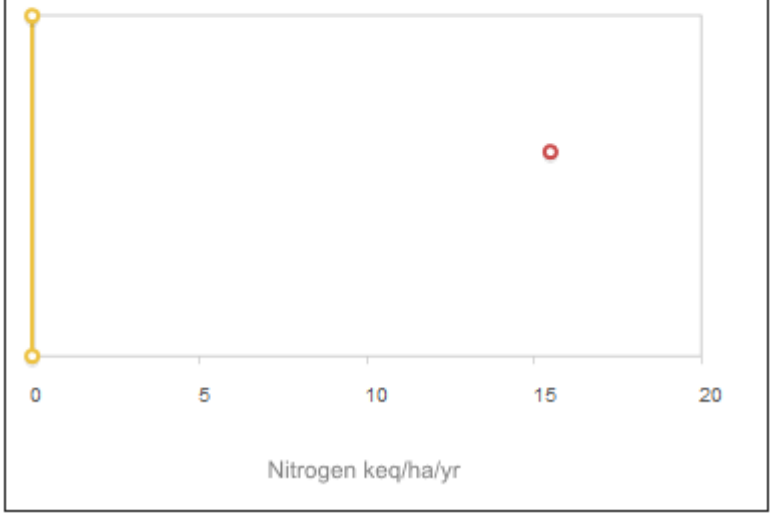


Feature: Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 15.5 Minimum: 10.6 Average: 12.9





Feature: Lutra lutra - Otter
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 15.5 Minimum: 10.6 Average: 12.9



(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. 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. 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.

12.1 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 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 <u>not by itself</u> 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 I

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

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

Attribute	Measure	Targets	Comments
*Population dynamics	Number	Stable or increasing	
	Age structure	20% of population <20 years old with aged individuals (>60 years) also present	A least-cost methodology for monitoring this attribute is being investigated, involving the sampling of representative reaches within an SAC. An abundant supply of 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 mussel 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.
	Maximum age	80-110 years	
	Mortality rate	No more than 10% of the population in 10 years	
	Fish host populations: Juvenile salmonid densities (0+ and 1+ year classes)	Should be abundant	

	Biological disturbance: Introductions	No stocking/translocation of pearl mussel unless agreed to be in the best interests of the population	Little work has been undertaken on pearl mussel genetics. However, given the sedentary nature of the pearl mussel, genetically discrete populations are likely.
		Absence of rainbow trout and brook trout and any other non-native species that may impair juvenile densities of salmon and brown/sea trout.	Rainbow trout and brook trout are resistant to glochidial infection and are, therefore, not suitable host species. Stocking of these species will create competition with native salmonids and is likely to reduce host opportunities for glochidia.
	Exploitation	No fishing for pearl mussels	
*Physical integrity	Disturbance of habitat	No disturbance of existing mussel beds by in-river activities	Relevant activities include fishing and watering stock (wading in the river) and canoeing (at access points to the river).
	River morphology	Maintain and where necessary restore to an extent characteristic of the river/reach	

	River Substrate	<10% fines in top 30cm of substrates hosting juvenile & adult mussels.	Elevated levels of fines can clog substrates used by juvenile mussels and can impair adult feeding/respiration. The target for salmon has been used for pearl mussels in the absence of species-specific information Sources of fines include; run-off from arable land, land (especially banks) trampled by livestock, sewage and industrial discharges.
*Water quantity	Flow	Flow regime should be characteristic of the river. As a guideline, at least 90% of the naturalised daily mean flow should remain in the river throughout the year	
*Water quality:	Biological class. Environment Protection's General Quality Assessment scheme. Assess every years.	'A' class	
	Ecosystem Class. Environment Protection's General Quality Assessment scheme. Assess every years	'A' class	
	Pollution	No Sheep dip	

	Minimal Algae cover	Should be <5% coverage over mussel beds and potentially suitable areas of coarse substrate	Extent of filamentous algal growth: Algal mats can impair respiration, feeding, fertilisation and the release of glochidia.
	Suspended solids	Annual mean <10mg L-1	

ANNEX 1

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

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

Attribute	Measure	Targets	Comments
*Population dynamics	Extent	Coverage should be characteristic of river type.	High cover of *Ranunculus spp* is not necessarily indicative of favourable condition.
	Reproduction *(only applies where control measures are implemented)*	*Ranunculus* should be able to flower and set seed, in suitable habitat.	Flowering outside the normal period and weed cutting or other activities that do not leave patches (at least 25% in every 100 metres of river) to flower and set seed are indicators of unfavourable condition. Use of herbicides should be avoided.
*Macrophyte assemblage	Composition	Characteristic plant species should dominate the assemblage. Indicators of unfavourable condition should be rare	The absence of *Ranunculus* and high frequency of occurrence of blanketweed and other algae, or dominance of *Potamogeton pectinatus* are signs of unfavourable condition.

Water quantity	Flow	Flow regime should be characteristic of the river. As a guideline, at least 90% of the naturalised daily mean flow should remain in the river throughout the year	
Physical integrity	River morphology	Maintain and where necessary restore [*to an extent characteristic of the river/reach*	
Physical integrity	River substrate	Channels should be dominated by clean gravels. Maximum fines content should not be too great to prevent the establishment of new plants.	Siltation of riverine sediments, caused by high particulate loads and/or reduced scour within the channel, is a major threat to interest features. Elevated fines levels can interfere with the establishment of *Ranunculus* plants. Sources of fines include; run-off from arable land, land (especially banks) trampled by livestock, sewage and industrial discharges.
*Water quality:	Biological class. Environment Protection's General Quality Assessment scheme. Assess every years.	'A' Class	
	Ecosystem Class. Environment Protection's General Quality Assessment scheme. Assess every years	'A' Class	

	Suspended solids	Annual mean <10mg L-1	
	Soluble Reactive Phosphorus	*Targets should be set in relation to river/reach types (and should be near background levels)* <0.02mg/l - upland watercourses <0.06mg/l mid-altitude watercourses on hard substrates	

ANNEX 1

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

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

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 data from other surveys or Ulster Museum, if available
	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	EP water quality scale	Water quality should be at least category A or B, according to EP guidelines, with no pollution incidents	Refer to Environment Protection 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 Agency for sample data if 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;	

Attribute	Measure	Target	Notes
		no significant development	
Flow rate	Mean annual flow rate	No reduction attributable to increased abstraction.	Refer to data from Rivers Agency if available
Site integrity	Total area	No reduction or fragmentation of area	

UPPER LOUGH ERNE SAC
UK0016614

CONSERVATION OBJECTIVES

Document Details

Title	*Upper Lough Erne SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
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V2	January 2015	Complete review	RMK

Site relationships

To fully understand the conservation requirements of this site, it is necessary to also refer to the Conservation Objectives for Upper Lough Erne SPA and Cladagh (Swanlinbar) River SAC.

Upper Lough Erne SAC boundary overlaps with the boundary for Upper Lough Erne SPA and adjoins Cladagh (Swanlinbar) River SAC.

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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: FERMANAGH

GRID REFERENCE: IH 330280

AREA: 5787ha

5. SUMMARY SITE DESCRIPTION

The open waters of the main lough and smaller satellite loughs contain a variety of aquatic communities typical of natural eutrophic lakes. In addition, the shallow sheltered shores support extensive swamp, fen and marsh communities. Behind the open grazed foreshore is species-rich grassland, which occasionally extends back into the old adjacent field systems. Alluvial woodland is found where the shoreline is ungrazed or only very lightly grazed, while occasionally the dryer soils of the drumlins behind support a natural Oak woodland; this is particularly well developed within the Crom Estate to the south and the small island to the north of the Lough. Such diversity of good habitats and communities is reflected in the very large number of rare and notable plants and insects flourishing here: the woods being particularly important for breeding passerines and home for some notable mammals.

The site regularly supports large numbers of over-wintering and breeding birds important in an all-Ireland context in addition to internationally important numbers of wintering Whooper Swan *Cygnus cygnus*, which has been recognised by its SPA designation.

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 boundary has been drawn to include the open water of the lough, its islands and adjacent semi-natural habitats such as woodland, species-rich grassland and natural transition vegetation such as scrub or heath. The SAC boundary includes the composite boundaries of 9 ASSIs; Mill Lough, Corraslough Point, Belleisle, Inishroosk, Trannish, Dernish Island, Crom, Killymackan Lough and Galloon. The site boundary utilised permanent man-made boundary features when ever possible, however along some stretches of the foreshore such boundaries were absent and recognisable topographical or physical features such as break in slopes, scrub line, etc were used. In exceptional cases when there was no recognisable feature on the ground, the Rivers Agency's ownership folio line was used.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ pop~
Habitat	Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation	A	3844.9ha*
Habitat	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	B	275ha
Habitat	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion alvae*)	B	130ha
Species	Otter *Lutra lutra*	B	
Habitat	Bog woodland	D	
Habitat	Alkaline fen	D	
Habitat	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinia caerulea*)	D	
Species	Atlantic salmon *Salmo salar*	D	

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 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 Upper Lough Erne SAC.

6.1 ASSI SELECTION FEATURES

Upper Lough Erne ASSI

Feature Type	Feature	Size/ extent/ pop~
Habitat	Eutrophic Standing Waters	3844.9 ha
Habitat	Oakwood	275 ha
Habitat	Wet Woodland	130 ha
Habitat	Fens	
Habitat	Purple Moor-grass & Rush Pasture	
Habitat	Reedbeds & Swamps	
Habitat	Wood Pasture & Parkland	
Habitat	Lowland Meadow	
Species	Otter *Lutra lutra*	
Species	Higher Plant Assemblage *Myriophyllum verticillatum* (1), *Potamogeton filiformis* (2), *P. pusillus* (2), *Zannichellia palustris* (1), *Ranunculus circinatus* (2), *Lemna polyrhiza* (2), *Lemna gibba* (2), *Hydrocharis morsus – ranae* (2), *Cicuta virosa* (2), *Sium latifolium* (2), *Butomus umbellatus* (1), *Lathyrus palustris* (5), *Stellaria palustris* (2), *Viola persicifolia* (5), *Eleocharis acicularis* (2), *Alisma Lanceolatum* (3), *Thelypteris palustris* (2), *Carex pseudocyperus* (3), *C. elongata* (5), *C. strigosa* (2), *Rhamnus cathartica* (1), *Scirpus sylvaticus* (2), *Neottia nudus – avis* (1), *Lathraea squamaria* (2), *Prunus padus* (2), *Equisetum hyemale* (2), *Sisyrinchium bermudiana* (3) and *Spiranthes romanzoffiana* (5)	ABCD score 66
Species	Internationally important over wintering waterfowl assemblage	
Species	Nationally important breeding wader assemblage	
Species	Invertebrate Asemblage - Notable water beetle, aquatic bug and dragonfly assemblages and 20 individual notable species: *Limnoporus rufoscutellatus, Micronecta powers, Saldula opacula, Xanthandrus comtus, Xylota abiens, Carabus clatratus, Pelophila borealis, Coelambus impressopunctatus, Noterus crassicornis, Hygrotus quinquelineatus, Dytiscus circumcinctus, Gyrinus natator G. distinctus, G. paykulli, Brachytron pratense, Drymonia ruficornis, Odontosia carmelita, Sesia bembeciformis, Quercusia quercus and*	

	Gonepteryx rhamni	
Species	Notable mammal assemblages including colonies of three bat species Daubenton's, Leisler's and Brown Long – eared Bat, and healthy populations of Pine Martin and Red Squirrel.	
Species	Fungi Assemblage	

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The ***Conservation Objective*** for this site is:

To maintain (or restore where appropriate) the

- ***Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation***
- ***Old sessile oak woods with Ilex and Blechnum in the British Isles***
- ***Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion alvae)***
- ***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	Global Status	Objective
Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation	A	Maintain and enhance water quality.
		Maintain a natural hydrological regime
		Maintain the extent of existing characteristic aquatic and emergent community types.
		Maintain and enhance species diversity within each community including populations of rare and endangered species.

		Maintain purity of the natural and characteristic species composition.
		Minimal sediment load
		Substrate should be natural & characteristic of lake type.
		Minimal environmental disturbance i.e. minimal negative impact from recreation and artificial structures and no fish farming
		Instigate cross border monitoring mechanism between the relevant authorities to monitor water quality.
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles.	B	Maintain and expand the extent of existing oak woodland but not at the expense of other SAC (ABC) features. (There are areas of degraded heath, wetland and damp grassland which have the potential to develop into oak woodland)
		Maintain and enhance Oak woodland species diversity including the presence of notable or rare species.
		Maintain and enhance Oak woodland structure
		Maintain the diversity and quality of habitats associated with the Oak woodland, e.g. fen meadow, grasslands, wet heath, wet woodland and scrub, especially where these exhibit natural transition to Oak woodland
		Seek nature conservation management over adjacent forested areas outside the SAC where there may be potential for woodland rehabilitation.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for woodland expansion.
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion alvae*)	B	Maintain and expand the extent of existing Alluvial forests but not at the expense of other SAC (ABC) features. (There are areas of wetland and damp grassland which have the potential to develop into Alluvial woodland)
		Maintain and enhance Alluvial forests species diversity including the presence of notable or rare species.

		Maintain and enhance Alluvial forests structure
		Maintain the diversity and quality of habitats associated with the Alluvial forests, e.g. fen meadow, grasslands, wet heath, wet woodland and scrub, especially where these exhibit natural transition to Alluvial forests
		Seek nature conservation management over adjacent forested areas outside the SAC where there may be potential for woodland rehabilitation.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for woodland expansion.
Otter *Lutra lutra*	B	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
Eutrophic Standing Waters	See SAC Selection Feature Objective Requirements table.
Oakwood	See SAC Selection Feature Objective Requirements table.
Wet Woodland	See SAC Selection Feature Objective Requirements table.
Inundation and wet grassland, species-rich grassland and fen meadow	Maintain and expand the extent of these existing semi-natural grassland but not at the expense of other SAC (ABC) features.
	Maintain and enhance species diversity.
	Maintain and enhance grassland structure
	Maintain the diversity and quality of habitats associated with these semi-natural grassland, e.g. fen, marsh, swamp, especially where these exhibit natural transition.

	Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for restoring these semi-natural grassland types.
Swamp, fen and marsh vegetation (*Alkaline fens are a component)*	Maintain and expand the extent of these existing vegetation types but not at the expense of other SAC (ABC) features.
	Maintain and enhance species diversity.
	Maintain and enhance structure
	Maintain the diversity and quality of habitats associated with these vegetation types, e.g. wet grassland, alluvial woodland, especially where these exhibit natural transition
	Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for restoring.
Parkland Woodland	Maintain the extent of the existing tree cover.
	Maintain and enhance lichen diversity.
Otter *Lutra lutra*	See SAC Selection Feature Objective Requirements table.
Higher Plant Assemblage	Map location of rare species scoring 3 or more
	Maintain abundance and distribution and if feasible enhance population.
	Establish the status of these species and if appropriate draw up further conservation priorities for this species.
Internationally important over wintering waterfowl	See SPA conservation objectives for this site
Nationally important breeding waders	Breeding numbers stable or increasing
	Chick mortality due to trampling by livestock to be minimised
	Disturbance of nesting pairs minimised
	A suitable nest site available for each summer resident pair of adult or sub-adult plovers.
Invertebrate Assemblage	To be finalised.
Mammal Assemblage	To be finalised.
Fungi Assemblage	To be finalised.

10. MANAGEMENT CONSIDERATIONS

Ownership

All the open water body and a narrow slice of the fringing foreshore of the lough is owned by DARD Rivers Agency. In total, there are 415 individuals or organisations with ownership or other rights associated with the site.
The greatest proportion of the semi-natural woodland is included within the Crom ASSI and is either managed by National Trust or NIEA, while the numerous smaller woodland units are privately owned. Significant proportions of the smaller woodland units are fenced under ESA agreement, but a large number are not.

Adjoining Land Use

Main adjoining landuse is one of semi-intensive farming including crop and silage production as well as stock grazing. Past management of the woods through planting and selective felling has partially altered the woodland's composition from their natural state, particularly in relation to tree composition. Due to the present policy of minimum interference the woodlands will revert to their natural state, which may be most evident by the replacement of Oak by Ash as the dominant tree component.

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 Lough Erne, or could affect it in the future.

Although ***Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation, Old sessile oak woods with Ilex and Blechnum in the British Isles, Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion alvae) 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.

Lake Impacts

Siltation

There is a tendency for naturally eutrophic lakes to silt up, both from sediment input through streams and rivers and from organic production. There may therefore be some loss of open water with time, though the rate should be relatively slow.

ACTION: Reduce the rate of catchment sedimentation by encouraging landowners to leave adequate vegetation buffer strips between ploughed fields and adjacent drains and streams that may drain into the lough.

Nutrient enrichment

The natural eutrophic status of the loughs is threatened by further eutrophication, as a result of increased nutrient loading from agricultural run-off (slurry, silage effluent and artificial fertilisers), discharge of effluent from pleasure boats, and general domestic sewage from shoreline housing and other developments, leading to deterioration of water quality. If the water becomes too nutrient-rich there may be a total loss of macrophytes and only blooms of algae present.

ACTION: Continued monitoring of water quality should identify increases in the eutrophic status of the lough. Current recommendations to reduce further eutrophication of the lough include the reduction of slurry spreading in high-risk areas; the provision of grants to farmers for improved storage of slurry, controls on agricultural pollution events, restrictions on the use of fertilisers and stricter controls on effluent disposal.

Changes in water level

The Electricity Supply Board in the Republic of Ireland controls the water level in Upper Lough Erne, as a requirement of the hydroelectric power station at Ballyshannon. High levels of discharge at Ballyshannon can significantly lower the level of the Lough. A set of sluices at Portora near Enniskillen can be lowered during times of low flow to maintain the water level in Upper Lough Erne. However, controls ensure the levels remain above the statutory minimum.

Both surface and groundwater's are abstracted for potable and non-potable use throughout Upper and Lower Lough Erne. Over-abstraction of water could have significant effects on both habitats and species alike.

ACTION: Through monitoring assess the possible impacts of water extraction, if any, on the conservation interest features.

Recreational Pressure

Although disturbance is minimal in most areas of Upper Lough Erne and the satellite loughs, it is possible that the popularity of this area for angling, camping and boating holidays will increase considerably.

ACTION: Monitor for any adverse impacts from increasing recreational pressure.

Alien Species

Only a few exotic plant species have been recorded for Upper Lough Erne, the most common being the Canadian Pondweed *Elodea canadensis*. This species although having a very high frequency of occurrence is not having a notable ecological impact.

Recent monitoring has indicated that Zebra Mussel (*Dressiness polymorpha*) is widespread and increasing in densities within Upper Lough Erne. Impacts on the ecology of Upper Lough Erne are difficult to predict. Zebra Mussels are able to attach to and form large colonies on any submerged hard surface. Fouling growths can swamp the spawning grounds of lake spawning salmonids and smother the shell of Swam Mussels. They are very effective filter feeders and can virtually strip the water column of zooplankton and phytoplankton leading to improved water clarity, although this does not result in a net loss of nutrients from the system. While water clarification may appear to be a benefit this may not always be the case. Mussel plankton grazing may (1) remove food from larval fish, (2) give sight feeding predatory fish an increased competitive edge over their prey, (3) shift the bulk of biological systems from pelagic to benthic systems associated with mussel beds, (4) clarify water to the point where algal populations change and where species formerly at a disadvantage are favoured and (5) increase macrophyte growth around lake margins (including nuisance carpeting growths of attached algae such as *Cladophora spp*.)

ACTION: Continue monitoring for any adverse impacts from alien species such as Zebra Mussels.

Woodland Impacts

Grazing/Poaching/Tree barking and Browsing

Free access to woodland by domestic stock, feral goats and deer is causing direct damage to the ground flora community by poaching and trampling, grazing, barking and browsing, so preventing natural regeneration. This suppression of regeneration will increasingly cause a detrimental change in the woodland structure and composition, with time.

Information on current grazing levels of domestic stock within privately owned woodland is not readily available. No information of the current population of goats or deer is available.

ACTION: Investigate the current activity relating to the practice of grazing woods by domestic stock. Reduce stocking pressure in woods to sustainable level or exclude stock by fencing off woodland under management agreement. Undertake census on the current population levels of feral goats and deer and if necessary, initiate control measures to reduce numbers to acceptable levels.

Woodland Clearance

There is some *ad hoc* removal of wood. Removal of woodland would lead to a reduction in diversity.

ACTION: Ensure there is no removal of woodland from the site.

Dead Wood Removal

Dead wood should be left *in situ* if safe or practical to do so. This provides valuable habitat for fungi, invertebrates etc. Removal of wood or fire-wood should be discouraged.

ACTION: Ensure there is no removal of dead wood from the site.

Invasion by exotics

Exotic species recorded for the wood include Sycamore *Acer pseudoplatanus* and occasional small areas of Indian Balsam *Impatiens glandulifera*, Rhododendron *Rhododendron ponticum*, Red Currant *Ribes rubrum*, Gooseberry *Ribes uva-crispa* and Snowberry *Symphoricarpos albus*. These are not posing a threat at present but they should be monitored and in the long-term removed.

ACTION: Monitor invasive /exotic species and control when necessary.

Dumping

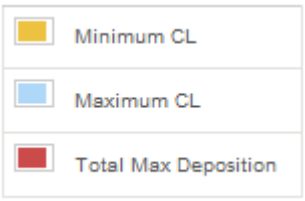
Fly tipping is not a major problem but does occur sporadically.

ACTION: Removal of dumped material from the woods when practical, to prevent the build-up of debris and to discourage further tipping. Fence off woodland adjacent to roads to discourage further tipping.

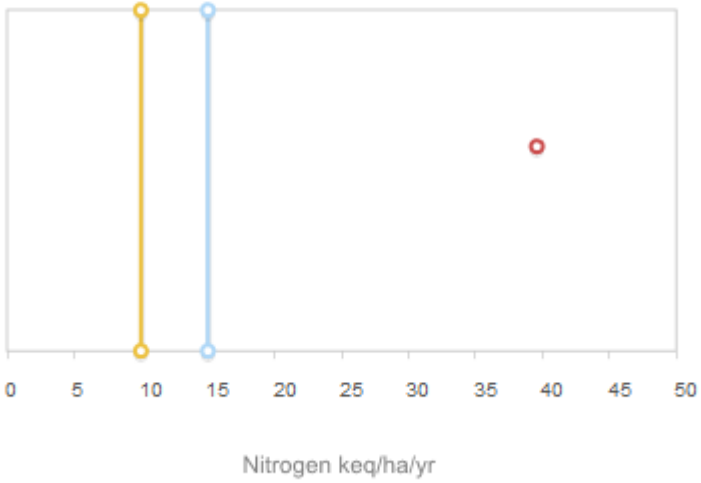
Nitrogen Deposition

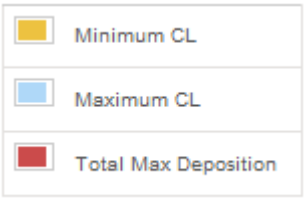
Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the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

Feature: Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 12 Minimum: 4.5 Average: 9.4

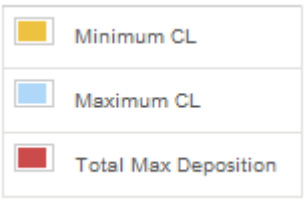


Feature: Old sessile oak woods with Ilex and Blechnum in the British Isles
Critical Load Class: Acidophilous Quercus-dominated woodland
Critical Loads (kg N/ha/yr): 10-15
Nitrogen Deposition (kg N/ha/yr):
Maximum: 39.6 Minimum: 19.6 Average: 24.3





Feature: Lutra lutra - Otter
Critical Load Class: No comparable habitat with established critical load estimate available
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 12 Minimum: 4.5 Average: 9.4



N.B. Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion alvae*) – Designated feature/feature habitat not sensitive to eutrophication.

(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. 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. 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.

12.1 MONITORING SUMMARY

1. *Monitor the integrity of the site (SIM or Compliance Monitoring)*
Check on maintenance of fences, disturbance to habitats, winter grazing, etc. 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 I

Feature 1 (SAC) – Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation (Status A)

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

Attribute	Measure	Targets	Comments
Water quality	TP load of the significant inflowing rivers in Northern Ireland.	No increasing trend in TP concentration	ASRD already conduct fortnightly samples at all NI river mouths A Water Quality Management strategy for the Erne Catchment was produced in 1998
	TP as measured in the lake outflow	<65µgl	May need to arrange for ASRD to sample at e.g. Killyhevlin
	TP load of water inflowing from the Republic of Ireland	No increasing trend in TP concentration	ASRD include analyses of the mixed input from the Republic of Ireland at Derryvore. There should be no need to examine the Republic's data on individual rivers unless the target is not met
	Abundance weighted Trophic Ranking Score in any of the sample areas	No increase in the mean of all sample areas of > 5%, and no increase in any individual sample area of > 10%	

	Pollutant levels: Heavy metals, pesticides, hydrocarbons, phenols, detergents	No increasing trend in pollutant levels	Measured annually at Kilyhevlin by Water Service
*Hydrology	Cm (staff gauge) Belleisle, Portora and Rosscor viaduct (Belleek) are measured daily (Rivers Agency)	A stable regime to include high winter water levels	Lake water level is controlled by the Portora sluices and by The Turbines at Catherines Falls on Assaroe lake.
Siltation	Depth measurements in selected bays	Stable or natural accretion rates	Rivers Agency have data for the last 30 years
*Aquatic flora	Blanketweed abundance in any of the sample areas (PIV value)	No more than 3 (frequent)	
	Broad-leaved *Potamogeton* (Section Potamogeton, plus *P. obtusifolius*) presence and abundance	No decline in species presence, or overall decrease in the abundance ratio between broad and fine-leaved species	
	Depth penetration of broad-leaved *Potamogeton* species (cm)	No decrease	Must be compared to water level at time of survey.

Swamp extent	Distance from a fixed point to a) the edge of the dominant emergent zone and b) to the furthest pioneer emergent (m) at least one point on each sub-sample	Mean increase over the reporting cycle of < 5cm per year	Note that Alkaline fens are also a D status SAC feature habitat and swamps and fens generally an ASSI feature
Environmental disturbance	Number of pleasure cruiser trips. The number of boat movements through the Shannon Erne water way and the numbers of boat licences on the Erne are recorded by Rivers Agency (Jeffrey Irwin)	Acceptable levels of usage / acceptable distribution of intensive boat movements i.e. leaving some parts relatively undisturbed (to be determined)	Ideally need to monitor boat movements in different parts of the lake
Invasive alien species	Status of Zebra mussel *Dreissena polymorpha*	Continued monitoring and evaluation of effects.	There is as yet no basis upon which to define condition criteria

Feature 2 (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.	Visual estimate in 10x10m plots and 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 and across the extent of the ASSI using a combination of aerial photographs, SIM and Condition	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.

		Assessment structured walk.	
* 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 *Luzula sylvatica*.	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: *L. sylvatica* 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
	Mature trees (20 - 75cm	Estimate within the	

	diameter) at least frequent in 75% of plots	visual vicinity of the monitoring plots.	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.
	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	Visual estimate in 10x10m plots.	Epiphytic bryophytes and lichens are an important component in all woodlands. However, in the extreme south east of Northern

	30% of plots.		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	Visual estimate in 10x10m plots.	

	20% of plots, but never frequent.		
	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. *Galium aparine, Urtica dioica, Heracleum spp, Epilobium spp. Rumex obtusifolius.* No more than occasional is equivalent to less than 40% occurrence in recorded plots.	Visual estimate in 10x10m plots.	
* Cover of *Pteridium* (% cover)	The mean cover of *Pteridium* 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) (DAFOR)	There should be no felling or coppicing of native trees or shrubs.	Visual estimate in 10x10m plots and across the extent of the ASSI using a combination of aerial photographs, SIM	Felling non-native species as part of management for conservation is acceptable.

		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:- *Vaccinium myrtillus,* *Blechnum spicant,* *Dicranum spp.,* *Luzula pilosa,* *Rhytidiadelphus loreus*	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:- *Sanicla europea,* *Geum urbanum,* *Polystichum setiferum,* *Aneomne nemorosa,* *Primula vulgaris.*	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:- *Carex remota,* *Ranunculus repens,*	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.

	Chrysosplenium oppositifolium, Filipendula ulmaria, Lysimachia nemorum.		
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 3 (SAC) – Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion Alnion incanae, Salicion alvae*) (Status B)

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

Attribute	Targets	Method of Assessment	Comments
* Area of Wet woodland	Maintain the extent Wet woodland at 130ha.	Visual estimate in 10x10m plots and 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
Alder woodland community diversity	Maintain presence of the woodland community, W5 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 and across the extent of the ASSI using a combination of aerial photographs, SIM and Condition Assessment	Repeat monitoring of plots using GPS should indicate whether mosaics and associated habitats have changed or been lost. Note: Loss of associated habitats to Wet woodland may be desirable in some instances.

		structured walk.	
* Structural variation (% cover)	Mean canopy cover greater than 50%	Estimate within the visual vicinity of the monitoring plots.	A well structured wood should have a well developed canopy and shrub layer. However, many Wet woodlands do not support a tall canopy or very mature trees.
	Mean shrub cover should be maintained between 15-50%	Estimate within the visual vicinity of the monitoring plots.	
	Maintain current levels of standard variation within reasonable limits for field, herb and moss cover.	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. The ground flora may appear sparse, particularly where periodic flooding leaves areas of bare mud etc. Its composition may be variable. Hydrology is difficult to assess given vagaries of climate. The regime should be allowed to revert to a natural one. Negative changes will be picked up in vegetation changes over time but more detailed recording may be necessary
		Visual estimate in 10x10m plots.	
		Visual estimate in 10x10m plots.	
	Water-filled pools and ditches (or mud) should be at least present in 50% of plots.	Visual estimate in 10x10m plots.	
* Age-class variation (DAFOR)	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 in many cases achieving the set targets is a long term aim. However, providing the correct management practices are in place, this attribute may
	Mature trees (20 - 75cm diameter) at least frequent in 75% of plots.	Visual estimate in 10x10m plots.	

	Over-mature trees (>75cm diameter) at least present in 10% of plots.	Visual estimate in 10x10m plots.	be recorded as Unfavourable -recovering.
* Presence of standing and fallen dead wood (DAFOR)	Standing dead wood at least occasional in 50% of plots.	Visual estimate in 10x10m plots.	Dead wood is often abundant but because there tend to be fewer big trees in wet woodland the size of the fallen wood is often small. Flooding may lead to local accumulations with other areas totally lacking fallen wood.
	Fallen dead wood at least occasional in 50% of plots.	Visual estimate in 10x10m plots.	
* Presence of epiphytes and climbers (DAFOR)	Epiphytes and climbers at least occasional in 50% of plots and at least frequent in 10% of plots.	Visual estimate in 10x10m plots.	Epiphytes and climbers are an important component in all woodlands. However, in Wet woodlands, their occurrence is much more sporadic than in other woodland types.
* 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	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
	Regeneration of native saplings.	Visual estimate in 10x10m plots.	

the current structure of the Wet Woodland.			trees to regenerate. This does not necessarily indicate unfavourable condition.
* 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 Wet Woodland should be largely comprised of Alder and Willow trees with associated native species. 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. *Galium aparine, Urtica dioica, Heracleum spp, Epilobium spp. Rumex obtusifolius*	Visual estimate in 10x10m plots.	

	No more than occasional is equivalent to less than 40% occurrence in recorded 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.
* 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	Damage to seedling/saplings should be absent, or recorded in less than 20% of plots.	Visual estimate in 10x10m plots.	

(DAFOR)			
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 and 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.
Maintain the diversity of woodland species throughout the wood.	Record the % of plots with each of the wet woodland indicators (W5 community) listed below:- *Filipendula ulmaria,* *Galium palustris,* *Caltha palustris,* *Cardamine pratensis,* *Lysimachia. nummularia,* *Ranunculus repens,* *Mentha aquatica,* *Angelica sylvestris,* *Potentilla palustris,* *Lythrum salicaria,* *Myosotis scorpioides,* *Oenanthe crocata,* *Lycopus europaeus,* *Angelica sylvestris,*	Visual estimate in 10x10m plots.	

	Scutellata, *Solanum dulcamara,* *Valeriana officinalis* *Iris pseudacorus,* *Equisetum fluviatile,* *Phragmites australis,* *Carex rostrata,* *C. paniculata,* *C. remota,* *C. vesicaria*.		
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 4 (SAC) – Otter *Lutra lutra* (Status B)

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 data from other surveys or Ulster Museum, if available
	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	EP water quality scale	Water quality should be at least category A or B, according to EP guidelines, with no pollution incidents	Refer to Environment Protection 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 Agency for sample data if available (This information may need to be inferred from the water quality category).

Attribute	Measure	Target	Notes
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 if available
Site integrity	Total area	No reduction or fragmentation of area	

UPPER LOUGH ERNE-
SPECIAL PROTECTION AREA (SPA)

CONSERVATION OBJECTIVES

UK9020071

Document Details

Title	Upper Lough Erne SPA Conservation Objectives
Prepared By	*Ian Enlander*
Approved By	*Mark Wright*
Date Effective From	*01/04/2015*
Version Number	*V3*
Next Review Date	January 2020
Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials	Changes Marked
V1	04/03/1997	Internal working document	IE	
V1.1	August 2013	Review	IE	
V2.0	February 2015	Draft	IE	Complete review

Site relationship

To fully understand the site conservation requirements for this site it may be necessary to also refer to other site Conservation Objectives

This SPA overlaps with Upper Lough Erne SAC

The SPA also includes the Upper Lough Erne Ramsar site.

See also Boundary Rationale

The SPA is also close to, or adjoins, European designations in the Republic of Ireland. These are Lough Oughter and Associated Lake SAC and Lough Oughter SPA.

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] 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, terrestrial/inter-tidal 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).

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.

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

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 GENERAL INFORMATION

COUNTY: Fermanagh

G.R. H330 280 AREA: 5787 ha.

5 SUMMARY SITE DESCRIPTION

The open waters of the main lough and smaller satellite loughs contain a variety of aquatic communities typical of natural eutrophic lakes. In addition the shallow sheltered shores support extensive swamp, fen and marsh communities. Behind the open grazed foreshore is species-rich grassland, which occasionally extends back into the old adjacent field systems. Alluvial woodland is found where the shoreline is ungrazed or only very lightly grazed, while occasionally the dryer soils of the drumlins behind support a natural Oak woodland; this is particularly well developed within the

Crom Estate to the south and the small island to the north of the Lough. Wintering Whooper Swan generally utilise improved or semi-improved grassland close to water bodies used for roosting. Foraging in flooded fields and of emergent vegetation in shallower lakes is common.

5.1 BOUNDARY RATIONALE

The boundary has been drawn to include the open water of the lough, its islands and adjacent semi-natural habitats such as woodland, species-rich grassland and natural transition vegetation such as scrub or heath. The SPA boundary includes the composite boundaries of 9 ASSIs; Mill Lough, Corraslough Point, Belleisle, Inishroosk, Trannish, Dernish Island, Crom, Killymackan Lough and Galloon. The site boundary utilised permanent man-made boundary features when ever possible, however along some stretches of the foreshore such boundaries where absent and recognisable topographical or physical features such as break in slopes, scrub line, etc were used. In exceptional cases when there was no recognisable feature on the ground the Rivers Agency's ownership folio line was used. Agriculturally improved areas utilised by swans have not been included but their importance must not be underestimated.

6 SPA SELECTION FEATURES

Feature Type (i.e. habitat or species)	**Feature**	**Designation Population**	**Population at time of designation (ASSI)**	**Population at time of designation (SPA)**	**SPA Review population**
Species	Whooper Swan wintering population [a]	495 (five year running mean of maximum annual WeBS counts - 1991/92-95/96)[1]		352	352
Habitat[2]	Habitat extent				

Table 1. List of SPA selection features.

[1] The SPA Citation states the designation population to be 352. However there was an error in the calculation of this figure and therefore the revised figure of 495 should be used.

[2] Habitat is not a selection feature but is a factor and is more easily treated as if it were a feature.

Notes on SPA features – may not be applicable to all SPAs

The above table lists all relevant qualifying species for this site. As the identification of SPA features has and continues to evolve, species may have different status but all should be considered in the context of any HRA process. Ultimately all SPAs will be renotified to formalise species features.

[a] – species cited in current SPA citation and listed on current N2K dataform

[b] – species selected post SPA designation through UK SPA Review 2001

[c] – species highlighted as additional qualifying features through the UK SPA Review 2015 or the UK marine SPA programmes.

6.1 ADDITIONAL ASSI SELECTION FEATURES -

Feature Type (i.e. habitat, species or earth science)	**Feature**	**Size/ extent/ pop[·]**
See SAC conservation objectives for ASSI feature details		

Table 2. List of ASSI features, additional to those that form all or part of SPA selection features. These will be referred to in ANNEX II.

7. CONSERVATION OBJECTIVES

The Conservation Objectives for this site are:

To maintain each feature in favourable condition.

For each feature there are a number of component objectives, which are outlined in the tables below. Component objectives for Additional ASSI Selection Features are not yet complete. For each feature there are a series of attributes and measures, which form the basis of Condition Assessment. The results of this will determine whether a feature is in favourable condition, or not. The feature attributes and measures are found in the attached annexes.

8 UPPER LOUGH ERNE SPA CONDITION ASSESSMENT 2014

Species	2008	2009	2010	2011	2012	CSM	5 yr mean	% CSM	Status
Whooper Swan	483	504	415	560	484	432	489.20	**113.24**	Favourable

9 SPA SELECTION FEATURE OBJECTIVES

To maintain or enhance the population of the qualifying species
To maintain or enhance the range of habitats utilised by the qualifying species
To ensure that the integrity of the site is maintained;
To ensure there is no significant disturbance of the species and
To ensure that the following are maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species

Feature	Component Objective
Whooper Swan wintering population	No significant decrease in population against national trends
Habitat	Maintain the extent of main habitat components used by or potentially usable by the feature species subject to natural processes

Table 3. List of SPA Selection Feature Component Objectives

9.1 ADDITIONAL ASSI SELECTION FEATURE OBJECTIVES

Feature	Component Objective
See SAC conservation objectives for ASSI feature details	

Table 4. List of Additional ASSI Selection Feature Objectives

10. MANAGEMENT CONSIDERATIONS

See also Views About Management for relevant ASSIs

Owner/Occupier's – Land ownership within Upper Lough Erne SPA/cSAC is complex, and reflects the size and geography of the site. As of October 1995 there were over 340 landowners, the largest of which were The National Trust (which owns and manages the Crom Estate) and DANI (which owns the beds of the loughs). In addition, Reilly & Gole Woods NR is owned by DoE(NI) NIEA.

11. MAIN THREATS, PRESSURES, ACTIVITES WITH IMPACTS ON THE SITE OR SITE FEATURES

Notifiable Operations - Carrying out any of the Notifiable Operations listed in the schedule could affect the site. The list below is not exhaustive, but deals with the most likely factors that are either affecting Upper Lough Erne SPA, or could affect it in the future. Although, features 1, 2, 3, 4 etc, are the qualifying SPA features, factors affecting ASSI features are also considered.

Site/feature management issues

No	Issue	Threat/comments	Local considerations	Action
1	Adjoining habitat	Particularly important for swans. Significant changes in land management and disturbance are key considerations. Such areas lie without the site making effective management of developments other than those for which planning permission is required, difficult.	Considerable ad hoc local field drainage activities none presently identified on swan fields.	Assess planning applications. Identify key areas and promote site management schemes. Review use of Wildfowl Refuges. Consider the collective impact.
7	Boating activity – recreational	Disturbance and potential for impact especially from jet skis. Generally relevant to particularly sensitive areas within site.	Very limited activity in winter.	Liaise with appropriate authority with codes of good practice, zoning and use of by-laws as necessary. Consider the collective impact.
8	Shoreline protection schemes	Where there is no history of this, it impacts on natural beach systems with loss of habitat.	Not a notable problem with only limited impacts.	Liaise with Planning Service and other parties with an involvement in shoreline management.
11	Drainage	Potential impact on water flooding regime. Potentially significant in relation to adjoining habitat if it leads to reduction in traditional areas of flooding.	Nature of the lough makes capital scheme unlikely. Ongoing individual operations outside site.	Identify key areas and promote site management schemes to protect and enhance site features. Consider the collective impact.
14	Fishing – commercial or recreational	Minimal disturbance consideration.	Disturbance not thought to be significant.	Liaise with DARD and fishing authority as required. Liaise with angling clubs as required.
16	Habitat extent – open water	Loss likely to be limited but expansion of marina facilities can impact on key localities.	Not a significant issue	Assess planning applications. Consider the collective impact.
18	Habitat quality	Alteration of habitat quality through	The lough is	Assess planning

No	Issue	Threat/comments	Local considerations	Action
	– open water	diminution of water quality or invasive species.	naturally enriched. Establishment of Zebra Mussel is likely to alter the water environment significantly.	applications. Deal with invasive alien species by preventing their spread or reducing their impact. Liaise with Environmental Protection. Consider the collective impact.
21	Introduced species	Range of threats from loss of habitat, feeding competition, disease, hosting species presenting a threat outside of the site.	Zebra Mussel issue.	Liaise with appropriate authority. Consider feasibility of elimination. Participate in national/international initiatives.
22	Power cables	Specifically a problem in relation to swans. Threat is through impact. Need to consider flight lines, as well as feeding and loafing areas, which ideally should be avoided.	Impact not considered to be widespread.	Liaise with NIE. Minimum need is for line marking based on best current practice. Consider the collective impact.
24	Recreational activities.	Disturbance is the main consideration.	Most traditional swan areas are relatively remote. Land-based activities are minimal concern while winter boating is limited.	Liaise with local authorities and other managing parties.
25	Research activities.	Census and ringing activities especially have the potential to impact on bird populations, particularly at breeding sites.	Routine winter WeBS counts.	Census and ringing activities to be undertaken by competent individuals, appropriately trained. In case of ringers, appropriate license must be held.
28	System dynamics	Cuts across many other issues. Dynamic systems, especially coastal, can be affected by many factors especially engineered structures and significant changes in dominant wind direction or storm frequency. Many systems may indeed still be undergoing responses to historical developments e.g. partial reclamation, seawall construction. Changes may include alteration in sediment grade, shifts in patterns of erosion and deposition, etc. Consequences for habitat and species utilisation of the site can be profound.	Historical lowering of the lough level reduced considerably the area subject to flooding but also would have had implications for shore and nearshore morphology, particularly the dynamics of sand bar and river mouth shoal complexes and for habitat dynamics.	Human induced change should be minimised. Assess planning applications and liaise with other relevant authorities. Ad hoc dumping and removal of natural materials should be managed. Major natural shifts in system behaviour may be identified through analysis of aerial photographs and site monitoring. Major and consistent changes to patterns of habitat distribution and bird utilisation of the site should be noted.

No	Issue	Threat/comments	Local considerations	Action
30	Water level control	Impacts on natural fluctuation of water body. Potentially significant in relation to adjoining habitat if it leads to reduction in traditional areas of flooding.	Water level influenced by Ballyshannon hydro-electric scheme. Not thought to be a problem.	Liaise with relevant authorities.
31	Wildfowling	Has indirect effect through wider disturbance issue. Issue of regulated (through recognised shooting clubs) and ad hoc shooters. Lead shot on grazing lands.	Erne Wildfowlers liaise with NIEA.	Liaise with relevant shooting bodies to define areas for wildfowling, the development of Wildfowlers Codes of Good Practice and encourage bag returns. Support pressure to stop use of lead shot. Review use of Wildfowl Refuges. Consider the collective impact.

Table 3. List of site/feature management issues

12. MONITORING

Monitoring of our Special Protection Areas takes place at a number of levels, using a variety of methods. Methods for both Site Integrity Monitoring and Condition Assessment can be found in the Monitoring Handbook (To be written).

In addition, detailed quality monitoring or verification monitoring may be carried out from time to time to check whether condition assessment is adequate to detect long-term changes that could affect the site. This type of quality monitoring may involve assessment of aerial photographs to determine site morphological changes. Methodology for this is being developed.

12.1 MONITORING SUMMARY

1. Monitor the integrity of the site (Site Integrity Monitoring or SIM) – to ensure compliance with the SPA/ASSI schedule and identify likely processes of change (e.g. water level change, changes to trophic state). This SIM should be carried out once a year.

2. Monitor the condition of the site (Condition Assessment) - Monitor the key attributes for each selection feature (species, assemblage, habitat, etc). This will detect if the features are in favourable condition or not. See Annexes I and II for SPA and Additional ASSI Features respectively.

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 appropriate assessment that may be needed. It should be noted that appropriate assessments are a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

12.2 ADDITIONAL MONITORING ACTIONS UNDERTAKEN FOR SITES IN UNFAVOURABLE CONDITION

Monitoring actions set out in section 6 and Annex 1 will use, amongst other attributes, bird population data to determine site condition. In the event of a significant population decline being detected, a series of subsequent actions will be initiated. The following list is not exhaustive, actions will be site dependant, but the order of these points IS hierarchical i.e. consider point 1, then 2, etc.

1. Assess the site population in a wider geographical context – Northern Ireland, Ireland, UK, world. Refer to BTO ALERT limits etc. Liaise with other competent bodies to meaningfully assess wider pattern. No site action if site decline mirrors regional pattern the cause of which is not related to the site. Action may be required at regional or larger scale. If the cause of the regional population decline (e.g. eutrophication) is found at the site then action may be necessary, but this may need to form part of a network of strategic species action. Further research may be required.
2. Assess the site population in a wider geographical context – Northern Ireland, Ireland, UK, Europe, world. Determine if site losses are balanced by gains elsewhere e.g. breeding terns. Review site condition to determine if losses are due to site deterioration. Determine if possible whether population has relocated within SPA series (national, biogeographical, European). Note that the reasons for such locational changes may not be readily identifiable. Further research may be required.
3. For passage/wintering species assess breeding information. No site action if site decline is due to breeding ground failure, unless breeding ground failure is related to poor adult condition resulting from factors affecting wintering / passage birds.
4. Determine whether a major incident has affected the site e.g. toxic impact on prey items, predation event or geographical shift in available prey. Ability to respond to impacts may be limited.
5. Assess condition of principal site habitats e.g. vegetational composition and structure, change in habitat balance e.g. mudflats reduced by encroaching mussel beds.
6. Assess prey availability. Issues to consider are both within site e.g. water quality, broad site management, and without site e.g. climatically driven factors.
7. Assess whether there have been any changes in any other site features or management practices (see Table 3) that may have affected populations of site selection features.
8. Long-term site value must be considered even when it is found to be in unfavourable condition for a number of reporting cycles. This is particularly important for breeding seabird and wader sites where ongoing appropriate management may ultimately encourage re-establishment of a favourable population.

13. SELECTION FEATURE POPULATION TRENDS

A summary statement of site population trends, together with wider geographical trends. Date of completion is given as well as information sources used. Site trends are reported as % increase/decline from designation population (1995/96) using running 5 year means of annual maximum count (WEBS data). Other trends are generally limited to terms such as 'consistent increase/decline', 'variable with overall increase/decline', 'no discernable trend'.

SPECIES	SITE TREND	NI TREND	IRISH TREND	UK TREND	COMMENTS
Wintering Whooper Swan	+11% (1999-2000)	Variable with overall decline 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	Variable with overall increase 1990/91-1999/2000 (WeBS)	

ANNEX I

Feature (SPA) – Wintering waterfowl

* = primary attribute. One failure among primary attribute = unfavourable condition
# = optional factors – these can be in unfavourable condition without the site being in unfavourable condition

Attribute	Measure	Targets	Comments
*Whooper Swan wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. A lower limit of 50% decline over a five year period may indicate unfavourable condition of the site.

Non-Avian Factors - habitat

Attribute	Measure	Targets	Comments
Habitat	Area of natural and semi-natural habitat	Maintain the extent of main habitat components subject to natural processes	

ANNEX II

Feature (ASSI)

Attribute	Measure	Targets	Comments
See SAC conservation objectives for ASSI feature details			

WEST FERMANAGH SCARPLANDS SAC
UK0030300

CONSERVATION OBJECTIVES

Document Details

Title	*West Fermanagh Scarplands SAC Conservation Objectives*
Prepared By	*R. McKeown*
Approved By	*P. Corbett*
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Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	Dec 2014	Complete review	RMK

1. INTRODUCTION

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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).

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

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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: FERMANAGH

GRID REFERENCE: IH 084478

AREA: 2270.33 ha

5. SUMMARY SITE DESCRIPTION

The site runs from Sraniff and Kilgarrow in the north to Aghahoorin and Carn in the south, while extending back through a series of escarpments and ridges from the low foothills and limestone cliffs in the east to the extensive peatland plateau between Big Dog and Ballintempo Forests in the west.

The site has a unique combination of geology, physiography, habitats, flora and fauna features. It has an unparalleled range of habitats and associated vegetation communities occurring in Northern Ireland including base-rich broad-leaved woodland, wet and dry acid heath and calcareous heath, blanket bog, fen-meadow, calcareous and mesotrophic grassland, petrifying springs, flushes both acid and alkaline, natural dystrophic, mesotrophic and eutrophic open water bodies with accompanying aquatic macrophyte communities, swamp and poor acid fen. Such diversity results in the presence of a large number of rare and notable higher plants, lichens, fungi and invertebrates.

In addition to having an unparalleled range of habitats and associated vegetation communities, the site is also a major landscape feature of this region.

The Western Fermanagh Scarpland geology is relatively simple but has a major influence on the plant communities that grow there. The rocks are Carboniferous in age, some 335 million years old, and date from a time when Ireland lay near the equator.

Three major cave systems occur within the site; with over 14-km of surveyed passage in total together with a range of surface karst features.

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 site boundary utilised permanent man made boundary fractures when ever possible, however along some stretches of the woodland such boundaries where absent and recognisable topographical or physical features such as break in slopes, tree line where used. In such a large complex site not all the resource of any particular habitat is of the same standard, with areas of sub standard habitat included to provide a coherent site boundary.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ pop~
Habitat	Limestone Pavements	B	90ha
Habitat	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)	B	306.08ha
Habitat	Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)	B	365.11ha
Habitat	Tilio-Acerion forests of slopes, screes and ravines	B	136.63ha
Habitat	Alkaline Fens	C	1ha
Habitat	Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* – type vegetation	C	5.2ha
Habitat	Blanket bog (active only)	C	811.85
Habitat	Northern Atlantic wet heath with *Erica tetralix*	C	133.51ha
Habitat	Petrifying springs with tufa formation (*Cratoneuron*)	C	P
Habitat	Alpine and Subalpine calcareous grassland	D	P
Habitat	Calcareous and calcshist screes of the	D	P

	montane to alpine levels (*Thlaspietea rotundifolii*)		
Habitat	Siliceous rocky slopes with Chasmophytic vegetation	D	P
Habitat	European dry heath	D	45.66ha
Habitat	Natural dystrophic lakes and ponds	D	P
Habitat	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	D	P
Habitat	Oligotrophic to mesotrophic lakes standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea*	D	P
Habitat	Siliceous scree of the montane to snow levels (*Androsacetalia alpinae and Caleopsietalia ladani*)	D	P
Habitat	Transition mires and quaking bogs	D	P
Species	White-clawed Crayfish *Austropotamobius pallipe*	D	P
Species	Otter *Lutra lutra*	D	P

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 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 West Fermanagh Scarplands SAC.

6.1 ASSI SELECTION FEATURES

West Fermanagh Scarplands ASSI

Feature Type	Feature	Size/ extent/ pop~
Habitat	Limestone Pavement	90 ha
Habitat	Purple Moorgrass and Rush Pasture	306.08 ha
Habitat	Calcareous Grasslands	365.11 ha
Habitat	Mixed Ashwoods	136.63 ha
Habitat	Fens	1.5 ha
Habitat	Eutrophic Standing Waters	5.2 ha
Habitat	Blanket Bog	811.85 ha
Habitat	Wet Heath	133.51 ha
Species	Higher Plant Assemblage: *Juniperus communis* (1), *Dryas octopetala* (2), *Festuca altissima* (2), *Lathraea squamaria* (2), *Neottia nidus-avis* (1), *Saxifraga hypnoides* (1), *Meconopsis Cambrica* (3) and *Carex strigosa* (2), lichens include Lungwort Lobaria pulmonaria, fungi include the Pink-gills *Entoloma bloxamii* and *E. incanum*.	
Species	Invertebrate Assemblage: *Potamonectes griseostriatus, Glaencorisa propinqua, Arctocorisa germari, Limnoporus rufoscutellatus, Acicula fusca, Succinea oblonga, Vallonia excentrica and Ena obscura, Geophilus insculptus Armadillidium pulchellum*	
Species	Fungi Assemblage	
Earth Science	Carboniferous stratigraphy – Knockmore reef series	
Earth Science	Karst geomorphology – cave systems and surface features	

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The *Conservation Objective* for this site is:

To maintain (or restore where appropriate) the

- **Limestone Pavements**
- **Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)**
- **Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)**
- **Tilio-Acerion forests of slopes, screes and ravines**
- **Alkaline Fens**
- **Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* – type vegetation**
- **Blanket bog (active only)**
- **Northern Atlantic wet heath with *Erica tetralix***
- **Petrifying springs with tufa formation (*Cratoneuron*)**

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
Limestone Pavements	B	Maintain the extent of limestone pavement
		Maintain and enhance, as appropriate, the species diversity within this community including the presence of notable species
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae	B	Maintain and expand the extent of existing fen meadow but not at the expense of other SAC (ABC) features. (There are area of degraded heath, scrub, and damp grassland which have the potential to develop into fen meadow)

		Maintain and enhance fen meadow species diversity including the presence of notable or rare species.
		Maintain the diversity and quality of habitats associated with the fen meadow, e.g. wet grasslands, wet heath, wet woodland and scrub, especially where these exhibit natural transition to fen meadow.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be potential for restoring fen meadow.
Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)	B	Maintain the extent of existing species-rich dry calcareous grasslands (CG9).
		Maintain and enhance species diversity within the CG9 community including the presence of notable species.
		Seek nature conservation management over suitable areas immediately outside the cSAC where there is possibility of restoring calcareous grassland
		Maintain the diversity and quality of habitats associated with the calcareous, e.g. fen, swamp, neutral grasslands, scrub, especially where these exhibit natural transition to calcareous grassland.
Tilio-Acerion forests of slopes, screes and ravines	B	Maintain and <u>expand</u> the extent of existing ash woodland, but not at the expense of other SAC (ABC) features (There is an area of degraded bog, wetland and damp grassland which have the potential to develop into ash woodland.
		Maintain and enhance ash woodland species diversity.
		Maintain and enhance bog woodland structure

		Maintain the diversity and quality of habitats associated with the ash woodland, e.g. scrub, especially where these exhibit natural transition.
		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.
Alkaline Fen (upland)	C	Identify the main areas of upland alkaline fen, describe and delineate them with more precision.
		Maintain the extent of existing alkaline fen.
		Maintain the diversity and quality of different alkaline fen habitat.
		Maintain and enhance fen species diversity including the presence of notable or rare species, within each type.
		Maintain the diversity and quality of associated habitats.
		Absence of erosion features associated with human impacts, and no exacerbation of natural erosion features.
Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation	C	Maintain and inherence water quality.
		Maintain a natural hydrological regime
		Maintain the extent of existing characteristic aquatic and emergent community types.
		Maintain and enhance species diversity within each community including populations of rare and endangered species.
		Maintain purity of the natural and characteristic species composition.
		Minimal sediment load

		Substrate should be natural & characteristic of lake type.
		Minimal environmental disturbance i.e. Minimal negative impact from recreation and artificial structures, No fish farming
Active blanket bog	C	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.
Northern Atlantic wet heath with Erica tetralix	C	Maintain the extent of the existing Northern Atlantic wet heath vegetation.
		Maintain and enhance the quality of the existing wet heathland.
		Seek to expand the extent of the wet heath communities into degraded areas of species poor, wet acid grassland.
		Maintain the diversity and quality of other habitats of conservation interest, especially where these exhibit natural transition to the Northern Atlantic wet heath.
		Seek nature conservation management over suitable areas immediately outside the SAC where there may be the potential for wet heath rehabilitation.
Petrifying springs with tufa formation	C	Identify the main areas of petrified springs, describe and delineate them with more precision.

(*Cratoneuron*)		Maintain and enhance the extent of petrifying springs subject to natural processes
		Allow the natural processes which determine the development and extent of petrifying springs to operate appropriately
		Maintain and enhance, as appropriate, the species diversity within this community
		Maintain water quality

9. ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Limestone Pavement	See SAC Selection Feature Objective Requirements table.
Purple Moorgrass and Rush Pasture	See SAC Selection Feature Objective Requirements table.
Calcareous Grasslands	See SAC Selection Feature Objective Requirements table.
Mixed Ashwoods	See SAC Selection Feature Objective Requirements table.
Fens	See SAC Selection Feature Objective Requirements table.
Eutrophic Standing Waters	See SAC Selection Feature Objective Requirements table.
Blanket Bog	See SAC Selection Feature Objective Requirements table.
Wet Heath	See SAC Selection Feature Objective Requirements table.
Carboniferous stratigraphy – Knockmore reef series.	Maintain extent and quality of exposure, together with access to the feature subject to natural processes
Karst geomorphology – cave systems and surface features.	Maintain extent and quality of features, together with the active processes influencing their development.
Higher plant assemblage.	Map location of rare species
	Maintain abundance and distribution and if feasible enhance population.
	Establish the status of these species and if appropriate draw up further conservation priorities for this species.
Invertebrate assemblage	Map location of rare species
	Maintain abundance and distribution and if feasible enhance population.
	Establish the status of these species and if appropriate draw up further conservation priorities for this species.
Fungi Assemblage	To be finalised.

10. MANAGEMENT CONSIDERATIONS

Ownership
The majority of the site is under private ownership except for the large area of intact blanket bog between Big Dog Forest and Ballintempo Forest to the west, which is owned by Forest Service. In total there are 101 individuals or organisations with ownership or other rights associated with the site.

The site lies within the boundary of the West Fermanagh and Erne Lake ESA, with large portions of the site currently under ESA agreement.

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 West Fermanagh Scarplands, or could affect it in the future. Although **Limestone Pavements, Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*), Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*), Tilio-Acerion forests of slopes, screes and ravines, Alkaline Fens, Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* – type vegetation, Blanket bog (active only), Northern Atlantic wet heath with *Erica tetralix*** and **Petrifying springs with tufa formation (*Cratoneuron*)** 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.

Grassland Impacts
Much of lowland and the marginal upland areas of Northern Ireland are dominated by agricultural grasslands. These grasslands are typically highly productive. Species-rich meadows and pastures are generally dependent upon traditional forms of management. The most diverse swards often occur where there are a variety of soil types and in particular, so called calcareous grasslands can be exceptionally species-rich. A history of low or negligible inputs of fertiliser is essential for the continued existence of species-rich swards.

Application of fertiliser
There is no information on the current rate of fertiliser application on the site, but HST survey suggests that treatment rates are low or non-existent over much of the site. Research indicates that the application of any inorganic fertiliser to grassland leads to a reduction in species diversity, both plants, fungi and indirectly associated invertebrates, through nutrient enrichment. Therefore the ultimate aim should be eliminate fertiliser use altogether.

ACTION: Ensure that there is no or minimal application of fertiliser on species-rich grassland.

Addition of manure/slurry

No information available on current practice. Whilst addition of farmyard manure can be part of traditional meadow management, significant increases in organic nitrogen will lead to a loss in species diversity (as above). Generally, slurry should not be applied.

ACTION: Ensure that there is no or minimal application of manure/slurry on species -rich grassland.

Grazing

No information on current grazing levels. Cattle graze parts of the site including some areas of woodland. Undergrazing or cessation of grazing results in pastures becoming rank, with a loss in species diversity and ultimately, scrub encroachment. Scrub encroachment is a natural successional development, but results from neglect or undergrazing. On the other hand, over-grazing leads to physical damage through poaching, in addition to reducing species diversity. The thin skeletal soils of calcareous grassland are particularly prone to damage if overgrazed. The correct grazing level should promote the maintenance of a species-rich grassland sward, which will be beneficial to plants, invertebrates and grassland fungi. Grazing should not be as intense in other habitats but light levels are desirable in heath areas. In general, grazing in woods is undesirable.

ACTION: Ensure that there is appropriate grazing levels for species-rich grassland.

Supplementary feeding

Supplementary feeding of livestock can lead to severe localised poaching and the risk of soil nutrient enrichment. Hay from an alternative source can lead to alien species colonising the site. Any supplementary feeding should be restricted to field units outside the boundary of the site, if at all possible. It should be carefully controlled and monitored.

ACTION: Ensure any supplementary feeding is restricted to field units outside the boundary of the site, if at all possible. If supplementary feeding does take place within the site, it should be carefully controlled and monitored.

Woodland Impacts

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 and will cause a detrimental change in the woodland structure and composition with time. Information on current grazing levels of domestic stock within privately owned woodland is not readily available. No information of the current population of goats is available.

ACTION: Reduce stocking pressure in woods to sustainable level or exclude stock by fencing off woodland under management agreement. Undertake census on the current population levels of feral goats. Initiate control measures to reduce numbers to acceptable levels using appropriate measures.

Woodland Clearance

There is some *ad hoc* removal of wood. Removal of woodland would lead to a reduction in diversity.

ACTION: Ensure that there is no removal of woodland from the site.

Dead Wood Removal

Dead wood should be left *in situ* if safe or practical to do so. This provides valuable habitat for fungi, invertebrates etc. Removal of wood or fire-wood should be discouraged.

ACTION: Ensure there is no removal of dead wood from the site.

Invasion by exotics

Very few exotic species were recorded for the woods but the invasive Sycamore *Acer pseudoplatanus* is present. These are not posing a threat at present but they should be monitored and removed in the long-term.

ACTION: Monitor invasive/exotic species and remove when necessary.

Lake Impacts

Siltation

There is a tendency for naturally eutrophic lakes to silt up, both from sediment input through streams and rivers and from organic production. There may therefore be some loss of open water with time, though the rate should be relatively slow.

ACTION: Reduce the rate of catchment sedimentation by encouraging landowners to leave adequate vegetation buffer strips between ploughed fields and adjacent drains and streams draining into the alkaline fens and loughs.

Nutrient enrichment

The natural eutrophic status of Dough Lough could be at threat from artificially enhanced eutrophication, as a result of increased nutrient loading from agricultural run-off (slurry, silage effluent and artificial fertilisers), and would lead to deterioration of water quality. If the water becomes too nutrient-rich there may be a total loss of macrophytes and only blooms of algae present.

ACTION: Prevent nutrient enrichment from fertiliser drift, slurry and runoff by encouraging landowners to leave adequate buffer strips between fertiliser spray areas and sensitive interest features such as alkaline fens and loughs.

Alien Species

The only exotic plant species recorded for the water body, was the Canadian Pondweed *Elodea canadensis*. This species, although having a moderately high

frequency of occurrence, is not having a notable ecological impact.
ACTION: Site integrity monitoring.

Peatland Impacts

Drainage (moor-gripping) and fertilisation

'Reclamation' of peatland involves drainage, liming and fertilisation, which will always damage a functioning peatland. Heathland is particularly vulnerable to reclamation, the obtrusive bright green rectangles of re-seeded grass are a common adjunct to heathland landscapes throughout the country. Many of the lakes on the plateau are very nutrient-poor and thus very vulnerable to nutrient accumulation. Without study of the movement of water through the peat in the area, it would be difficult to predict their exact catchment, so fertilisation could also lead to their eutrophication.
ACTION: A hydrological assessment is needed to identify the active drains. Seek management agreements with landowners/managers to arrange for the blockage of identified active drains carrying water off the peat mass. Ensure that all existing dams are maintained.

Peat extraction

Peat extraction by any method is a particularly damaging activity, including extrusion cutting which far from sparing surface vegetation, has very profound effects upon its ecology and hydrology.
ACTION: No peat cutting within the SAC.

Afforestation

Preparation for afforestation involves disturbing the surface by draining, ploughing, or mounding. Establishment of the trees involves fertilisation, pest control and often liming. A successfully established plantation will shade the peat surface and intercept airborne pollutants. Peatland that has been subject to these operations has little potential to recover after harvesting.
ACTION: There should be no further afforestation of peatland. Every effort should be made by Forest Service to ensure that wind blown fertiliser and lime does not affect peatlands of conservation interest.

Inappropriate grazing

Over-wintered sheep exert the most pressure on a peatland, as this is when vegetation growth is minimal and the forces of erosion, most effective. At the most damaging intensities, this can lead to soil exposure by vegetation removal and trampling which in turn can instigate erosion. Sheep are selective grazers and a less dramatic form of damage, at lower grazing intensities, is the decline in dwarf shrubs. Summer grazing intensity should be set at an appropriate level.

Ling heather (*Calluna vulgaris*) can tolerate the removal by grazing of 40% of the season's growth but heavier grazing begins to have more of an effect on the plant. Autumn grazing is potentially more damaging to heather and particular care

should be taken to avoid Autumn overgrazing. The commonage system tends to promote overstocking.
Under-grazing or the cessation of grazing, results in the prevalence of over-mature and degenerate Ling heather (*Calluna vulgaris*) (burning may then be a useful form of restorative management).
ACTION: Ensure through landowner liaison and management agreements that there are appropriate grazing levels for peatland vegetation.

Supplementary stock feeding
This causes localised overgrazing and poaching damage and should ideally be avoided. If this not an option, it should be confined to less sensitive areas. Particularly avoid denuded sloping areas and pockets of deeper level peat which are not adapted to counter wind erosion and gully easily.
ACTION: Ensure any supplementary feeding is restricted to field units outside the boundary of the site, if at all possible. If supplementary feeding does take place within the site it should be carefully controlled and monitored.

Inappropriate burning
Management by burning can be acceptable on both heathland and blanket bogs, but excessive burning favours acid grasses at the expense of dwarf shrubs and destroys mature communities of *Sphagnum* mosses and lichens. Management of Ling heather (*Calluna vulgaris*) in upland heath and blanket bog is facilitated by burning. If burning is practised, it should only be carried out between late October and early March and preferably on days when the wind is light and the ground is frozen or damp; if it is too dry or too windy the fire will be too hot, if it is too wet, combustion will be poor and subsequent regeneration weak. Blanket bog should not be burnt more than once every 12 - 20 years, and not at all in areas where the gradient is greater than 25°, erosion may be the net result.
ACTION: Ensure that burning within the SAC is kept to a minimum.

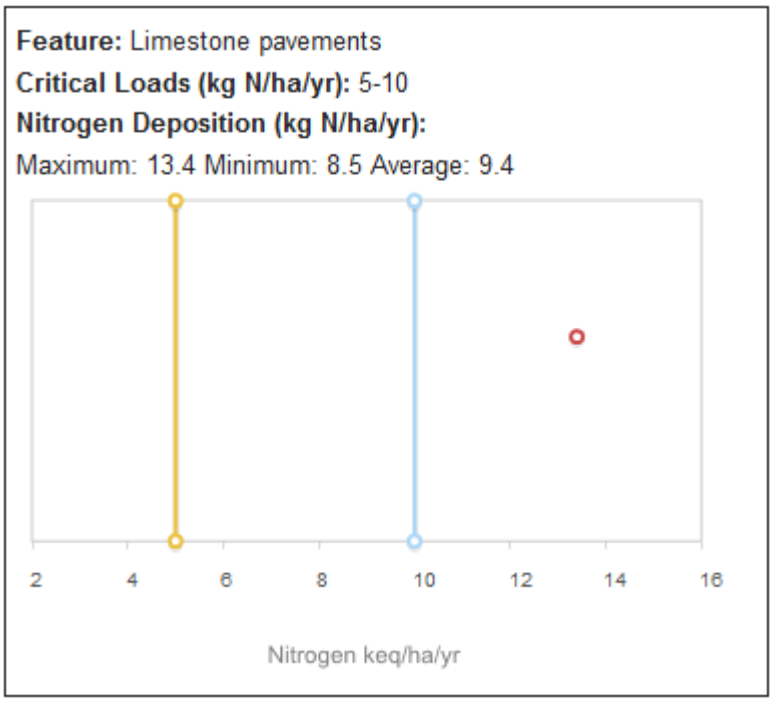
Damaging recreational activities
Damaging recreational activities, especially four wheel drive access, can cause vegetation loss which may cause significant erosion, particularly on sloping areas.
ACTION: Ensure there is no damaging recreational activities taking place within the SAC.

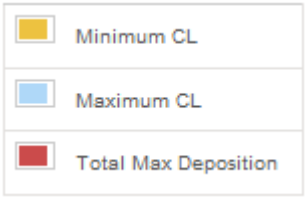
Limestone Pavement Impacts

Extraction
Commercial extraction has not been an issue within the site. However, past extraction of stone for walls and more recent clearance for field improvement has occurred.
ACTION: Site integrity monitoring.

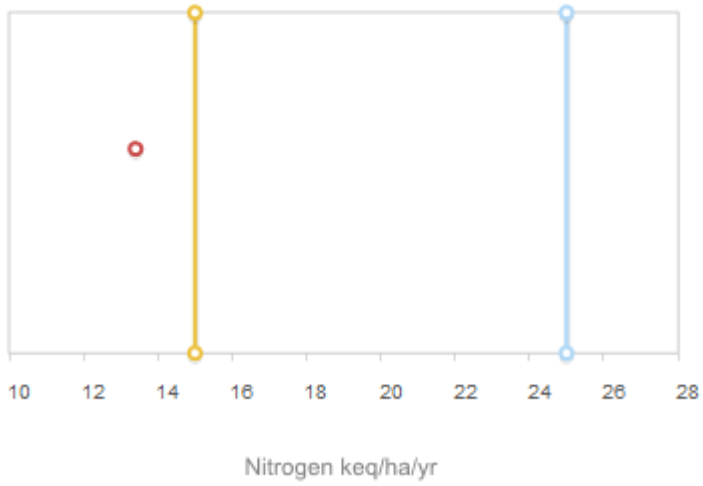
Nitrogen Deposition

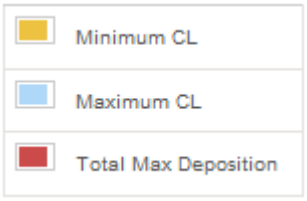
Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the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



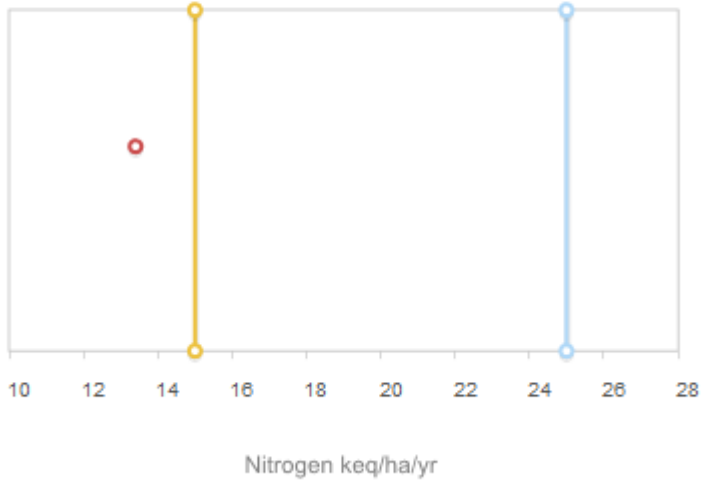


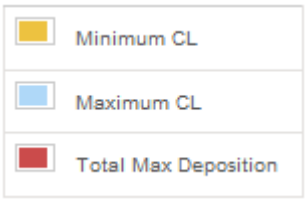
Feature: Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)
Critical Loads (kg N/ha/yr): 15-25
Nitrogen Deposition (kg N/ha/yr):
Maximum: 13.4 Minimum: 8.5 Average: 9.4



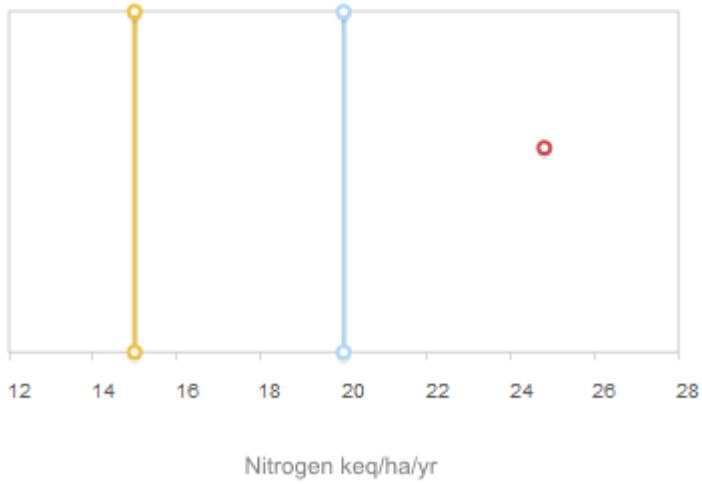


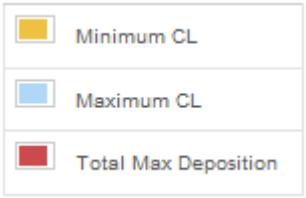
Feature: Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)
Critical Loads (kg N/ha/yr): 15-25
Nitrogen Deposition (kg N/ha/yr):
Maximum: 13.4 Minimum: 8.5 Average: 9.4



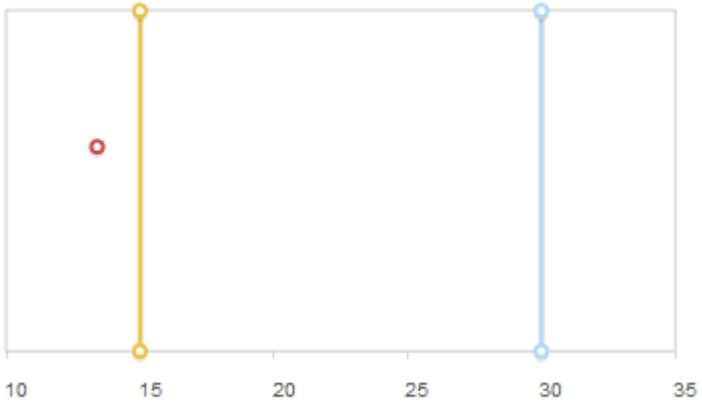


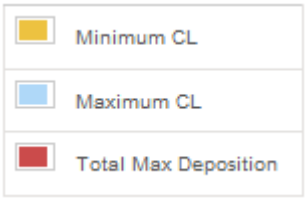
Feature: Tilio-Acerion forests of slopes, screes and ravines
Critical Loads (kg N/ha/yr): 15-20
Nitrogen Deposition (kg N/ha/yr):
Maximum: 24.8 Minimum: 14 Average: 16.3



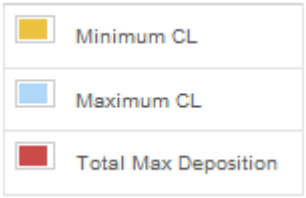


Feature: Alkaline fens
Critical Loads (kg N/ha/yr): 15-30
Nitrogen Deposition (kg N/ha/yr):
Maximum: 13.4 Minimum: 8.5 Average: 9.4

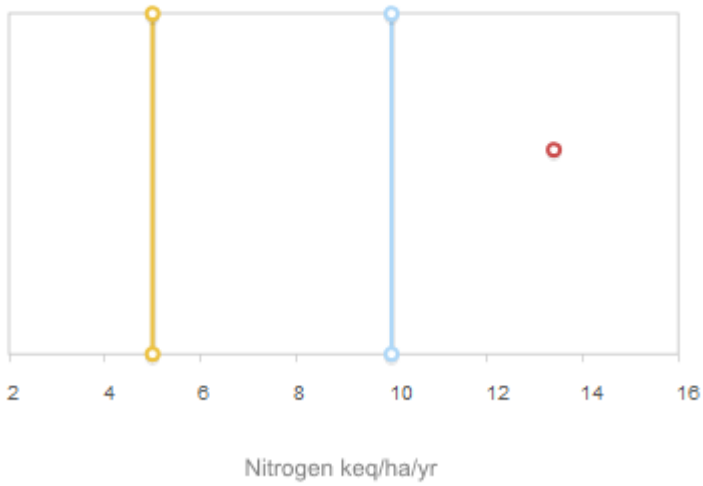


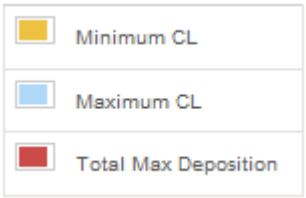


Feature: Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation
Critical Loads (kg N/ha/yr): no critical loads available for this feature
Nitrogen Deposition (kg N/ha/yr):
Maximum: 12.2 Minimum: 6.3 Average: 9.4

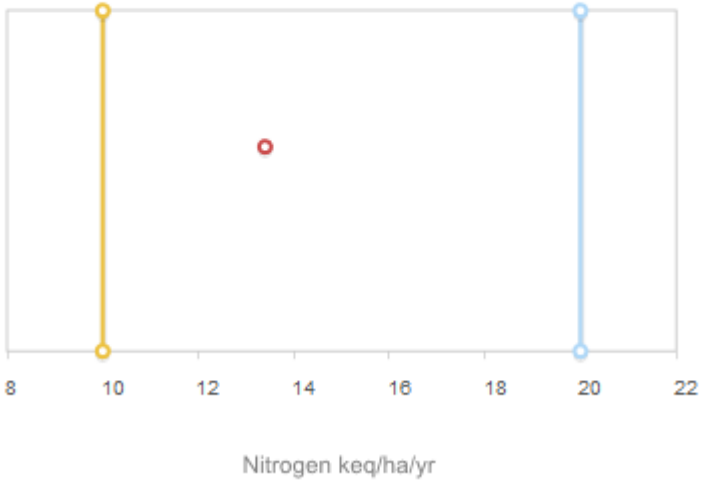


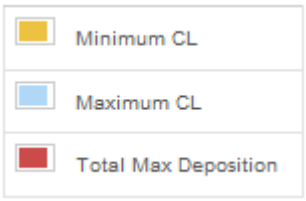
Feature: Blanket bogs (* if active bog)
Critical Loads (kg N/ha/yr): 5-10
Nitrogen Deposition (kg N/ha/yr):
Maximum: 13.4 Minimum: 8.5 Average: 9.4



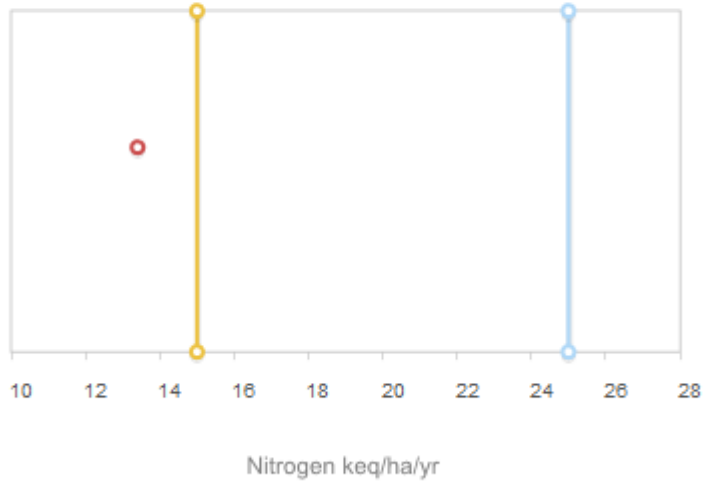


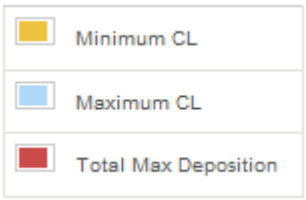
Feature: Northern Atlantic wet heaths with Erica tetralix
Critical Loads (kg N/ha/yr): 10-20
Nitrogen Deposition (kg N/ha/yr):
Maximum: 13.4 Minimum: 8.5 Average: 9.4





Feature: Petrifying springs with tufa formation (Cratoneurion)
Critical Loads (kg N/ha/yr): 15-25
Nitrogen Deposition (kg N/ha/yr):
Maximum: 13.4 Minimum: 8.5 Average: 9.4





(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

Activities occurring outside the site (e.g. agricultural intensification, drainage works, and development) may be detrimental to the site through remote affects.

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 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. woodland clearance, overwintering of stock, dumping etc), or will be comparatively slow. 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 boundary features, that were previously present are still intact. Ensure there has been no peat cutting, tree felling, moor-gripping, ground 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 every year.

2. Monitor the condition of the site (Condition Assessment)
Monitor the key attributes for each selection feature. This will detect if the features are in favourable condition or not.

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) – Limestone Pavement - Status B

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

Attribute	Target	Method of Assessment	Comments
Extent			
*Extent of Open Limestone pavement vegetation.	Maintain the extent of Open Limestone pavement vegetation.	Visual assessment of pavement for signs of damage in past 2 years. Signs are broken, white, lichen-free rock, rubble, displaced clints & infilled grikes	Limestone Pavement is non-renewable. Any recent damage results in unfavourable condition. Old damage is easy to differentiate from new damage due to the colonisation of lichens and the weathering of rock on older damage.
Presence of associated semi-natural habitats	Maintain existing associated semi-natural habitats (Purple Moor-grass and rush pasture, acid grassland, wet woodland, Fen, wet heath etc.)	Visual estimate in 2x2m plots and across 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.

Vegetation Structure			
Height. Height of emergent vegetation growing out of the grike's above the level of the clint top.	Set baseline		
% Cover litter in a more or less continuous layer, distributed either in patches or in one larger area. Estimate % in 2x2.	Less than 25% mean cover	Visual estimate in 2x2 m plots.	This refers to clint top vegetation. Outside of the target indicates insufficient management either by lack of grazing or mowing. This attribute can contribute to a loss of positive indicator species and herb richness.
% Cover bare ground **not rock** extent, noticeable without disturbing the vegetation.	Less than 10% mean cover	Visual estimate in 2x2 m plots.	Outside of the target indicates excessive trampling or sward disturbance and can lead to agricultural weed infestation or loss of herb richness and positive indicators.
*Vegetation Composition – Positive Indicators			

*Frequency of Community character species on the Limestone grassland on the clint top. At least four of the following at least frequent and four at least occasional throughout the sward: *Carex caryophyllea, Alchemilla sp, Campanula rotundifolia, Anthyllis vulneraria, Euphrasia sp, Thymus polytrichus, Galium verum, Ranunculus bulbosus, Linum catharticum, Koeleria macrantha, Lotus corniculatus, Succisa pratensis, Pilosella officinarum, Avenula pubescens, Polygala sp, Sesleria albicans,Briza media, Carex flacca, Euphrasia sp,*	Two at least frequent and three at least occasional throughout the sward: At least frequent is equivalent to greater than 41% occurrence in recorded plots. At least occasional is equivalent to greater than 21% occurrence in recorded plots	A structured walk over significant areas of Limestone Pavement where well defined clint and grike structure is evident. Presence recorded in 2x2 m plots and then establish frequency in 2x2 m plots throughout the entire site by working out % plots that species occurs within.	

*Presence of Community character species in the Grike Vegetation. *Geranium robertianum, Oxalis acetosella, Corylus avellana, Phyllitis scolopendrium, Asplenium ruta-muraria, Asplenium trichomanes, Cystopteris fragilis, Dryopteris filix-mas, Ceterach officinarum.*	Four at least occasional within Grikes throughout the pavement	A structured walk over significant areas of Limestone Pavement where well defined clint and grike structure is evident.	Note that significant areas of limestone pavement do not have a classic clint and grike structure. Here 'grike' vegetation should be assessed against appropriate rock clefts or similar structures.
*Vegetation Composition – Indicators of Negative Change			
*Cover of negative indicators - *Bellis perennis Holcus lanatus Ranunculus repens Lolium perenne*	No species should be individually at more than 10% cover	Visual estimate in 2x2 m plots.	Care should be taken with the setting of these targets as thresholds may vary considerably by site and conservation goals.

*Frequency of negative indicators – agricultural weeds *Cirsium arvense, Cirsium vulgare, Senecio jacobaea, Urtica dioica*	No more than one negative more than Occasional throughout the sward	Presence recorded within 2x2 m plots and frequency worked out throughout the sward.	The majority of the listed agricultural species respond to some form of nutrient enrichment. Therefore high or increasing frequency/cover will generally indicate unfavourable condition. However, *S. jacobaea* often reflects grazing management rather than soil nutrient status, and some horse-grazed pastures with frequent *S. jacobaea* can be potentially favourable, where other agricultural weeds are absent or at very low levels.
Cover of negative indicators *Pteridium aquilinum*, in period mid May-end July, measured annually if possible	*Pteridium aquilinum* should not be at more than 10%	Visual estimate in 2x2 m plots.	
*Woody species on open pavement	Woody species present on at least 5% of the whole pavement. Mean cover of scrub should be less than 25% over average of the open pavement. Mean cover measured in a 10m radius from the 2x2m plot.	Visual assessment of the presence and overall cover of woody species (excluding non-native species).	Open pavements need an element of dwarf woody growth and cover to be in favourable condition. A dwarf woodland element within the grikes, needs to be developed on such sites. Open pavement should not be lost to scrub encroachment. The open nature of open pavement often reflects its unfavourable condition Open pavement generally looks grey or white as a landscape feature and has vegetation mostly within the grikes. High scrub cover may be required at sites with specialist invertebrate interest.

Scrubby limestone pavement is measured by assessing structural variety. Clearings or open areas present with covered pavement.	Clearings or open areas present within scrubby pavement. Set baseline target.	Aerial assessment of pavement feature.	
Indicators of Local distinctiveness			
Rare or scarce species specific to the site or locally distinctive attributes not covered above	Site dependent e.g. presence of *Primula veris*		It is recommended that the appropriate size class and extent of scarce taxa be recorded. For plants, recommended size classes are as follows for number of shoots (or ramets): very small 1-10; small 11-100; medium 101-1000, large 1001-10000; very large >10000.

Feature 2 (SAC) - *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) **(Status B)**

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

Attribute	Target	Method of Assessment	Comments
Extent			
*Extent of Purple Moor-grass and rush pastures	Maintain the Extent of Purple Moor-grass and rush pastures at 306.08ha.	Visual estimate in 2x2 m plots and across the Purple Moor-grass and rush pastures using a combination of aerial photographs, SIM and Condition Assessment structured walk.	In exceptional circumstances, target may be set to accept some loss to other habitat, e.g. if required by specialist taxa or other ASSI feature in a mosaic such as lowland meadow or calcareous grassland.. Threshold areas for assessing 'significant' loss will vary according to site and the quality of available vegetation maps and/or aerial photos.
Presence of associated semi-natural habitats	Maintain existing associated semi-natural habitats (Lowland meadow	Visual estimate in 2x2m plots and across	Repeat monitoring of plots using GPS should indicate whether mosaics and associated habitats have changed or been lost.

	and pasture, wet woodland, Fen, wet heath etc.)	the ASSI using a combination of aerial photographs, SIM and Condition Assessment structured walk.	
Vegetation Structure			
Height (excluding *Juncus* spp.)	Mean vegetation height 2cm-20cm	Visual estimate in 2x2 m plots	
% Cover Litter (in a more or less continuous layer, distributed either in patches or in one larger area).	Less than 25% mean cover	Visual estimate in 2x2 m plots	

Cover of Bare ground not rock extent. Noticeable without disturbing the vegetation.	Less than 10% mean cover	Visual estimate in 2x2 m plots	NB. It is the average amount present through the sward. It must be visible from above without disturbing the vegetation and will not include rock or pebbles.
*Vegetation Composition – Positive Indicators			
*Frequency of *Molinia caerulea*. *Molinia* should be frequent throughout the sward. This only applies to Fen Meadow ASSI features.	Must be at least Frequent throughout the sward.	Presence recorded in 2x2 m plots and then establish frequency in 2x2 m plots throughout the entire site by working out % plots that species occurs within.	This only applies to Purple Moor-grass fen meadow (M24/M25/M26).
*Cover of herbs.	35%-90% herbs.	Visual estimate in 2x2 m plots	Herbs include small wood-rushes and sedges. Be careful estimating herb cover as it is usually underestimated in tall swards.
*Frequency of community character species	At least three of these species at least Frequent and three at least	Record presence in 2x2m plot	This list applies to the NVC communities M23, M24, M25 and M26.

Potentilla erecta, Carex flacca, Carex panicea, Carex pulicaris, Carex hostiana, Cirsium dissectum, Erica tetralix, Briza media, Ranunculus flammula, Linum catharticum, Dactylorhiza sp, Succisa pratensis, Crepis paludosa, Primula vulgaris, Breutelia chrysocoma, Ctenidium molluscum, Mentha aquatica, Lychnis flos-cuculi, Lotus pedunculatus, Hydrocotyle vulgaris, Lysimachia nummularia	Occasional throughout the sward:		

*Vegetation Composition – Indicators of Negative Change			
*Frequency of negative indicator species- agricultural weeds : *Cirsium arvense, Cirsium vulgare, Rumex crispus, Rumex obtusifolius, Urtica dioica*, *Bellis perennis,*, *Anthriscus sylvestris*, and *Plantago major*.	No more than occasional throughout the sward.	Record presence in 2x2m plot	
*Cover of negative indicator species – agriculturally favoured species : *Lolium perenne* and *Trifolium repens*	No species at more than 10% cover throughout the sward	Visual estimate in 2x2 m plots	
*Cover of *Holcus lanatus*.	No more than 20% cover	Visual estimate in 2x2 m plots	Holcus tends to be at a higher cover in wetter grasslands, so the generic target of 10% can be increased up to a maximum of 20%.

*Cover of rank grasses.	No more than 10% cover	Visual estimate in 2x2 m plots	Species such as *Arrhenatherum elatius*, *Deschampsia cespitosa* and large Carex spp. (leaves more than 5mm wide).
*Cover (combined) of *Cirsium palustris* and *Senecio aquaticus*.	No more than 20% cover combined	Visual estimate in 2x2 m plots	To quantify any sward disturbance through overgrazing etc.
*% cover of *Juncus* spp in Group A and B Group A: jointed rushes (*Juncus acut/arti/subnod*) Group B: *J. conglomeratus, J. effusus* and *J. inflexus*.	All species combined no more than 80% cover, of which no more than 50% made up of species from Group B	Visual estimate in 2x2 m plots	

*Cover of scrub/tree species and *Pteridium aquilinum* (except *Salix repens* or ericoids).	No more than 5% mean cover within the sward as measured in 10m radius of the plot.	Visual estimate within a 10 m radius of plot.	These targets should be used with caution. Scrub and tree cover can form a useful transition habitat across part of a site, but if more than occasional throughout a sward, even at less than 5% cover, scrub and bracken can soon become a problem if grazing levels are not sufficient or if control measures are not being carried out. High scrub cover may be required at sites with specialist invertebrate interest.
Indicators of Local distinctiveness			
Presence of rare species – to be determined.			It is recommended that the appropriate size class and extent of scarce taxa be recorded. For plants, recommended size classes are as follows for number of shoots (or ramets): very small 1-10; small 11-100, medium 101-1000, large 1001-10000; very large >10000.

Feature 3 (SAC) – Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia)* (Status B)

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

Attribute	Target	Method of Assessment	Comments
Extent			
*Extent of Upland Calcareous Grassland	Maintain the Extent of Upland Calcareous Grassland at 365.11ha.	Visual estimate in 2x2 m plots and across the lowland meadow and pasture using a combination of aerial photographs, SIM and Condition Assessment structured walk.	In exceptional circumstances, target may be set to accept some loss to other habitat, e.g. if required by specialist taxa or other ASSI feature in a mosaic such as rush pasture or lowland meadow and pasture grassland Threshold areas for assessing 'significant' loss will vary according to site and the quality of available vegetation maps and/or aerial photos.
Presence of associated semi-natural habitats	Maintain existing associated semi-natural habitats (Purple Moor-grass and rush pasture, acid grassland,	Visual estimate in 2x2m plots and across 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.

	wet woodland, Fen, wet heath etc.)		
Vegetation Structure			
Height (refers to height of pasture)	Mean vegetation height 2-10cm.	Visual estimate in 2x2 m plots.	Outside target indicates insufficient grazing or over-grazing. This attribute can contribute to a loss of positive indicator species and herb richness.
% Cover litter in a more or less continuous layer, distributed either in patches or in one larger area. Estimate % in 2x2.	Less than 25% mean cover.	Visual estimate in 2x2 m plots.	Outside of the target indicates insufficient management either by lack of grazing or mowing. This attribute can contribute to a loss of positive indicator species and herb richness.
% Cover bare ground not rock extent, noticeable without disturbing the vegetation.	Less than 10% mean cover.	Visual estimate in 2x2 m plots.	Outside of the target indicates excessive trampling or sward disturbance and can lead to agricultural weed infestation or loss of herb richness and positive indicators.

*Vegetation Composition – Positive Indicators			
*Cover of herbs, sedges and wood-rushes	30 - 90% herbs	Visual estimate in 2x2 m plots.	Note sedges taken as honorary herbs with small wood rushes
Frequency of Sesleria albicans.	At least frequent.	Record presence in 2x2, should be frequent throughout the sward, as the type species of the NVC community.	

Frequency of Community character species. At least four of the following at least frequent and four at least occasional throughout the sward: *Carex caryophyllea, Alchemilla sp, Campanula rotundifolia, Anthyllis vulneraria, Euphrasia sp, Thymus polytrichus, Galium verum, Ranunculus bulbosus,* *Linum catharticum, Koeleria macrantha, Lotus corniculatus, Succisa pratensis, Pilosella officinarum, Polygala sp Helictotrichon pubescens*.	Four at least frequent and four at least occasional throughout the sward:	Presences recorded in 2x2 m plots and then establish frequency in 2x2m plots throughout the entire site by working out % plots that species occurs within.	

Rare Species. Two of the following at least rare. *Antennaria dioica, Saxifraga hypnoides, Coeloglossum viride, Gentianella* sp.	Two of the rare species at least rare throughout the sward.	Presences recorded in 2x2m plots and then establish frequency in 2x2m plots throughout the entire site by working out % plots that species occurs within.	
*Vegetation Composition – Indicators of Negative Change			
*Cover of negative indicators - *Bellis perennis Holcus lanatus Ranunculus repens*	No species should be individually at more than 10% cover	Visual estimate in 2x2 m plots.	Care should be taken with the setting of these targets as thresholds may vary considerably by site and conservation goals.
*Frequency of negative indicators – agricultural weeds *Cirsium arvense, Cirsium vulgare, Lolium perenne Senecio jacobaea, Urtica dioica*	No more than one negative more than Occasional throughout the sward	Presence recorded within 2x2 m plots and frequency worked out throughout the sward.	The majority of the listed agricultural species respond to some form of nutrient enrichment. Therefore high or increasing frequency/cover will generally indicate unfavourable condition. However, *S. jacobaea* often reflects grazing management rather than soil nutrient status, and some horse-grazed pastures with frequent *S. jacobaea* can be potentially favourable, where other agricultural weeds are absent or at very low levels.

Cover of negative indicators *Pteridium aquilinum*, in period mid May-end July, measured annually if possible.	*Pteridium aquilinum* should not be at more than 10%	Visual estimate in 2x2 m plots.	
*Cover of scrub/tree species and (except *Salix repens* or ericoids).	No more than 5% mean cover within the sward as measured in 10m radius of the plot.	Visual estimate within a 10 m radius of plot.	These targets should be used with caution. Scrub and tree cover can form a useful transition habitat across part of a site, but if more than occasional throughout a sward, even at less than 5% cover, scrub can soon become a problem if grazing levels are not sufficient or if control measures are not being carried out. High scrub cover may be required at sites with specialist invertebrate interest.
Indicators of Local distinctiveness			
Rare or scarce species specific to the site or locally distinctive attributes not covered above	Site dependent e.g. presence of *Primula veris*		It is recommended that the appropriate size class and extent of scarce taxa be recorded. For plants, recommended size classes are as follows for number of shoots (or ramets): very small 1-10; small 11-100; medium 101-1000, large 1001-10000; very large >10000.

Feature 4 (SAC) - Tilio-Acerion forests of slopes, screes and ravines (Status B)

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

Attribute	Targets	Method of Assessment	Comments
Extent			
*Area of Mixed ashwood	Maintain the extent of Mixed ashwood at 136.63ha.	Visual estimate in 10x10m plots and 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
Mixed ashwood community diversity	Maintain presence of woodland communities, W9, W7, W11 & W17 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 and 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 Mixed ashwood may be desirable in some instances.
Vegetation Structure			
*Structural Variation (%Cover)	Mean Canopy cover greater than 60% Where Hazel predominates, take this as the canopy layer.	Estimate within the visual vicinity of the monitoring plots.	A well structured wood should have a well developed canopy and shrub layer. However, many Mixed ashwoods in County Antrim and on very shallow soils on limestone across Northern Ireland are dominated by Hazel with very few Ash standards. It is the current belief, that even if optimal management practices were to be adopted, these Hazel woods will never sustain an Ash canopy. Therefore in these Hazel Woods, natural processes result in the canopy and the shrub layer merging together to give one structural layer. Therefore it is acceptable to have a mean shrub cover falling

			outside the specified limits for all other Mixed ashwoods.
	Mean Shrub cover should be maintained between 20 - 50% Note: There are no set limits for mean shrub cover in Hazel Woods.	Estimate within the visual vicinity of the monitoring plots.	
	Maintain current levels of standard variation within reasonable limits for Field, Herb and Moss cover.	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.
		Visual estimate in 10x10m plots.	
		Visual estimate in 10x10m plots.	
	Mean cover of bare ground should be less than 5%.	Visual estimate in 10x10m plots.	
*Age-class variation (DAFOR)	Young Trees (5- 20cm diameter) at least occasional in 25% of Plots. In the case of Hazel this	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. However, on very steep sided slopes with shallow soils, over-mature trees are unlikely to occur as larger trees are likely to fall

	refers to young vigorous "stools" with not to many stems.		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. In the case of Hazel this refers to the normal Hazel bush, i.e. not falling over and no large trunks.	Visual estimate in 10x10m plots.	
	Over-mature Trees (>75cm diameter) at least present in 10% of Plots In the case of Hazel this refers to large trunks and	Visual estimate in 10x10m 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 mixed Ash woodland.	Regeneration of Ash 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.
	Regeneration of Ash 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.	

Vegetation composition – Negative indicators			
*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 mixed Ash woodland should be largely comprised of Ash trees with associated native species. 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. *(Galium aparine, Urtica dioica, Heracleum spp, Epilobium spp. Rumex obtusifolius)*	Visual estimate in 10x10m plots.	
*Cover of *Pteridium* (% Cover)	The mean cover of Pteridium or 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 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 and 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 base-rich woodland indicators (W9 community) listed below:- *Sanicula europaea, Geum urbanum, Polystichum setiferum, Anemone nemorosa, Primula vulgaris*.	Visual estimate in 10x10m plots.	Within any Mixed ashwood, there may be pockets of acid woodland and or flushed woodland within the boundaries of the ASSI/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 acid woodland indicators (W11 & W17 communities) listed below:- *Vaccinium myrtillus, Blechnum spicant, Dicranum spp., Luzula pilosa, Rhytidiadelphus loreus*.	Visual estimate in 10x10m plots.	Within any Mixed ashwood, there may be pockets of acid woodland and or flushed woodland within the boundaries of the ASSI/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 flushed woodland indicators (W7 community) listed below:- *Carex remota, Ranunculus repens, Chrysosplenium oppositifolium, Filipendula ulmaria, Lysimachia nemorum*.	Visual estimate in 10x10m plots.	Within any Mixed ashwood, there may be pockets of acid woodland and or flushed woodland within the boundaries of the ASSI/SAC. The diversity of these woodland communities should be maintained.

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.	Name the species at least present along the length of the Condition Assessment structured walk.	Note: Where the Rare Plant Assemblage is recorded as an ASSI selection feature; woodland plants will be monitored separately. Mapped locations of rare species will be inspected for presence or absence.

Feature 5 (SAC) – Alkaline Fens (Status C)

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

Attribute	Targets	Method of Assessment	Comments
Extent			
*Area of Fen	Maintain the extent of fen (at 1ha where known).	Visual estimate in 2x2m plots and across the extent of the fen should be monitored using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Variety within fens is determined by water supply mechanism, hydroseral succession and land management practices. Account should be taken of successional processes and management aims/priorities.
*Mire community diversity	Maintain presence of fen communities e.g. M9, M10 as established at base line survey.	Visual estimate in 2x2m plots.	Natural succession may lead to an increase in the area of certain communities and a decrease in others. The most likely changes are subtle shifts in species composition as a result of eutrophication or water-level changes. Repeat monitoring of plots using GPS should indicate whether fen communities have changed or been lost.
Presence of associated semi-natural habitats	Maintain existing associated semi-natural habitats (wet grassland, wet woodland, wet	Visual estimate in 2x2m plots and across the ASSI using a combination of aerial	Repeat monitoring of plots using GPS should indicate whether mosaics and associated habitats have changed or been lost. Note: Loss of associated habitats to fen communities may be desirable in some instances.

	heath etc.)	photographs, SIM and Condition Assessment structured walk.	
Vegetation structure			
Vegetation height (cm)	Mean vegetation height of medium fen communities (e.g. M9, M22) should be 30–75cm. Mean vegetation height of short fen communities (e.g. M10, M13) should be 5–15cm.	Visual estimate in 2x2 m plots.	Medium fen communities are highly variable. After the baseline survey, these can be set with more precision.
Cover of litter/thatch accumulation (% cover)	Less than 10% mean cover in medium fen communities (e.g. M9, M22) Less than 5% mean cover in short fen communities (e.g. M10, M13)	Visual estimate in 2x2m plots.	More than 10% litter cover indicates insufficient removal of biomass by grazing.

Extent of bare mud visible without disturbing the vegetation (% cover)	Less than 10% mean cover in medium fen communities (e.g. M9) Less than 25% mean cover in short fen communities (e.g. M10, M13)	Visual estimate in 2x2m plots.	A high cover of exposed substrate will usually be undesirable and may indicate over-grazing and water scour. Patches of exposed substrate are likely to be more typical/desirable for short fen communities such as M10 which is often based on unconsolidated peat exposed beneath a water film. At a later stage it might be better to merge these two targets and have just one threshold of less than 15%.
Vegetation composition – Positive Indicators			
*Combined cover of herbs and sedges in fen areas (only applicable to medium height sedge fen communities e.g. M9)	Maintain cover greater than 45%	Visual estimate in 2x2m plots.	
Cover of all bryophytes (only applicable to medium height sedge fen communities e.g. M9)	Maintain moss cover appropriate to fen vegetation communities recorded for the site.	Visual estimate in 2x2m plots.	Refer to Common Standards Monitoring guidance for lowland wetland habitats.

*Combined cover of key species – small *Carex*, all bryophytes, *Eleocharis* spp., *Eriophorum* spp., *Schoenus nigricans* and *Molinia caerulea* (% cover) (only applicable to short sedge fen communities e.g. M10, short M13)	At least 75% of the vegetation cover should be made up of key species. (exclude bare peat)	Visual estimate in 2x2m plots.	This is only applicable to short calcareous and alkaline fen.
*Frequency of positive indicators short medium fen (DAFOR scale) *Alisma-plantago aquatica, Anagallis tenella, Angelica sylvestris, Berula erecta, Briza media, Caltha palustris, Carex curta, C. diandra, C. dioica, C. disticha, C. flacca, C. hostiana, C. nigra, C. panicea, C. pulicaris, C. rostrata, C. vesicaria, C. viridula, Cicuta virosa, Crepis paludosa, Dactylorhiza sp., Epilobium palustris,*	At least six indicator species at least occasional, of which three are at least frequent throughout the sward:	Visual estimate in 2x2m plots.	The suite of key communities to be monitored is chosen on a site specific basis. In some instances short sedge communities (e.g. M10, M13) may fail on this attribute as they are naturally species poor. However, providing they have passed on the % cover of combined key species they should be recorded as favourable for this attribute.

Equisetum fluviatile, E. palustre, Eriophorum angustifolium, Euphrasia spp., Galium palustris, Hydrocotyle vulgaris, Juncus articulatus, Linum catharticum, Lotus pedunculatus, Lychnis flos-cuculi, Lycopus europaeus, Lysimachia vulgaris, Lythrum salicaria, Mentha aquatica, Menyanthes trifoliata, Oenanthe crocata, Parnassia palustris, Pedicularis palustris, Pinguicula vulgaris, Potamogeton spp., Potentilla erecta, Potentilla palustris, Ranunculus flammula, Sagina nodosa, Selaginella selaginoides, Succisa pratensis, Triglochin palustre, Valeriana officinalis, Veronica scutellata, Viola			

palustris. Aulacomnium palustre, Bryum pseudotriquetrum, Calliergon spp., Campylium stellatum, Cratoneuron/Drepanocladus, Ctenidium molluscum, Polytrichum commune, Scorpidium scorpioides, Sphagnum denticulatum, Sphagnum fallax, Sphagnum palustre, Sphagnum squarrosum			
Vegetation composition – Indicators of Negative Change			
*Frequency and % cover of scrub/tree encroachment on the fen communities (DAFOR and % cover).	Scrub/tree encroachment including *Betula*, *Salix*, *Rhododendron* etc should be no more than occasional over the fen communities.	Visual estimate within a 10 m radius of plots and across the feature using a combination of aerial photographs and Condition Assessment structured walk.	Scrub and woodland are integral components of many fen systems and may be particularly important for invertebrates. However, invasion by woody species, primarily *Betula* and *Salix*, and their development to maturity may indicate drying out, dereliction, disturbance and/or enrichment.

	Mean cover should be less than 10 %.		
Height of trees and scrub within fen communities (cm)	Average height of scrub, where it is recorded.	Visual estimate within a 10 m radius of plots.	The average height of *Betula* and *Salix* scrub will help to access their maturity and help to inform management.
Frequency of seedlings/ saplings. (DAFOR)	Seedlings/saplings should be no more than rare over the fen communities.	Visual estimate within a 10 m radius of plots.	High levels of seedlings and saplings indicate recent dereliction or other change in management. These fen communities are under threat from significant scrub encroachment.
*Frequency and % cover of negative indicator species- eutrophication indicators: *Phalaris arundinacea, Glyceria maxima, Typha latifolia, Epilobium hirsutum, Urtica dioica.*	No one negative indicator species more than rare throughout the fen and/or singly or together comprising more than 5% cover.	Visual estimate in 2x2m plots.	
*% cover of negative species – indicating lack of management/successional changes:	No one negative indicator singly or together comprising more than 10% cover.	Visual estimate in 2x2m plots.	

Filipendula ulmaria, Phragmites australis.	In short fen communities (M10/M13) *Phragmites* cover should be no more than rare.		
*% cover of *Juncus* spp in Group A and B Group A: jointed rushes (*Juncus acut/arti/subnod*) Group B: *J. conglomeratus, J. effusus and J. inflexus.*	All species combined less than 20% cover and less than 5% made up of species from Group B.	Visual estimate in 2x2m plots.	Where M22 vegetation is dominated by *Juncus subnodulosus* a higher mean cover may be considered.
*Cover of grasses (excludes *Phalaris* and *Phragmites*, but includes the rank grasses *Arrhenatherum elatius, Deschampsia cespitosum, Brachypodium sylvaticum*)	All grass species combined less than 20% cover and less than 10% made up of rank grasses.	Visual estimate in 2x2m plots.	
*% cover of *Molinia caerulea* (only applicable to the NVC communities M9/S27, M10 and M13)	% cover in M10 or M13 should be less than 25% % cover in M9/S27 should be less than 5%	Visual estimate in 2x2m plots.	

Fen hydrology			
*Groundwater elevation (Ground soft, bouncy and squelchy)	Maintain the water table height as determined at baseline survey.	Test with foot	Maintain the water table height as determined at baseline survey. The water table level will obviously fluctuate seasonally and with local weather conditions. However, this assessment should try and gauge if the hydrology of the site is being adversely affected.
Indicators of Local Distinctiveness			
Presence of notable or locally distinctive species specific to the site (include species of note mentioned in the site citation) e.g. *Juncus subnodulosus*.	Locally distinctive species recorded for the site should be at least present along the length of the Condition Assessment structured walk.	Name the species 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. Some sites may not have any notable or locally distinctive species recorded.

Feature 6 (SAC) – Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation (Status C)

Attribute	Targets	Method of assessment	Comments
Extent	No loss of extent of standing water	Assessment against baseline map. Aerial photographs may be useful.	This attribute is to assess changes caused by active management, such as infilling or channel diversion. Changes due to drying out or successional change are covered under other attributes.
Vegetation composition: macrophyte community composition	i) Presence of at least 6 of the characteristic species listed in Box 4 (except where valid reasons (see comments) suggest otherwise). At least two species should be from the appropriate water type (i.e. mesotrophic or eutrophic). ii) No loss of characteristic species recorded from the site (see Box 4 below) iii) 6 out of 10 sample spots (boat or wader	Fixed point sector/transect sampling (boat or shore-based methods)	It is likely that natural eutrophic lakes are now uncommon in the EU owing to pollution, but the exact status of the habitat type is unknown. In the UK, lakes of this type are comparatively rare, although they have a wide and scattered distribution. These water bodies have nutrient levels that are higher than those of oligotrophic, dystrophic or mesotrophic loughs, resulting in higher natural productivity, and are typically species-rich. *Magnopotamion* vegetation are pondweed-dominated formations of submerged rooted perrennials with species such as *Potamogeton perfoliatus, P. lucens, P. praelongus, P. coloratus* and various submerged associates such as *Myriophyllum spicatum* and *Ceratophyllum demersum. Magnopotamion* vegetation is generally quite sensitive to adverse impacts such as eutrophication or fish disturbance. *Hydrocharition*-type vegetation are largely free-floating surface communities with species such as *Lemna* spp., *Hydrocharis morsus-ranae* and *Stratiodes aloides*. *Hydrocharition*-type vegetation in the UK is rare in lakes and seems to be confined to

Attribute	Targets	Method of assessment	Comments
	survey) should include at least one characteristic species from Box 4.		Northern Ireland. In the rest of the UK the most complete expression of this community type is found in the ditch systems of the Norfolk Broads. *Hydrocharition* vegetation is sensitive to wave action. There may be valid reasons why a characteristic species is not present at a site (such as biogeographic range or isolation from source populations) which need to be considered when applying targets to an individual site. Except in the most northerly areas, *Scirpo-Phragmitetum* associations fringe many eutrophic lakes. More northern shorelines may have *Phalaris-Littorella-Eleocharis* associations. Most eutrophic lakes are formed on soft rocks but wave-washed rocky shores can form an important part of the habitat on larger lakes. The UK selection of sites was based largely on the presence of remnants of the *Hydrocharition* (mainly duckweed *Lemna* spp.) and a good representation of the *Magnopotamion*. Check for increased frequency of occurrence of pollution tolerant species, such as *Potamogeton pectinatus, Myriophyllum spicatum, Zannichellia palustris* and/or *Ceratophyllum demersum*. Dominance of these species may indicate a site is in unfavourable condition.

Attribute	Targets	Method of assessment	Comments
Vegetation composition: negative indicator species	Non-native species should be absent or present at low frequency Non-*Chara* algal dominance: cover of benthic and epiphytic filamentous algae less than 10%		Introduced species should be identified. A number of non-natives have such invasive potential that they should be assessed separately. Species of particular concern are: *Crassula helmsii*, *Hydrocotyle ranunculoides*, *Myriophyllum aquaticum* and *Azolla filiculoides*. If any of these species are present, a water body should be considered as being in unfavourable condition. This list is not exhaustive and should be updated as new threats become apparent. Colonisation since the previous field visit by *Elodea nuttallii* or *Elodea canadensis* at >5% frequency is indicative of unfavourable condition, as is dominance of naturalised non-native species, such as *E. canadensis*. Occurrence of such species at >50% frequency in productive waters, is indicative of unfavourable condition. Presence of extensive cover of filamentous algae and especially *Cladophora glomerata* is indicative of a site moving out of favourable condition. There should be no persistent blanket growth of filamentous algae on macrophytes or substrate
Macrophyte community structure	Characteristic zones of vegetation should be present	Fixed point sector/transect sampling (boat or shore-based methods)	Extensive beds of submerged macrophytes should be present. Emergent vegetation may include beds of *Phragmites australis*, *Schoenoplectus lacustris* and *S. tabernaemontani* or *Typha latifolia* and *T. angustifolia* and, in the north and west of the UK, lawns of *Littorella uniflora.*

Attribute	Targets	Method of assessment	Comments
	Maximum depth distribution should be maintained Maintain at least the present structure		Depth penetration of *Potamogeton* spp. should not be compromised by changes in water quality Where present, well defined hydroseres should be maintained.
Water quality	Stable nutrient levels appropriate for the lake type	Existing data or develop a water-sampling regime. This should be carried out quarterly, ideally monthly. As a minimum, samples should be taken in early spring. Water transparency measurements should also be taken.	These are oxygen- and nutrient-rich waters, clear except for periods of increased algal biomass in seasonal succession of algal blooms. As there is a wide clinal range of community types embraced by this feature, the acceptable range of chemical conditions (especially total P, other elements of phosphorus, pH/ANC, and where appropriate NO3-N,) should be set for individual SAC lakes from recent or historical water chemistry data. Acceptable ranges of values for each variable should be established. Mean annual TP concentrations (based on at least quarterly measurements), or spring TP levels, should meet the targets appropriate for the lake type documented in the guidance, unless site-specific targets are available. If palaeolimnological techniques or hindcast modelling have been employed to reconstruct natural background TP concentrations for a particular lake these can be used to set

Attribute	Targets	Method of assessment	Comments
			targets, although it may be necessary to accept a small deviation from these background conditions. Alternatively, historical water chemistry data may exist for individual lakes. Where existing, site-specific TP concentrations are consistently lower than the standard appropriate for the habitat type, a lower target should be applied to prevent deterioration from current status.
	Stable pH/ANC values appropriate for the lake type.		*As a guide, generally pH > 7.00 and < 9.00* The acceptable range of chemical conditions (especially total P, other P fractions, pH/ANC, and where appropriate NO_3-N) should be set for individual SAC lakes from recent or historical water chemistry data. From a management perspective it would be useful to establish whether the individual systems are N or P limited. Check for changes in land-use in the catchment causing diffuse pollution and/or siltation and check point sources of pollution. Aerially applied agro-chemicals have a high potential to change plant communities, and move them out of favourable condition.
	Adequate dissolved oxygen levels for health of characteristic fauna	Existing data, or dissolved oxygen/temperature profile	Other methodologies involving trophic scoring can contribute to the assessment of favourable condition.
	No excessive growth of	Existing data, shoreline walk, sampling of bloom	Levels of dissolved oxygen should support the invertebrate and vertebrate taxa associated with this lake type.

Attribute	Targets	Method of assessment	Comments
	cyanobacteria or green algae.		There should be no evidence that algal blooms are excessive and/or persistent.
Hydrology	There should be a natural hydrological regime	Shoreline walk. Where necessary, develop a hydrological model and sampling regime. This should initially be carried out quarterly as a minimum, ideally monthly.	Natural flushing rate and seasonal pattern of fluctuation need to be considered. Maintain flushing rate of system. Modifications of inflows and outlets or changes in hydrology (e.g. from flood control regimes and abstraction) can lead to unnatural changes in lake levels.
Lake substrate character	Maintain the natural shoreline of the lake. Maintain natural and characteristic substrate for lake type.	Shoreline walk. Need to consider the development of a modified freeze coring technique as developed for collecting sediments in rivers.	Sediment quality and quantity when enriched can cause excessive growths of *Juncus bulbosus* var. *fluitans* or growths of algae.
Sediment load	Maintain natural sediment load.	Direct observation and /or establish sedimentation rate from sediment cores or sediment traps.	Increases in siltation could result from e.g. increased lake productivity, changes in catchment land-use (particularly over-grazing), lake level fluctuations, climatic fluctuations or changes in sewage treatment. If broad-leaved *Potamogeton* species decline and the fine-leaved *Potamogeton pectinatus* increases above 40% level or *Myriophyllum spicatum/Ceratophyllum demersum/Zannichellia palustris* become dominant, yet water quality is at target levels, then enrichment of sediments may be an issue.

Attribute	Targets	Method of assessment	Comments
Indicators of local distinctiveness	Maintain distinctive elements (e.g. rare plant or invertebrate species, habitat features) at current extent/levels and/or in current locations.	As appropriate	This attribute is intended to cover any site-specific aspects of this habitat feature (forming part of the reason for notification) which are not covered adequately by the previous attributes, or by separate guidance (e.g. for notified species features). For species of local distinctiveness, which are documented on citations, or for which records are held for individual lakes, references such as LACON (Palmer, in prep.) should be consulted for current lists of species rare in the constituent countries of GB and in EA and SEPA areas. For "notable" species (e.g. nationally scarce plants), it is not intended that a target is set for detailed species monitoring. It is intended that a rapid indication of presence/absence and /or approximate extent should be provided. Allowing for natural fluctuations in population size. The same approach applies to "notable" habitats.

Aspects of environmental disturbance to be noted as an accompaniment to assessing condition: Natural eutrophic lake

Objective	Specified assessment method (if appropriate)	Comment
Impact of factors that can act as "forward switches" to phytoplankton-dominant turbid-water conditions should be minimised. Minimal negative impact from artificial structures Minimal negative impact from recreation or navigation No introduction, or stocking, of fish or other organisms not indigenous to the water body. No fish farming, excessive stocking or selective removal of piscivores. No herbicide or pesticide use in water or catchment areas vulnerable to runoff.		Forward switches include nutrient addition, mechanical or boat damage to plants, herbicides, exotic vertebrate grazers (e.g. grass carp), pesticides, increased salinity and differential kills of piscivores. Artificial structures could include boat-mooring facilities, dams, fish reefs, fishing platforms. Negative impacts from recreational activities can include enrichment caused by ground baiting, introduction of herbivorous, planktivorous or bottom feeding fish and other organisms not characteristic of the habitat, increased disturbance to SACs from water-sports. Negative impacts from navigation can include sediment disturbance and physical destruction of plant communities. Zebra mussels have the potential to change the fundamental character of the ecosystem. Catchment area changes affecting the lake, such as flood defences and infrastructure schemes should be considered.

Box 4. Characteristic species of the SAC feature of natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation equates to Eutrophic standing waters

Characteristic species	Associates
Magnopotamion species:	Various submerged species including:
Potamogeton spp:	*Ceratophyllum demersum*
P .lucens	*Potamogeton friessii*
P. perfoliatus	*P. pusillus*
P. coloratus	*P. obtusifolius*
P. praelongus	*P. berchtoldii*
P. x zizii (or any other hybrid with one of the above three species as a parent)	*P. trichoides*
Chara spp.	*P. pectinatus*
	P. filiformis
	P. crispus
	Myriophyllum spicatum
	Zannichellia palustris
	Ranunculus circinatus
	Callitriche spp.
Hydrocharition species:	Associates
Stratiotes aloides	*Nuphar lutea*
Lemna sp.	*Nymphaea alba*

Hydrocharis morsus-ranae	*Potamogeton natans*
Riccia fluitans	*Butomus umbellatus*
Utricularia australis/vulgaris	*Callitriche* spp.
Spirodela polyrhiza	

Associated marginal *Scirpo-Phragmitetum* species include: *Phragmites australis*, *Schoenoplectus lacustris*, *Sparganium erectum*, *Typha* spp., *Alisma plantago-aquatica*.

Feature 7 (SAC) – Active Blanket Bog (Status C)

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

Attributes	Targets	Method of Assessment	Comments
Extent			
*Area of blanket bog and upland raised mire (ha)	Maintain the extent of the intact bog surface (at xxha where known).	Visual estimate in 2x2m plots and across the blanket bog using a combination of aerial photographs, SIM and Condition Assessment structured walk.	The blanket bog communities include M17 – *Scirpus cespitosus-Eriophorum vaginatum* blanket mire, M18 – *Sphagnum papillosum* raised and blanket mire and M19 *Calluna vulgaris -Eriophorum vaginatum* 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 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.
Structure			
*Pool/hummock system extent and complexity	The extent and complexity of pool and hummock systems at least maintained. Differentiation of *Sphagnum* species should be recorded with S. *cuspidatum* or S. *auriculatum* in the pools and S. *papillosum* and S. *capillifolium* forming the lawns and hummocks.	The extent of pool and hummock systems should be monitored using a combination of aerial photographs and SIM.	The extent of pool and hummock systems should be monitored using a combination of aerial photographs and Condition Assessment. Within xxxxx SAC, there is a xxxxx pool system
Dwarf-shrub Height (cm)	Average ericoid height should be 15 –30 cm.	Visual estimate in 2x2m 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 (excluding recently burnt areas) should occupy less than 2% of the intact blanket bog surface overall.	Visual estimate in 2x2m plots.	Bare peat, or bare ground carpeted by *Polytrichum* spp., *Campylopus* 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.
Vegetation Composition – Positive Indicators			
**Sphagnum* Cover/Abundance (% cover and frequency) Active Peat Formation (DAFOR)	*Sphagnum* moss species should have a minimum cover of 25% over at least 66% of the intact lowland raised bog surface. Thick, hummock forming species of sphagnum should be at least occasional.	Visual estimate in 2x2m plots.	A constant *Sphagnum* moss cover is indicative of active peat formation and is dependent on the maintenance of a high water table. *Sphagnum* moss is therefore used to measure the hydrological integrity of the blanket bog 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	Visual estimate in 2x2m plots.	Ericoid (dwarf-shrub species) include *Calluna vulgaris*, *Erica tetralix*, *E. cinerea*, *Myrica gale*, *Vaccinium myrtillis and Empetrum nigrum*.

	areas where *Narthecium ossifragum* or *Sphagnum* spp. are abundant and forming lawns.		
*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 2x2m plots.	A mono-dominant sward of *Calluna vulgaris* 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.

Vegetation Composition – Indicators of negative Change			
*Scrub/tree encroachment on any active peat surface (DAFOR)	Scrub/tree encroachment should be no more than Rare on the intact bog surface, or in the actively regenerating cutover areas.	Visual estimate in 2x2m plots.	Scrub encroachment should be checked using a combination of aerial photographs and Condition Assessment. Invasive exotic species such as *Rhododendron ponticum* 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	Visual estimate in 2x2m 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.

	area of blanket bog other than very localised instances.		
*Graminoid Cover (%)	Total cover of graminoids should not exceed 50%, unless dominated by *Molinia caerulea* forming even swards over waterlogged areas with *Sphagnum* moss cover greater than 25%.	Visual estimate in 2x2m plots.	Include true grasses, sedges, and rushes in this assessment. *Eriophorum vaginatum*, *Trichophorum cespitosum*, *Deschampsia flexuosa*, *Juncus squarrosus* or other graminoids (except *Molinia* in some instances) should not dominate over other species.
*Management - Peat extraction	No evidence of unconsented active peat extraction.	Visual estimate in 2x2m 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 2x2m plots.	The frequency of droppings, the extent of poaching and the presence of grazing induced *Calluna vulgaris* growth forms indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.

Indicators of Local Distinctiveness			
Molinia caerulea Cover (%)	Where *Molinia caerulea* cover is greater than 50%, it should form an even (not tussocky) sward in waterlogged conditions with *Sphagnum* moss cover greater than 25%.	Visual estimate in 2x2m plots.	*Molinia caerulea* 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.	*Sphagnum imbricatum* and *Sphagnum fuscum*, where they have been recorded, should remain at least present along the length of each of the w-walks.	Visual estimate in 2x2 m plots.	If these species are not recorded on any one visit, it does not automatically make the SAC unfavourable.

Feature 8 (SAC) – Northern Atlantic wet heath with *Erica tetralix* (Status C)

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

Attributes	Targets	Method of Assessment	Comments
Extent			
*Area of wet heath	Maintain the extent of wet heath (at 133.51 ha).	Visual estimate in 2x2 m plots and across the wet heath using a combination of aerial photographs, SIM and Condition Assessment structured walk.	Any loss of wet heath or fragmentation of this habitat is unacceptable. Note that it may be possible to extend wet heath communities, provided this is into degraded areas and does not encroach into other habitats of scientific interest.
*Heath community diversity	Maintain the presence of the wet heath community M15 as established at base line survey.	Visual estimate in 2x2 m plots.	Repeat monitoring of plots using GPS should indicate whether wet heath communities have changed or been lost.
*Area of mosaic communities and associated semi-natural habitats.	Maintain associated mosaic communities and semi-natural habitats (dry heath, blanket bog,	Visual estimate in 2x2 m plots and across 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.

	flush, etc).		
Vegetation Structure			
Dwarf-shrub height	Average ericoid height should be 15 – 35 cm with at least 25% of the wet heath in the late mature/degenerate growth phase (greater than 35 cm).	Visual estimate in 2x2 m plots.	On some areas of wet heath (especially on gentle slopes), the ericoid age structure will largely reflect recent burning patterns. However, in wet heath, burning should only be carried out in exceptional circumstances. Heather height reflects the age structure of the Heather.
*Bare Peat, or ground covered by algal mats (% cover)	Bare peat etc. (excluding recently burnt areas), should occupy less than 2% of the wet heath surface overall.	Visual estimate in 2x2 m plots.	Bare peat or peat carpeted by *Polytrichum* spp., *Campylopus* spp. crust forming lichens or algal mats can occur as a consequence of excessive burning and/or grazing. Bare peat here represents bare peat etc. within the wet heath vegetation.

Vegetation Composition – Positive Indicators			
*Ericaceous cover (% cover)	Dwarf-shrub cover should be maintained between 50 – 75%	Visual estimate in 2x2 m plots.	Although dominated by dwarf shrubs, the sward should be composed of a variety of higher plants and bryophytes.
*Ericoid diversity	At least two species of dwarf-shrub at least present in 90% of plots.	Visual estimate in 2x2 m plots.	Ericoid (dwarf-shrub species) include *Calluna vulgaris*, *Erica tetralix*, *Empetrum nigrum* and *Myrica gale*.
*Cover of graminoids (% cover)	Total graminoid cover should be less than 50%.	Visual estimate in 2x2 m plots.	Include true grasses, sedges, and rushes in this assessment. *Molinia caerulea, Trichophorum cespitosum, Deschampsia flexuosa*, *Juncus squarrosus* or other graminoids should not dominate over other species. Localised *Schoenus nigricans* flushes should not be included in this habitat assessment.
*Bryophyte cover and frequency of *Sphagnum* mosses (% cover and DAFOR)	Mean bryophyte cover (excluding *Polytrichum* spp. and *Campylopus* spp. on bare ground) should be at least 25%.	Visual estimate in 2x2 m plots.	Bryophytes should include a range of pleurocarpus species forming patches below, or in more open swards beneath the dwarf-shrubs as well as *Sphagnum* moss species.

	Sphagnum moss species should be at least Frequent throughout the moss layer.		
Vegetation Composition – Indicators of Negative Change			
*Frequency and % cover of scrub/tree encroachment on wet heath communities. (DAFOR and % cover)	Scrub/tree encroachment should be no more than rare over the wet heath community. Mean cover should be less than 2%.	Visual estimate within a 10 m radius of plots and across the feature using a combination of aerial photographs and Condition Assessment structured walk.	Scrub encroachment should be checked using a combination of aerial photographs and Condition Assessment. Invasive exotic species e.g. *Rhododendron ponticum* should be removed immediately.
*Frequency and cover of undesirable agricultural grasses and weeds (DAFOR and % cover)	None of the following should be more than rare: *Cirsium arvense, C. vulgare, Senecio jacobaea, Urtica dioica, Plantago*	Visual estimate in 2x2 m plot.	

	major, Phleum pratense, Trifolium repens, Holcus lanatus and *Lolium perenne*. Combined mean cover of agricultural grasses and weeds less than 1%.		
*Management - Grazing (% cover)	Signs of moderate or heavy grazing should occupy less than 5% of the wet heath vegetation.	Visual estimate in 2x2 m plots.	The frequency of droppings, the extent of poaching, uprooting of dwarf shrubs and invasion by *Juncus squarrosus* etc. indicate moderate and heavy grazing where any one of the above is recorded as more than occasional.
*Management - Burning (% cover)	Signs of recent burning should occupy less than 5% of the wet heath vegetation.	Visual estimate in 2x2 m plots and across the feature using a combination of aerial photographs, SIM and Condition Assessment structured walk.	

Frequency and cover of Erosion Features associated with human impacts (DAFOR and % cover)	No gully erosion, bare peat or rock associated with more concentrated human impacts (ATV tracks or recreational activities). Man induced/enhanced erosion should occupy less than 2% of the total area of wet heath 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 high mountain slopes. However, where natural erosion is exacerbated by human activity, mainly hill walking, the heath will not be in favourable condition, except where such erosion is very limited in nature.
Indicators of Local distinctiveness			
Herb diversity	Herbs (excluding negative indicators) at least frequent.	Visual estimate in 2x2 m plots.	Wet heaths tend to be dominated by dwarf-shrubs and graminoids; however, some herbs should be present in most plots (albeit at a low cover).

Feature 9 (SAC) – Petrifying springs with tufa formation (*Cratoneurion*) (Status C)

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

Attribute	Target	Method of Assessment	Comments
*Morphological naturalness (extent and processes)	No human induced developments impacting on the natural system, including livestock impacts	Ensure that any loss in extent and change in system dynamics is only due to natural processes	This community is maintained primarily by water quality considerations and by an absence of physical impacts on the feature. Provided that no human developments, including livestock impacts, result in direct loss of habitat or of areas with the potential to develop this habitat, or change the feature dynamics, then the attribute should be deemed to be in favourable condition.
Characteristic species	Growing Cratoneuron present over 25% of tufa.	Cratoneuron Cover	To be verified - possibly not easily measurable.
Disturbance	<5%	Approximate area of feature impacted by physical disturbance	To include obvious signs of tufa removal or effects trampling. Provided that water quality has not been impacted, the feature is recoverable in the long-term.
*Water quality	To be defined – sub-attributes Ca, Alk, pH, TP, BOD to be finalised	To be defined – sampling frequency probably 2/year	Main concern relates to long-term change to water quality – the feature should generally recover from episodic or discrete polluting events – any significant effects due to the latter should be identified through disturbance

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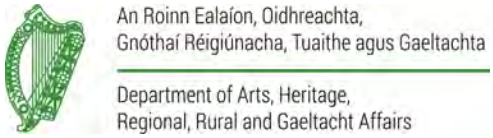
Conservation Objectives Series

Arroo Mountain SAC 001403



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Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Notes/Guidelines:

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

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

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

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

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2012
Title :	Ireland Red List no. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	Conservation status assessment for petrifying springs
Author :	Lyons, M.D.; Kelly, D.L.
Series :	Unpublished report to NPWS
Year :	2013
Title :	National survey of upland habitats (phase 3, 2012-2013), site report no.12: Arroo Mountain cSAC (001403), Co. Leitrim
Author :	Perrin, P.M.; Roche, J.R.; Barron, S.J.; Daly, O.H.; Hodd, R.L.; Muldoon, C.S.; Leydon, K.J.
Series :	Unpublished report to NPWS
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2016
Title :	Arroo Mountain SAC (site code: 1403) Conservation objectives supporting document- upland habitats- V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1988
Title :	The Irish red data book 1. Vascular plants
Author :	Curtis, T.G.F; McGough, H.N.
Series :	Wildlife Service, Dublin
Year :	2000
Title :	A guide to habitats in Ireland
Author :	Fossitt, J.A.
Series :	The Heritage Council, Kilkenny
Year :	2013
Title :	Interpretation manual of European Union habitats- Eur 28
Author :	European Commission- DG Environment
Series :	European Commission

Spatial data sources

Year :	2012
Title :	National Survey of Upland Habitats- Phase 3
GIS Operations :	Habitat dataset for site clipped to SAC boundary. Relevant QI selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	4010, 4030, 4060, 7130, 7220, 8120, 8210 (maps 3 to 7)

4010 Northern Atlantic wet heaths with Erica tetralix

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

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

Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush (*Juncus effusus*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: signs of browsing	Percentage at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids, crowberry (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) showing signs of browsing	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of 2m x 2m monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: drainage	Percentage cover in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details

4030 European dry heaths

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes	Arroo Mountain SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of dry heath stated by Perrin et al. (2013) is 363.4ha, covering 9.2% of the SAC. Perrin et al. (2013) report minor obvious losses of habitat of 0.01ha since 1995. A summary of the mapping methodology is presented in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 4	Dry heath was recorded by Perrin et al. (2013) throughout the SAC, with the most extensive patches at Leckanarainey on the south-western slopes. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded four different dry heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities is presented in Perrin et al. (2014)
Vegetation composition: lichens and bryophytes	Number of species at a representative number of 2m x 2m monitoring stops	Number of bryophyte or non-crustose lichen species present at each monitoring stop is at least three, excluding *Campylopus* and *Polytrichum* mosses	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: number of positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species present at each monitoring stop is at least two	Based on Perrin et al. (2014). The list of positive indicator species for this habitat, which is composed of dwarf shrubs, is presented in Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of positive indicator species at least 50% for siliceous dry heath and 50-75% for calcareous dry heath	Based on Perrin et al. (2014). The list of positive indicator species for this habitat, which is composed of dwarf shrubs, is presented in Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: dwarf shrub composition	Percentage cover at a representative number of 2m x 2m monitoring stops	Proportion of dwarf shrub cover composed collectively of bog-myrtle (*Myrica gale*), creeping willow (*Salix repens*) and western gorse (*Ulex gallii*) is less than 50%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Based on Perrin et al. (2014). See the uplands supporting document for further details. *Campylopus introflexus* was recorded within this habitat by Perrin et al. (2013) but did not form extensive carpets. *Rhododendron ponticum* was recorded from this habitat at Leckanarainey
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Based on Perrin et al. (2014). See the uplands supporting document for further details

Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush (*Juncus effusus*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: senescent ling	Percentage cover at a representative number of 2m x 2m monitoring stops	Senescent proportion of ling (*Calluna vulgaris*) cover less than 50%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: signs of browsing	Percentage at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids showing signs of browsing	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas	Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: growth phases of ling	Percentage cover in local vicinity of a representative number of monitoring stops	Outside sensitive areas, all growth phases of ling (*Calluna vulgaris*) should occur throughout, with at least 10% of cover in the mature phase	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details

4060 Alpine and Boreal heaths

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

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

Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details

7130 Blanket bogs (* if active bog)

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes	Arroo Mountain SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). Perrin et al. (2013) state that the current total area of blanket bog is 2174.9ha (54.8% of the SAC). This comprises 2096.3ha of active blanket bog area and 78.6ha of inactive blanket bog. Perrin et al. (2013) also report obvious losses of habitat since 1995 of approximately 1.83 ha. However, this is almost certainly an under-estimate, as chronic losses due to erosion since 1995 cannot be quantified (89.0ha were mapped as eroding blanket bog by Perrin et al. (2013)). It should be noted that further restoration of blanket bog would be required in order to fulfil the targets for peat formation and hydrology presented below. A summary of the mapping methodology and a brief discussion of restoration potential are presented in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 6	Blanket bog was recorded by Perrin et al. (2013) extensively across the SAC. It was abundant along the lower flanks of the SAC, but was also frequent on gently sloping higher ground. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the uplands supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog	At least 99% of the total Annex I blanket bog area is active	From the areas given by Perrin et al. (2013) above, 96.4% of the Annex I blanket bog habitat is currently active. See the uplands supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the uplands supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded six different active blanket bog communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop is at least seven	Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes or lichens, excluding *Sphagnum fallax*, at least 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species less than 75%	Based on Perrin et al. (2014). See the uplands supporting document for further details including the list of potentially dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details

Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Based on Perrin et al. (2014). See the uplands supporting document for further details. *Campylopus introflexus* was recorded forming extensive carpets within this habitat by Perrin et al. (2013)
Vegetation composition: native trees and scrub	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: signs of browsing	Percentage at a representative number of 2m x 2m monitoring stops	Last complete growing season's shoots of ericoids, crowberry (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) showing signs of browsing collectively less than 33%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: drainage	Occurrence in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: erosion	Occurrence in local vicinity of a representative number of monitoring stops	Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas	Based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details

7220 Petrifying springs with tufa formation (Cratoneurion)

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

Attribute	Measure	Target	Notes
Habitat area	Square metres	Area stable or increasing, subject to natural processes	Within Arroo Mountain SAC, 26 polygons were recorded as having petrifying springs/spring complexes during the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013). The majority of these (21) were recorded as being less than 1% of the polygon in which they occurred. The overall area of habitat 7220* is given in Perrin et al. (2013) as 0.9ha. The approach to mapping conducted during the NSUH is detailed in Perrin et al. (2014). Note that the NSUH did not undertake a conservation status assessment of this habitat and thus it is not included in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution. See map 7	This habitat has been recorded from 26 polygons within the SAC. Four of the polygons are predominantly wooded, with the Fossitt (2000) woodland types oak-ash-hazel woodland (WN2), scrub (WS1), mixed conifer woodland (WD3) and scattered trees and parkland (WD5) being associated with the habitat. The majority of the polygons where the habitat was recorded are more open with the Annex I habitats Wet heath (4010), Alkaline fens (7230), Blanket bog (7130*) and Calcareous scree (8120) being recorded with the springs. Other open polygons supported the non-Annex I habitats rich fen and flush (PF1), wet grassland (GS4), dry-humid acid grassland (GS3) and dry calcareous and neutral grassland (GS1). Lyons and Kelly (2013) recognise three main sub-types of spring: wooded springs, inland non-wooded springs and coastal springs. The springs in this SAC fall into the first two sub-types
Hydrological regime: height of water table; water flow	Metres; metres per second	Maintain appropriate hydrological regimes	The hydrological regimes of individual springs are currently unknown in detail. Petrifying springs rely on permanent irrigation, usually from upwelling groundwater sources or seepage sources. In karst areas, water tends to flow away rapidly over bare rock surfaces, even on fairly flat ground (Lyons and Kelly, 2013)
Water quality	Water chemistry measures	Maintain oligotrophic and calcareous conditions	Water chemistry is currently unknown for springs in this SAC. Characteristically, petrifying spring water has high values for pH, alkalinity and dissolved calcium and is oligotrophic (Lyons and Kelly, 2013)
Vegetation composition: typical species	Occurrence	Maintain typical species	The bryophytes *Palustriella commutata* (*Cratoneuron commutatum*) and *Cratoneuron filicinum* are diagnostic of petrifying springs (EC, 2013) and are found in this habitat in the SAC (Perrin et al., 2013). *Palustriella commutata* is diagnostic for the NSUH vegetation community SPG2i, this being synonymous with 7220*. Other bryophyte species recorded within the SAC (Perrin et al., 2013), which are listed in Appendix 1 A-C of Lyons and Kelly (2013) as being indicative of petrifying springs, are: *Aneura pinguis, Bryum pseudotriquetrum, Campylium stellatum, Fissidens adianthoides, Hymenostylium recurvirostrum* var. *recurvirostrum, Orthothecium rufescens, Palustriella falcata, Pellia endiviifolia, Philontis calcarea* and *Preissia quadrata*

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

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

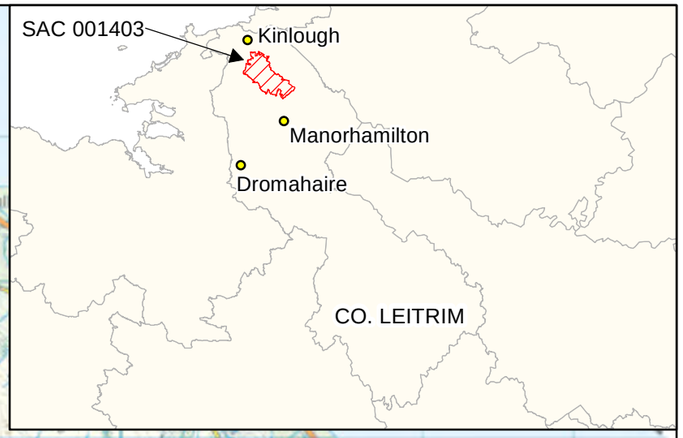
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Arroo Mountain SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of calcareous scree in the SAC stated by Perrin et al. (2013) is 21.4ha. This covers 0.5% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology is presented in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 8	Calcareous scree was recorded by Perrin et al. (2013) on the steep slopes which occur in the north-eastern portion of the SAC. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the uplands supporting document for further details
Vegetation composition: positive indicator fern and *Saxifraga* species	Number of species in local vicinity of a representative number of 2m x 2m monitoring stops	Number of ferns and *Saxifraga* indicators at each monitoring stop at least one	Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: positive indicator species	Number of species in local vicinity of a representative number of monitoring stops	Number of positive indicator species at each monitoring stop at least three	Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: grass species and dwarf shrubs	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrubs and grasses, excluding blue moor-grass (*Sesleria caerulea*) collectively less than 20%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Proportion of vegetation composed of negative indicator species less than 1%	Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at a representative number of 2m x 2m monitoring stops	Proportion of vegetation composed of non-native species less than 1%	Based on Perrin et al. (2014). See the uplands supporting document for further details. No non-native species were recorded within this habitat by Perrin et al. (2013)
Vegetation composition: bracken, native trees and scrub	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken (*Pteridium aquilinum*), native trees and scrub less than 25%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: grazing and browsing	Percentage at a representative number of 2m x 2m monitoring stops	Live leaves of forbs and shoots of dwarf shrubs showing signs of grazing or browsing collectively less than 50%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: disturbance	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Ground disturbed by human and animal paths, scree running, vehicles less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details

Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details

8210 Calcareous rocky slopes with chasmophytic vegetation

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

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



Legend

Arroo Mountain SAC 001403

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MAP 1: ARROO MOUNTAIN SAC CONSERVATION OBJECTIVES SAC DESIGNATION

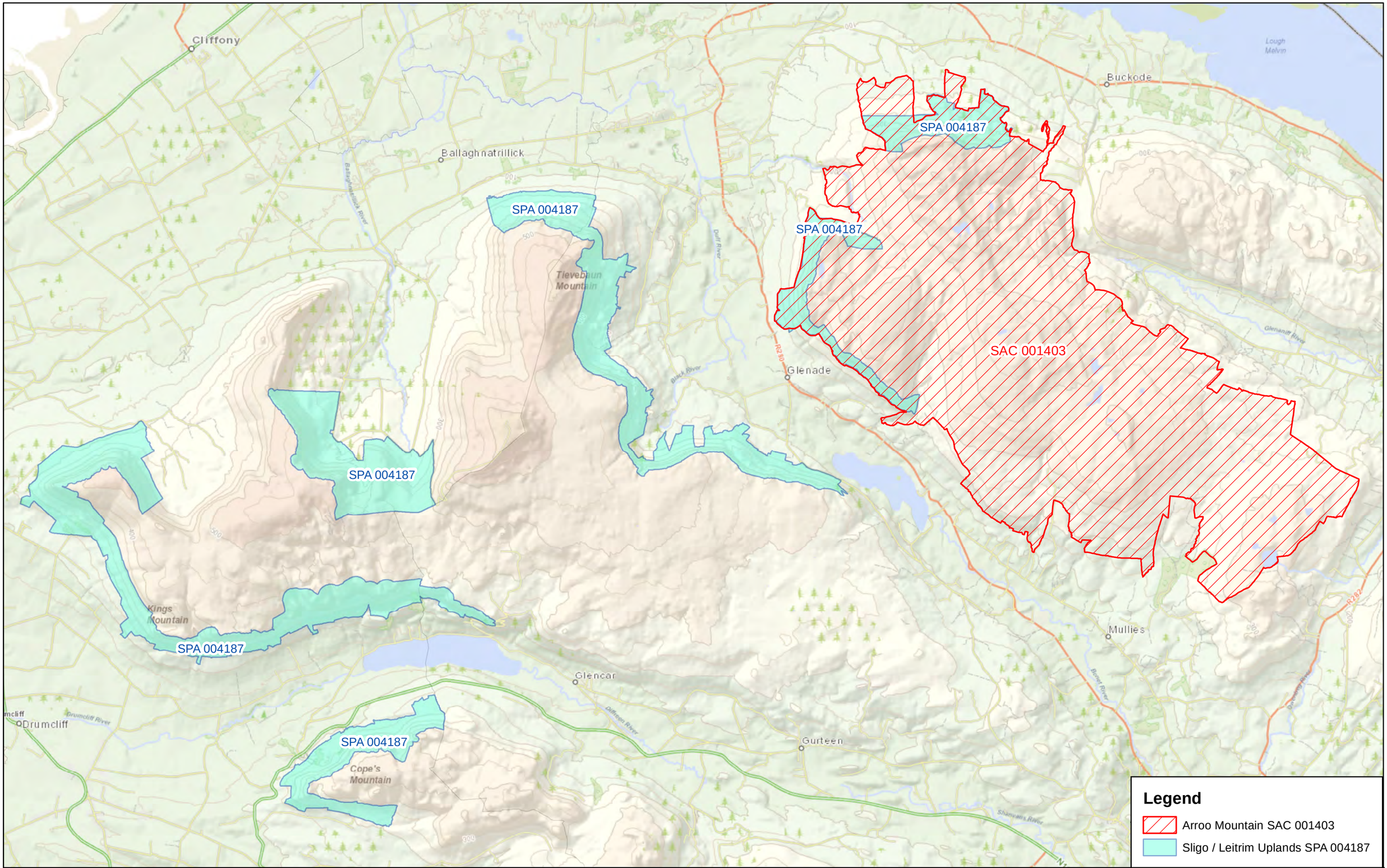
Map to be read in conjunction with the NPWS Conservation Objectives Document.

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: July 2016



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

MAP 2:
ARROO MOUNTAIN SAC
CONSERVATION OBJECTIVES
OVERLAPPING DESIGNATIONS

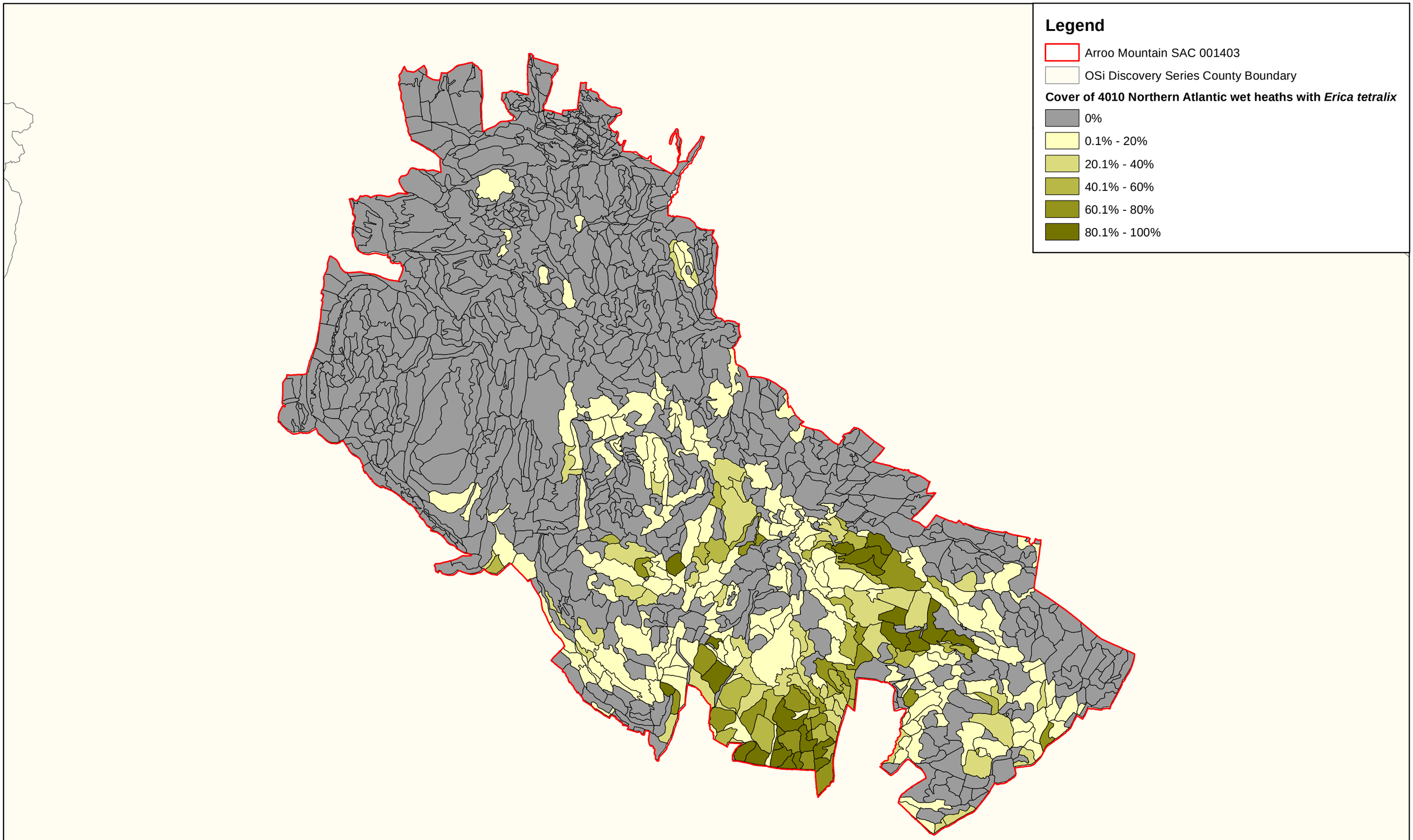
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 001403; version 3.01.
SPA 004187; version 2. Counties Leitrim / Sligo.

0 1 2 3 4 km

N

Map Version 1
Date: July 2016



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MAP 3:
ARROO MOUNTAIN SAC
CONSERVATION OBJECTIVES
WET HEATH

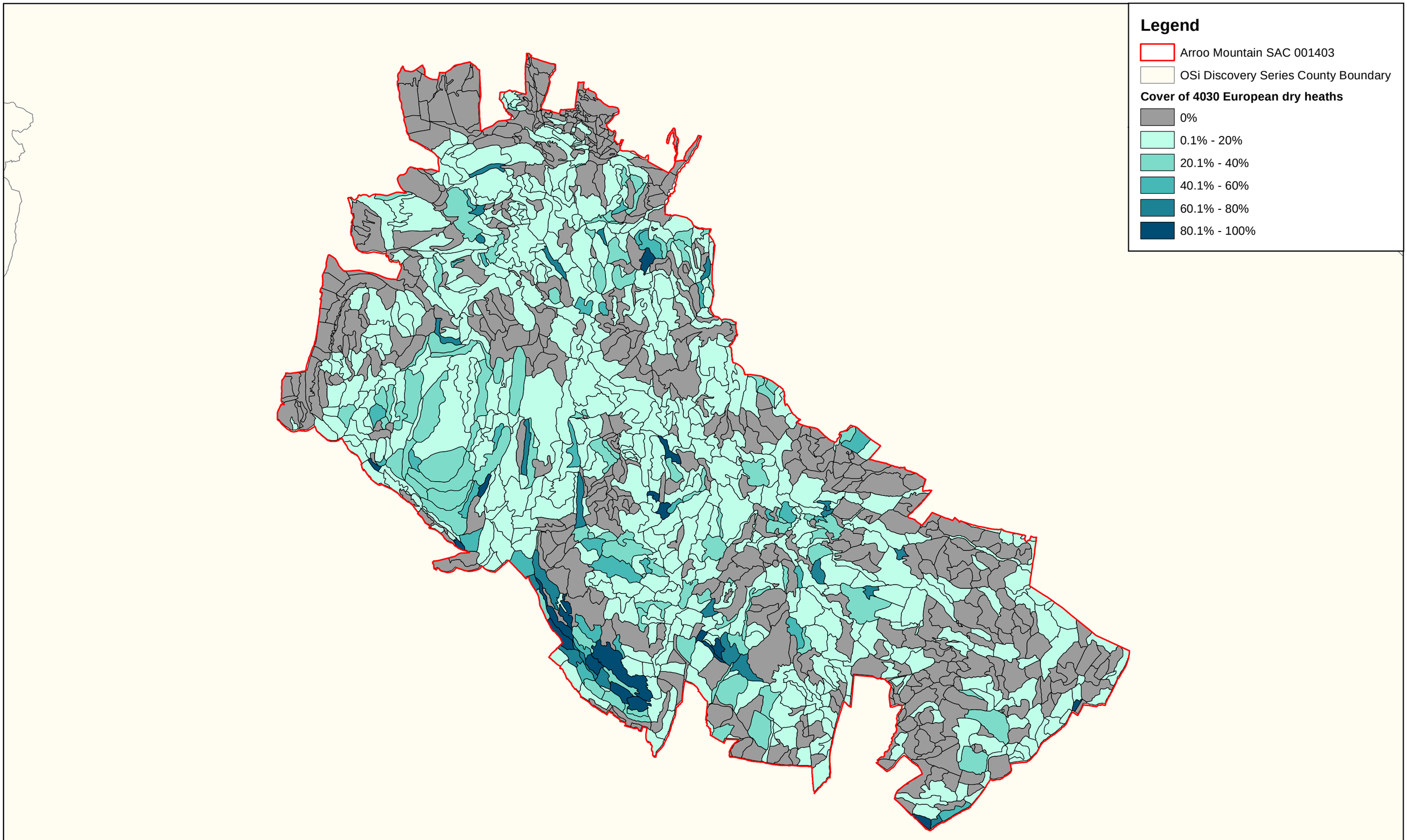
Map to be read in conjunction with the NPWS Conservation Objectives Document.

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: July 2016



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MAP 4:
ARROO MOUNTAIN SAC
CONSERVATION OBJECTIVES
DRY HEATHS

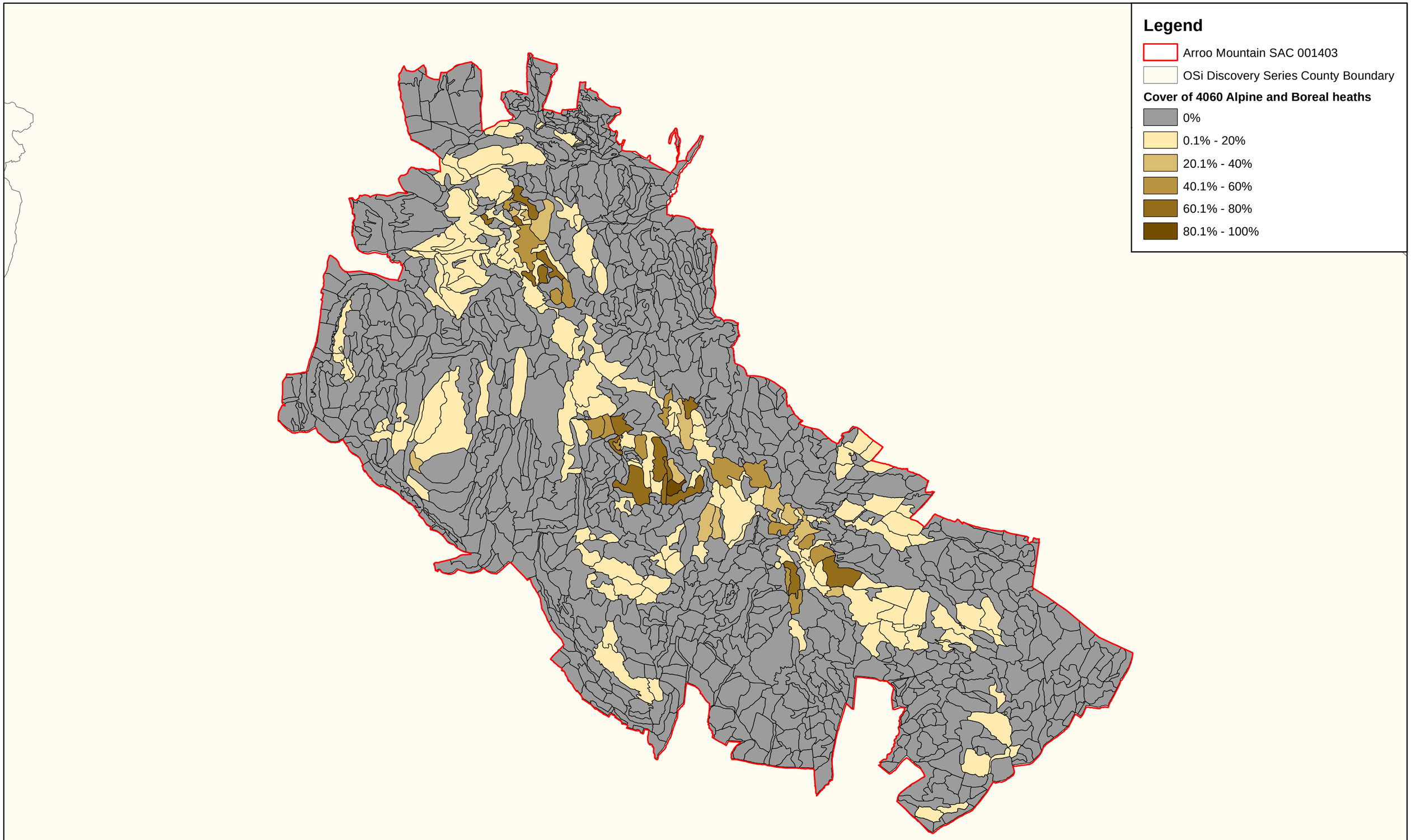
Map to be read in conjunction with the NPWS Conservation Objectives Document.

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: July 2016



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MAP 5:
ARROO MOUNTAIN SAC
CONSERVATION OBJECTIVES
ALPINE AND BOREAL HEATHS

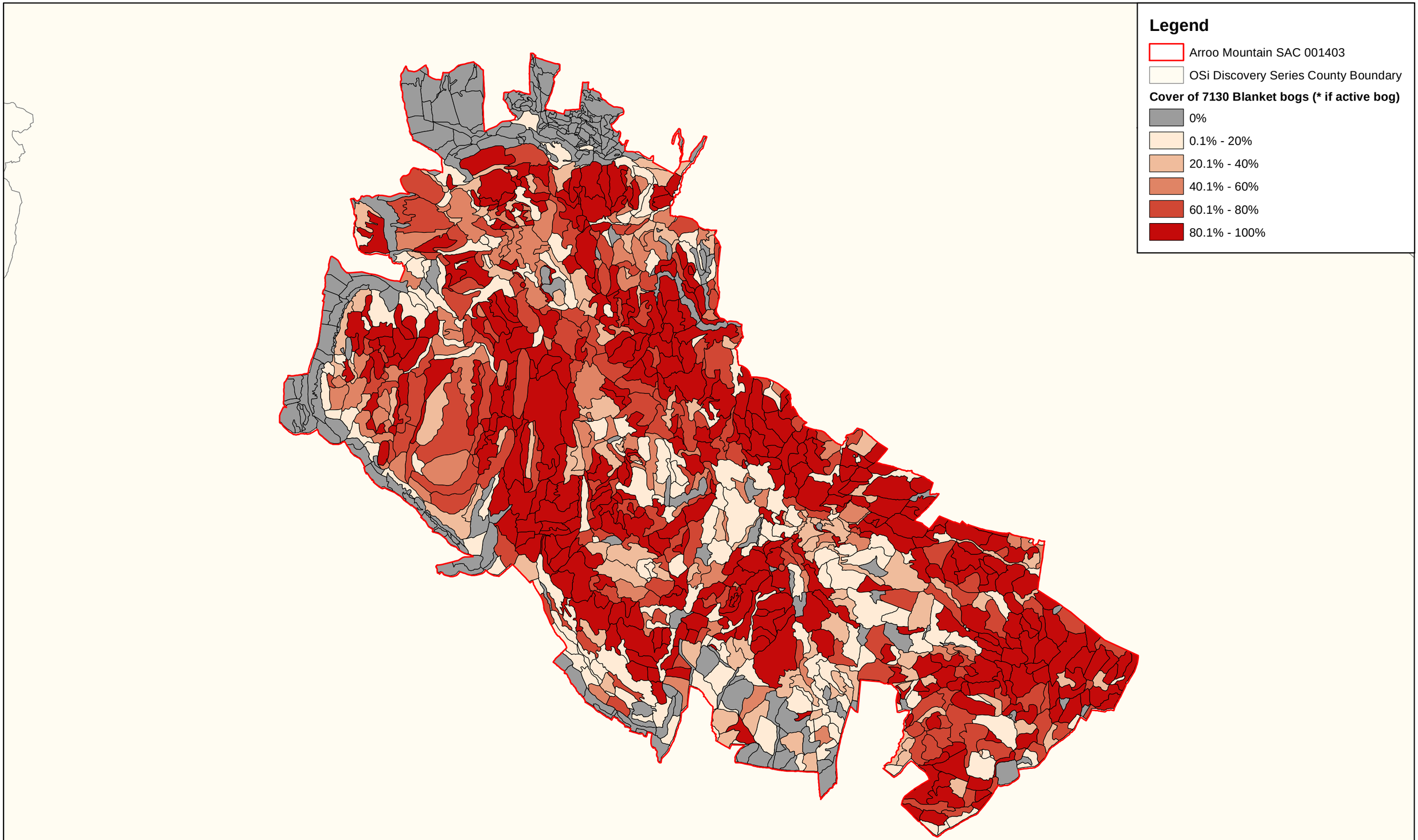
Map to be read in conjunction with the NPWS Conservation Objectives Document.

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: July 2016



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MAP 6:
ARROO MOUNTAIN SAC
CONSERVATION OBJECTIVES
BLANKET BOGS (* IF ACTIVE BOG)

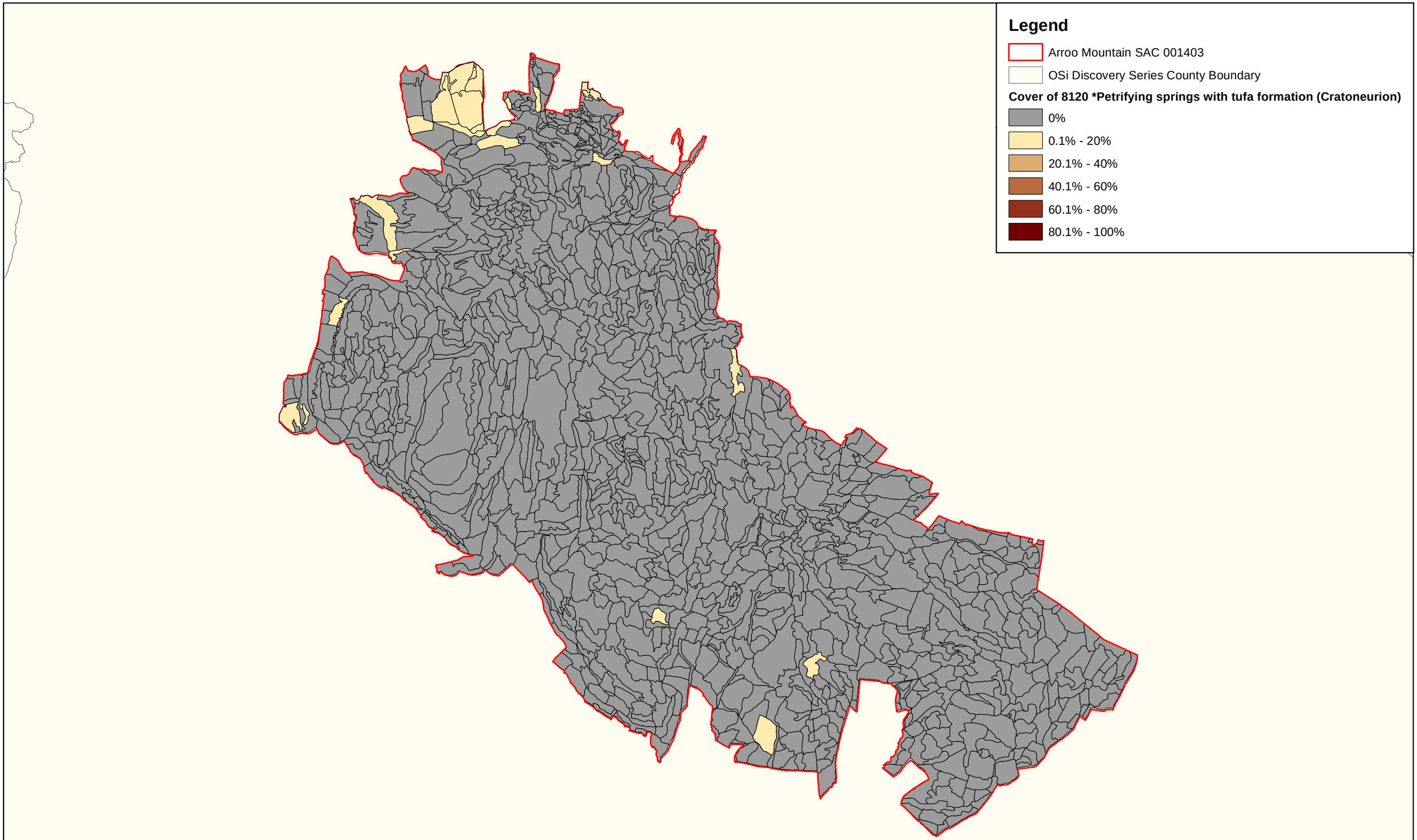
Map to be read in conjunction with the NPWS Conservation Objectives Document.

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: July 2016



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MAP 7:
ARROO MOUNTAIN SAC
CONSERVATION OBJECTIVES
PETRIFYING SPRINGS

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

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: July 2016

Legend

- Arroo Mountain SAC 001403
- OSi Discovery Series County Boundary

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

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

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MAP 8:
ARROO MOUNTAIN SAC
CONSERVATION OBJECTIVES
CALCAREOUS SCREES

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

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: July 2016

Legend

- Arroo Mountain SAC 001403
- OSi Discovery Series County Boundary

Cover of 8210 Calcareous rocky slopes with chasmophytic vegetation

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

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

MAP 9:
ARROO MOUNTAIN SAC
CONSERVATION OBJECTIVES
CALCAREOUS ROCKY SLOPES

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

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: July 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Ballintra SAC 000115

An Roinn Cultúir,
Oidhreachta agus Gaeltachta
Department of Culture,
Heritage and the Gaeltacht

National Parks and Wildlife Service,
Department of Culture, Heritage and the Gaeltacht,

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Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Notes/Guidelines:

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

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000115	Ballintra SAC
4030	European dry heaths
8240	Limestone pavements*

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2006
Title :	Conservation Plan for 2006-2011. Ballintra cSAC Site Code 000115 Co. Donegal
Author :	NPWS
Series :	Conservation Plan
Year :	2009
Title :	Ireland Red List No. 2: Non-marine molluscs
Author :	Byrne, A.; Moorkens, E.A.; Anderson, R.; Killeen, I.J.; Regan, E.C.
Series :	Ireland Red List series, NPWS
Year :	2010
Title :	Ireland Red List No. 4: Butterflies
Author :	Regan, E.C.; Nelson, B.; Aldwell, B.; Bertrand, C.; Bond, K.; Harding, J.; Nash, D.; Nixon, D.; Wilson, C.J.
Series :	Ireland Red List series, NPWS
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	National survey of limestone pavement and associated habitats in Ireland
Author :	Wilson, S.; Fernandez, F.
Series :	Irish Wildlife Manuals, No. 73
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red List Series, NPWS
Year :	2018
Title :	The Irish Juniper Monitoring Survey 2017
Author :	O'Neill, F.H.; Martin, J.R.
Series :	Irish Wildlife Manuals, No. 101
Year :	2018
Title :	The Irish Juniper Monitoring Survey 2017 - Appendices
Author :	O'Neill, F.H.; Martin, J.R.
Series :	Irish Wildlife Manuals, No. 101

Other References

Year :	1934
Title :	*Helianthemum vulgare* in Ireland
Author :	Praeger, R.L.
Series :	Irish Naturalists' Journal 5(4): 76-77

Year :	1985
Title :	The present status and ecology of *Helianthemum nummularium* (L.) Miller in Ireland
Author :	Curtis, T.G.F.; Bassett, J.A.; McGough, H.N.
Series :	Irish Naturalists' Journal, 21(12): 515-517

Spatial data sources

Year :	2013
Title :	National Survey of Limestone Pavement and Associated Habitats in Ireland distribution data
GIS Operations :	Dataset clipped to the SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	8240 (map 2)

Conservation Objectives for : Ballintra SAC [000115]

4030 European dry heaths

To maintain the favourable conservation condition of European dry heaths in Ballintra SAC, which is defined by the following list of attributes and targets:

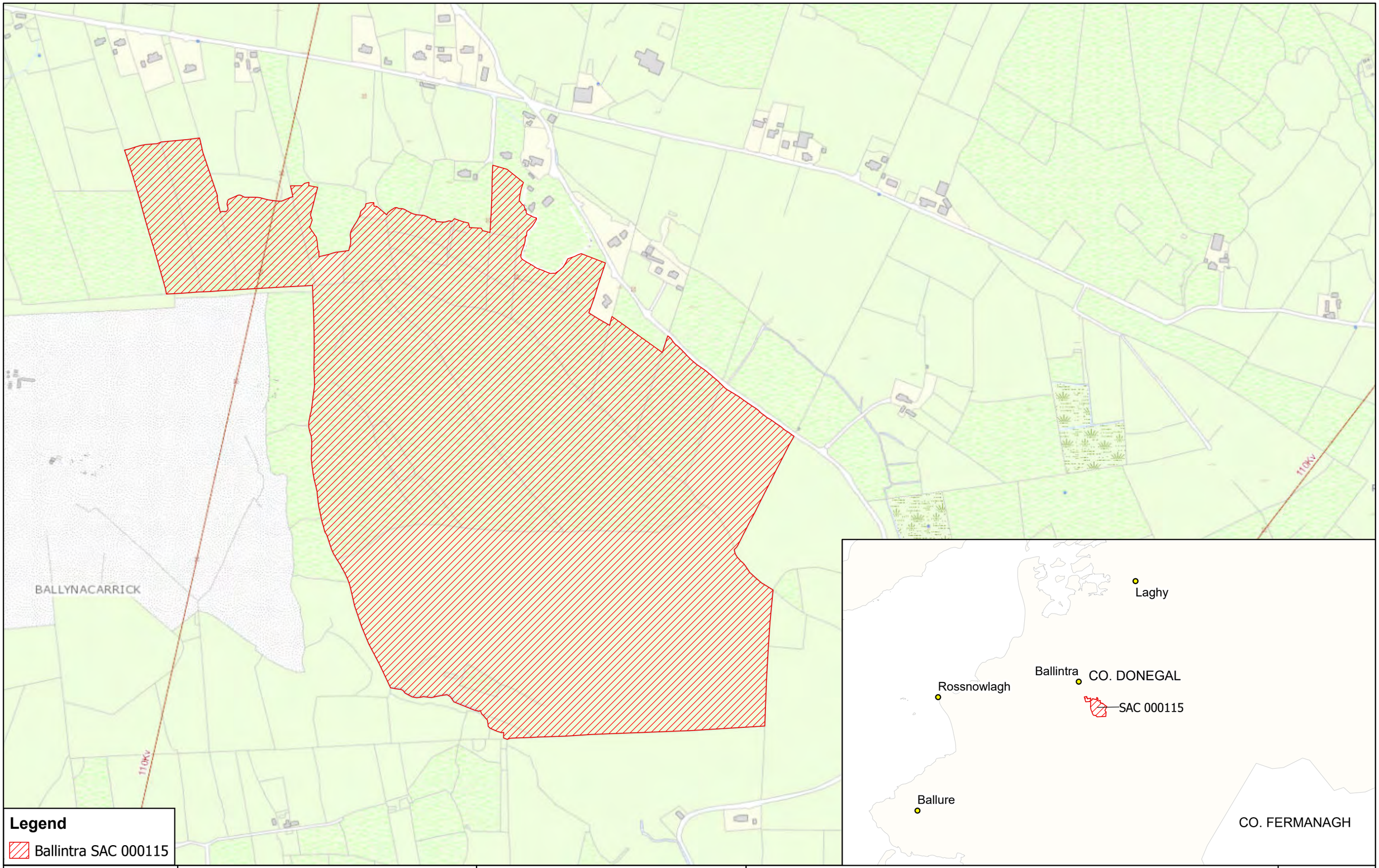
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	European dry heath occurs in areas of deeper soil, which are peaty in nature, in Ballintra SAC. There is a wet black bog-rush (*Schoenus nigricans*) flush in the centre of the dry heath area. Dry heath also occurs in intimate association with the Annex I habitat Limestone pavements* (habitat code 8240). Therefore, these habitats cannot be easily mapped or considered separately. Conservation objectives for the Annex I habitats should be used in conjunction with each other as appropriate. As part of the National Survey of Limestone Pavement and Associated Habitats, Wilson and Fernandez (2013) recorded the habitat in the sub-site Ballynacarrick (site code NSLP13). This survey should be consulted for further details
Habitat distribution	Occurrence	No decline, subject to natural processes	See the notes for Habitat area above
Vegetation composition: positive indicator species	Number at a representative number of monitoring stops	At least seven positive indicator species present	Attribute and target based on Wilson and Fernandez (2013), where the list of positive indicator species for this habitat, as identified by Wilson and Fernandez (2013), is also presented. Positive indicator species recorded in the habitat in the SAC include bell heather (*Erica cinerea*), ling (*Calluna vulgaris*), lady's bedstraw (*Galium verum*), slender St. John's-wort (*Hypericum pulchrum*), common bird's-foot-trefoil (*Lotus corniculatus*), tormentil (*Potentilla erecta*), devil's-bit scabious (*Succisa pratensis*), wild thyme (*Thymus polytrichus*), flea sedge (*Carex pulicaris*) and blue moor-grass (*Sesleria caerulea*) (Wilson and Fernandez, 2013; NPWS internal files)
Vegetation composition: negative indicator species	Percentage cover at a representative number of monitoring stops	Negative indicator species collectively not more than 1% cover	Attribute and target based on Wilson and Fernandez (2013), where the list of negative indicator species for this habitat, as identified by Wilson and Fernandez (2013), is presented
Vegetation composition: non-native species	Percentage cover at a representative number of monitoring stops	Non-native species not more than 1% cover	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: native trees and shrubs	Percentage cover at a representative number of monitoring stops	Cover of native trees and shrubs (excluding juniper (*Juniperus communis*)) not more than 25% cover	Attribute and target based on Wilson and Fernandez (2013). Scrub encroachment is impacting on the habitat in the SAC (Wilson and Fernandez, 2013)
Physical structure: disturbance	Percentage cover at a representative number of monitoring stops	Less than 10% disturbed bare ground (excluding rocks/stones)	Attribute and target based on Wilson and Fernandez (2013). Damage from poaching by grazing cattle has been reported from the flush area in the habitat in the SAC (NPWS, 2006; NPWS internal files)
Indicators of local distinctiveness	Occurrence	Indicators of local distinctiveness are maintained	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.) and other rare or localised species, as well as archaeological and geological features, which often support distinctive species

8240 Limestone pavements

To maintain the favourable conservation condition of Limestone pavements* in Ballintra SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Limestone pavements* in Ballintra SAC represents one of the most northerly outposts of typical limestone flora in Ireland. The habitat exhibits a good example of shattered pavement and occurs in association with species-rich calcareous grassland, juniper (*Juniperus communis*) formations (see O'Neill and Martin, 2018, site DL30), scrub, and European dry heaths (4030), a Qualifying Interest (QI) for the SAC. Therefore, these habitats cannot easily be mapped or considered separately. Conservation objectives for the QI Annex I habitats should be used in conjunction with each other as appropriate. Wilson and Fernandez (2013) mapped the indicative area of limestone pavement, including mosaics with associated habitats, as 21.55ha within the SAC (see map 2). As part of the National Survey of Limestone Pavement and Associated Habitats (Wilson and Fernandez, 2013), the sub-site Ballynacarrick (code NSLP13) was surveyed in detail. This survey should be consulted for further details
Habitat distribution	Occurrence	No decline. Map 2 shows indicative distribution, including mosaics with other habitats	See the notes for Habitat area above. Distribution based on data from Wilson and Fernandez (2013). This habitat can be split into exposed pavement and wooded pavement. In Ballintra SAC, the limestone pavement habitat occurs on Ballintra Hill and consists of shattered pavement in association with calcareous grassland, juniper (*Juniperus communis*), scrub and dry heath habitats
Vegetation composition: positive indicator species	Number at a representative number of monitoring stops	At least seven positive indicator species present	Positive indicator species for exposed and wooded pavement are listed in Wilson and Fernandez (2013). Positive indicator species recorded by Wilson and Fernandez (2013) in exposed pavement in the Ballynacarrick sub-site (site code NSLP13) include blue moor-grass (*Sesleria caerulea*), burnet rose (*Rosa spinosissima*), maidenhair spleenwort (*Asplenium trichomanes*), wall-rue (*A. ruta-muraria*) and the mosses *Breutelia chrysocoma, Ctenidium molluscum, Fissidens dubius, Neckera crispa* and *Tortella tortuosa*
Vegetation composition: bryophyte layer	Percentage at a representative number of monitoring stops	Bryophyte cover at least 50% on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Collective cover of negative indicator species on exposed pavement not more than 1%	Negative indicator species are listed in Wilson and Fernandez (2013). Negative indicator species for wooded pavement overlap with non-native species (below)
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1% on exposed pavement; on wooded pavement not more than 10% with no regeneration	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: scrub	Percentage at a representative number of monitoring stops	Scrub cover no more than 25% of exposed pavement	Attribute and target based on Wilson and Fernandez (2013). There is some encroachment of scrub, mostly hazel (*Corylus avellana*), onto areas of limestone pavement in the SAC (NPWS, 2006; Wilson and Fernandez, 2013; NPWS internal files)
Vegetation composition: bracken cover	Percentage at a representative number of monitoring stops	Bracken (*Pteridium aquilinum*) cover no more than 10% on exposed pavement	Attribute and target based on Wilson and Fernandez (2013)

Vegetation structure: woodland canopy	Percentage at a representative number of monitoring stops	Canopy cover on wooded pavement at least 30%	Attribute and target based on Wilson and Fernandez (2013)
Vegetation structure: dead wood	Occurrence in a representative number of monitoring stops	Sufficient quantity of dead wood on wooded pavement to provide habitat for saproxylic organisms	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Physical structure: disturbance	Occurrence in a representative number of monitoring stops	No evidence of grazing pressure on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)
Indicators of local distinctiveness	Occurrence	Indicators of local distinctiveness are maintained	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.) and other rare or localised species, as well as archaeological and geological features, which often support distinctive species. The sole known Irish population of the FPO listed and Critically Endangered common rock-rose (*Helianthemum nummularium*) (Wyse Jackson et al., 2016) occurs in the habitat in the SAC (Praeger, 1934; Curtis et al., 1985; NPWS, 2006; NPWS internal files)



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Department of Culture, Heritage and the Gaeltacht

MAP 1:
BALLINTRA SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

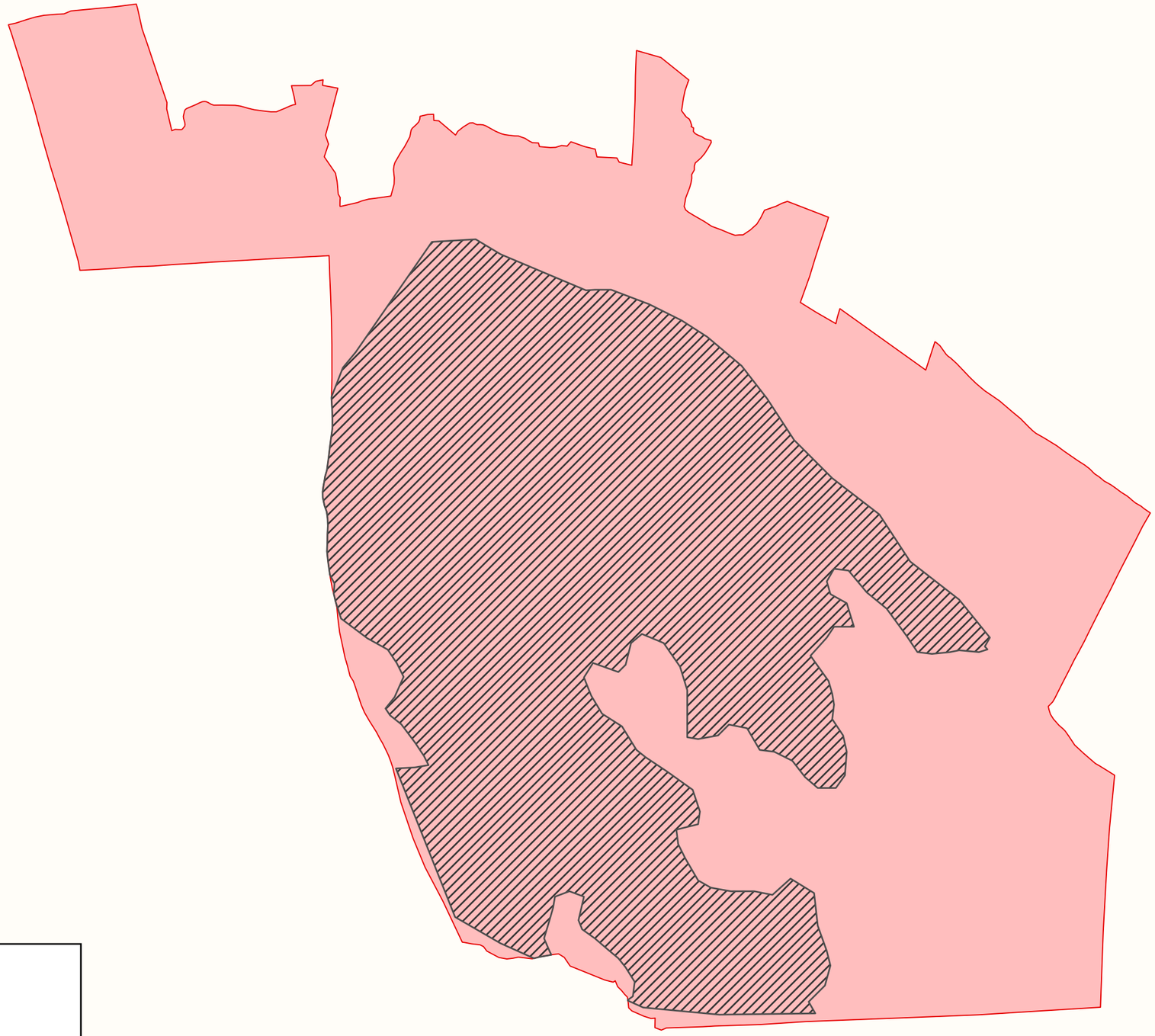
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 000115; version 3.01. CO. DONEGAL

0 60 120 180 240 Meters

N

Map Version 1
Date: Nov 2018



Legend

- 8240 Limestone pavements
- Ballintra SAC 000115
- OSi Discovery Series County Boundary

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Department of Culture, Heritage and the Gaeltacht

MAP 2:
BALLINTRA SAC
CONSERVATION OBJECTIVES
LIMESTONE PAVEMENT

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

SITE CODE:
SAC 000115; version 3.01. CO. DONEGAL

0 50 100 150 200 Meters

N

Map Version 1
Date: Nov 2018

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Ben Bulben, Gleniff and Glenade Complex SAC 000623

An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreachta
Department of Housing,
Local Government and Heritage

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Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Notes/Guidelines:

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

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000623	Ben Bulben, Gleniff and Glenade Complex SAC
1013	Geyer's Whorl Snail *Vertigo geyeri*
1355	Otter *Lutra lutra*
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
4010	Northern Atlantic wet heaths with *Erica tetralix*
4030	European dry heaths
4060	Alpine and Boreal heaths
5130	*Juniperus communis* formations on heaths or calcareous grasslands
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)
6230	Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)*
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
7130	Blanket bogs (* if active bog)
7140	Transition mires and quaking bogs
7220	Petrifying springs with tufa formation (Cratoneurion)*
7230	Alkaline fens
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)
8210	Calcareous rocky slopes with chasmophytic vegetation

Please note that this SAC is adjacent to Glenade Lough SAC (001919) and overlaps with Sligo/Leitrim Uplands SPA (004187). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjacent and overlapping sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1987
Title :	The vegetation of Irish rivers
Author :	Heuff, H.
Series :	Unpublished report to NPWS
Year :	2006
Title :	Otter survey of Ireland 2004/2005
Author :	Bailey, M.; Rochford, J.
Series :	Irish Wildlife Manuals, No. 23
Year :	2007
Title :	Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents. Article 17 forms and supporting maps
Author :	NPWS
Series :	Unpublished report to NPWS
Year :	2009
Title :	Ireland Red List No. 2: Non-marine molluscs
Author :	Byrne, A.; Moorkens, E.A.; Anderson, R.; Killeen, I.J.; Regan, E.C.
Series :	Ireland Red List series, NPWS
Year :	2009
Title :	Irish semi-natural grasslands survey. Annual report No. 2
Author :	O'Neill, F.H.; Martin, J.R.; Perrin, P.M.; Delaney, A.M.; McNutt, K.E.; Devaney, F.M.
Series :	Unpublished report to NPWS
Year :	2010
Title :	Ireland Red List No. 4: Butterflies
Author :	Regan, E.C.; Nelson, B.; Aldwell, B.; Bertrand, C.; Bond, K.; Harding, J.; Nash, D.; Nixon, D.; Wilson, C.J.
Series :	Ireland Red List series, NPWS
Year :	2011
Title :	Monitoring and condition assessment of populations of *Vertigo geyeri*, *Vertigo angustior* and *Vertigo moulinsiana* in Ireland
Author :	Moorkens, E.; Killeen, I.
Series :	Irish Wildlife Manuals, No. 55
Year :	2012
Title :	The conservation status of juniper formations in Ireland
Author :	Cooper, F.; Stone, R.E.; McEvoy, P.; Wilkins, T.; Reid, N.
Series :	Irish Wildlife Manuals, No. 63
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	Conservation status assessment for petrifying springs
Author :	Lyons, M.D.; Kelly, D.L.
Series :	Unpublished report to NPWS

Year :	2013
Title :	National otter survey of Ireland 2010/12
Author :	Reid, N.; Hayden, B.; Lundy, M.G.; Pietravalle, S.; McDonald, R.A.; Montgomery, W.I.
Series :	Irish Wildlife Manuals, No. 76
Year :	2013
Title :	Irish semi-natural grasslands survey 2007-2012
Author :	O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; Perrin, P.M.
Series :	Irish Wildlife Manuals, No. 78
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2013
Title :	National Survey of Upland Habitats (Phase 3, 2012-2013), Draft Site Report No. 11: Ben Bulben, Gleniff and Glenade Complex cSAC (000623), Co. Sligo
Author :	Perrin, P.M.; Roche, J.R.; Barron, S.J.; Daly, O.H.; Hodd, R.L.; Muldoon, C.S.; Leyden, K.J.
Series :	Unpublished report to NPWS
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manuals, No. 79
Year :	2016
Title :	Monitoring guidelines for the assessment of petrifying springs in Ireland
Author :	Lyons, M.D.; Kelly, D.L.
Series :	Irish Wildlife Manuals, No. 94
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2016
Title :	Survey of Flora Protection Order Bryophytes 2016
Author :	Hodd, R.L.
Series :	Unpublished report to NPWS
Year :	2018
Title :	The Irish Juniper Monitoring Survey 2017
Author :	O'Neill, F.H.; Martin, J.R.
Series :	Irish Wildlife Manuals, No. 101
Year :	2018
Title :	The Irish Juniper Monitoring Survey 2017 - Appendices
Author :	O'Neill, F.H.; Martin, J.R.
Series :	Irish Wildlife Manuals, No. 101
Year :	2018
Title :	The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats
Author :	Martin, J.R.; O'Neill, F.H.; Daly, O.H.
Series :	Irish Wildlife Manuals, No. 102

Year :	2019
Title :	The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2019
Title :	Monitoring of sites and habitat for three Annex II species of whorl snail (*Vertigo*)
Author :	Long, M.P.; Brophy, J.T.
Series :	Irish Wildlife Manuals, No. 104
Year :	2019
Title :	Monitoring of sites and habitat for three Annex II species of whorl snail (*Vertigo*). Appendix V. *Vertigo geyeri* site reports
Author :	Brophy, J.T.; Long, M.P.
Series :	Irish Wildlife Manuals, No. 104
Year :	2019
Title :	Checklists Protected and Threatened Species in Ireland 2019
Author :	Nelson, B.; Cummins, S.; Fay, L.; Jeffrey, R.; Kelly, S.; Kingston, N.; Lockhart, N.; Marnell, F.; Tierney, D.; Wyse Jackson, M.
Series :	Irish Wildlife Manuals, No. 116
Year :	2021
Title :	Checklists Protected and Threatened Species in Ireland. Version 2.1. 3 December 2021
Author :	Nelson, B.; Cummins, S.; Fay, L.; Jeffrey, R.; Kelly, S.; Kingston, N.; Lockhart, N.; Marnell, F.; Tierney, D.; Wyse Jackson, M.
Series :	Irish Wildlife Manuals, No. 116
Year :	2021
Title :	Ben Bulben, Gleniff and Glenade Complex SAC (site code: 623) Conservation objectives supporting document - upland habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1982
Title :	Otter survey of Ireland
Author :	Chapman, P.J.; Chapman, L.L.
Series :	Unpublished report to Vincent Wildlife Trust
Year :	1991
Title :	The spatial organization of otters (*Lutra lutra*) in Shetland
Author :	Kruuk, H.; Moorhouse, A.
Series :	Journal of Zoology, 224: 41-57
Year :	2003
Title :	Ecology of watercourses characterised by Ranunculion fluitantis and Callitricho-Batrachion vegetation
Author :	Hatton-Ellis, T.W.; Grieve, N.
Series :	Conserving Natura 2000 Rivers Ecology Series No. 11. English Nature, Peterborough
Year :	2004
Title :	The Geological Heritage of Sligo. An audit of County Geological Sites in Sligo
Author :	McAteer, C.; Parkes, M.
Series :	Geological Survey of Ireland

Year :	2006
Title :	Otters - ecology, behaviour and conservation
Author :	Kruuk, H.
Series :	Oxford University Press
Year :	2010
Title :	Otter tracking study of Roaringwater Bay
Author :	De Jongh, A.; O'Neill, L.
Series :	Unpublished draft report to NPWS
Year :	2011
Title :	The Fen Management Handbook
Author :	McBride, A.; Diack, I.; Droy, N.; Hamill, B.; Jones, P.; Schutten, J.; Skinner, A.; Street, M. (eds.)
Series :	Scottish Natural Heritage, Perth
Year :	2012
Title :	Rare and threatened bryophytes of Ireland
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	National Museums Northern Ireland
Year :	2013
Title :	Interpretation manual of European Union habitats- Eur 28
Author :	European Commission- DG Environment
Series :	European Commission
Year :	2015
Title :	The flora and conservation status of petrifying springs in Ireland
Author :	Lyons, M.D.
Series :	Unpublished Ph.D. thesis, Trinity College Dublin
Year :	2016
Title :	A narrative for conserving freshwater and wetland habitats in England
Author :	Mainstone, C.; Hall, R.; Diack, I.
Series :	Natural England Research Reports Number 064
Year :	2017
Title :	Irish Vegetation Classification: Technical Progress Report No. 3
Author :	Perrin, P.
Series :	Report submitted to National Biodiversity Data Centre
Year :	2018
Title :	Irish Vegetation Classification: Technical Progress Report No. 4
Author :	Perrin, P.
Series :	Report submitted to National Biodiversity Data Centre

Spatial data sources

Year :	2013
Title :	National Survey of Upland Habitats
GIS Operations :	Habitat dataset for site clipped to SAC boundary. Relevant QI selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	4010, 4030, 4060, 6210, 6430, 7130, 7140, 7220, 7230, 8110, 8120, 8210 (maps 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14)
Year :	2013
Title :	Irish Semi-Natural Grassland Survey
GIS Operations :	Dataset clipped to the SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	6210 (map 6)
Year :	2016
Title :	Point file associated with Lyons (2015)
GIS Operations :	Dataset created from spatial references; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	7220 (map 10)
Year :	2021
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1013 (map 15)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	Creation of 80m buffer on aquatic side of lake data; creation of 10m buffer on terrestrial side of lake data Datasets are combined with the derived EPA WFD Waterbodies data. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising. Creation of 250m buffer on aquatic side of the lake boundary to highlight potential commuting points
Used For :	1355 (map 16)
Year :	2010
Title :	EPA WFD Waterbodies data
GIS Operations :	Creation of 10m buffer on terrestrial side of river banks data. Dataset combined with derived OSi 1:5000 vector lake buffer data. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1355 (map 16)

3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

To maintain the favourable conservation condition of Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Kilometres	Area stable or increasing, subject to natural processes	Conservation objectives concentrate on the high conservation value sub-types of the habitat. Selection of Ben Bulben, Gleniff and Glenade Complex SAC was based on the occurrence of a variety of rare upland stream types. Many streams rise on the plateau and form cascades as they flow over the steep slopes. Some have intermittent flow. Some disappear down swallow holes on the plateau. The SAC is an Important Bryophyte Area with many protected and threatened species, many of which are associated with intermittent streams, splash-zones and stream edges (Lockhart et al., 2012). Many headwaters are base-rich and contain a species-rich bryophyte flora accompanied by tufa deposits, i.e. have petrifying springs. Some base-poor streams have been noted, with a poorly-developed flora mainly composed of calcifuge bryophytes. Further study is required to fully document the habitat sub-types in this SAC
Habitat distribution	Occurrence	No decline, subject to natural processes	The SAC contains the headwaters of many rivers, including the Ballaghnatrillick-Black-Duff River, Carney River, Grange River, Diffreen River, Glencar Lough and Drumcillf River. The Glencar waterfall is particularly notable for bryophytes. The Diffreen was surveyed, downstream of the SAC, by Heuff (1987). McAteer and Parkes (2004) stated that the gradual upward transition from the Benbulben Shale Formation to the Glencar Limestone Formation is well exposed in a stream section at Tievebaun and the alternating, fossil-rich shales and limestones are well exposed in other rivers. Further study of Irish rivers is needed to interpret the broad description of 3260 which covers from upland bryophyte/macroalgal dominated to lowland depositing rivers with pondweeds and starworts (European Commission, 2013)
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	As noted above, the streams in the SAC display a wide range of upland hydrological regimes from headwaters of petrifying springs and flushes, to slower flows on the plateau, swallow holes and underground stretches, cascades and waterfalls, pools, permanent and intermittent flow. Heuff (1987) described the Diffreen at Aghmore as a high-level karst stream, very few of which occur in Ireland, and a 'turlough among rivers'. Hydrology is a key driver of the high conservation value, bryophyte-rich sub-types found in the SAC. A natural flow regime is required for both plant communities and channel geomorphology to be in favourable condition, exhibiting typical dynamics for the river type (Hatton-Ellis and Grieve, 2003). For many sub-types, high flows are required to maintain the substratum necessary for the characteristic species. Flow variation can be particularly important, with high and flood flows being critical to the hydromorphology

Hydrological regime: groundwater discharge	Metres per second	Maintain appropriate hydrological regime	Groundwater makes significant contributions to the streams in the SAC, with petrifying springs and tufaceous deposits occurring, and some streams disappearing into swallow holes and flowing underground for part of their length. It is essential that the appropriate groundwater contributions necessary for the natural functioning of the habitat be maintained and that there is no significant disturbance of the catchments' groundwater regimes
Substratum composition: particle size range	Millimetres	Maintain appropriate substratum particle size range, quantity and quality, subject to natural processes	Substratum type is variable within the streams in the SAC; however, bedrock is frequent and calcareous groundwater springs and seepages exert a significant influence on many streams through the precipitation of tufa. Boulders and rock dominated the upland stretch of the Diffreen surveyed by Heuff (1987). Although many high conservation value sub-types are dominated by coarse substrata and bedrock, certain sub-types, notably those associated with lake inflows/outflows and peatlands, are dominated by fine substrata. The size and distribution of particles is largely determined by the river flow and geology. The chemical composition (particularly minerals and nutrients) of the substratum is also important. The quality of finer sediment particles is a notable driver of rooted plant communities
Water quality	Various	Maintain appropriate water quality to support the natural structure and functioning of the habitat	The rivers within the SAC are naturally very nutrient-poor and, therefore, require Water Framework Directive (WFD) high status or reference condition. However, some of the methods, e.g. EQRs (Ecological Quality Ratios) for macroinvertebrates and phytobenthos, may not be appropriate to the upland streams such as those found in the SAC, and there are no WFD river monitoring stations within the SAC. A station on the Grange River immediately downstream of the SAC boundary has had consistently high status (Q4-5 or Q5) 1990-2018. See also The European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2019
Typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition	Typical species have not been fully defined, but may include higher plants, bryophytes, algae and invertebrates. The habitat in the SAC is dominated by bryophytes. Some bryophytes are fully aquatic; however, many are associated with intermittent streams, splash-zones and stream edges: *Marchantia polymorpha* subsp. *montivagans* (FPO) is an Endangered species found on a small, tufaceous rock in the river below Glencar waterfall; *Campylostelium saxicola* (FPO) is Endangered and occurs on rocks at edge of Glencar river (Lockhart et al., 2012). Other species that may be associated with waterfalls and/or temporary streams/cascades include the Near Threatened species *Didymodon maximus* (FPO), *Dumortiera hirsuta* and *Hymenostylium recurvirostrum* (Lockhart et al., 2012). Species with FPO are protected under the Flora (Protection) Order, 2015. *Saxifraga aizoides*, a spring and stream-side species, is frequent in the SAC

Floodplain connectivity: area	Hectares	Maintain the area of active floodplain at and upstream of the habitat	As the SAC has upland streams, natural floodplains are unlikely to occur. River connectivity with natural floodplains is important for habitat functioning. Channels with a naturally functioning floodplain are better able to maintain habitat and water quality (Hatton-Ellis and Grieve, 2003). Floodplain connectivity is particularly important in terms of sediment sorting and nutrient deposition. High conservation value rivers are intimately connected to floodplain habitats and function as important wildlife corridors, connecting otherwise isolated or fragmented habitats in the wider countryside (Hatton-Ellis and Grieve, 2003; Mainstone et al., 2016)
Riparian habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the habitat and its sub-types	Riparian habitats (e.g. woodlands and wetlands) are integral to the structure and functioning of rivers, even where not part of a floodplain. Fringing habitats can contribute to the aquatic food web (e.g. allochthonous matter such as leaf fall), provide habitat for certain life-stages of fish, birds and aquatic invertebrates, assist in the settlement of fine suspended material, protect banks from erosion and contribute to nutrient cycling. Shade may be important in suppressing algal growth and moderating temperatures. Equally, fringing habitats are dependent on rivers, particularly their water levels, and support wetland communities and species of conservation concern. See Mainstone et al. (2016). A variety of upland and woodland habitats fringe the streams in the SAC. Trees and rock outcrops are important for many typical species as they provide shade and maintain high moisture levels

4010 Northern Atlantic wet heaths with Erica tetralix

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Ben Bulben, Gleniff and Glenade Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; Perrin et al., 2013, 2014). Northern Atlantic wet heaths with *Erica tetralix* was mapped in detail for the SAC and the total area of the qualifying habitat stated by Perrin et al. (2013) is 44.4ha, covering 0.7% of the SAC. Perrin et al. (2013) report no significant losses of area of the habitat since 1995. Further information can be found in Perrin et al. (2013). Further details on this and the following attributes can be found in the Ben Bulben, Gleniff and Glenade Complex SAC conservation objectives supporting document for upland habitats where a summary of the mapping methodology and a brief discussion of restoration potential are also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 3	Wet heath was recorded with a fragmented distribution and in intimate mosaic with blanket bog within Ben Bulben, Gleniff and Glenade Complex SAC by Perrin et al. (2013). See Perrin et al. (2013) for further information. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	See the uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded five different wet heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on the vegetation communities associated with this habitat is presented in Perrin et al. (2014). See also the Irish Vegetation Classification (Perrin, 2017; www.biodiversityireland.ie/projects/ivc-classification-explorer)
Vegetation composition: cross-leaved heath	Occurrence within 20m of a representative number of 2m x 2m monitoring stops	Cross-leaved heath (*Erica tetralix*) present within a 20m radius of each monitoring stop	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of positive indicator species at least 50%	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is presented. Further details can be found in the uplands supporting document
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of *Cladonia* and *Sphagnum* species, *Racomitrium lanuginosum* and pleurocarpous mosses at least 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: ericoid species and crowberry	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of ericoid species and crowberry (*Empetrum nigrum*) at least 15%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: dwarf shrub species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrubs less than 75%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details

Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is presented. See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush (*Juncus effusus*) less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids, crowberry (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) showing signs of browsing	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Attribute and target based on Perrin et al. (2014), where the list of sensitive areas for this habitat is presented. See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: drainage	Percentage cover in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.; see Nelson et al., 2019, 2021). Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH. Any new records should be considered within this attribute. See the uplands supporting document for further details

4030 European dry heaths

To restore the favourable conservation condition of European dry heaths in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes	Ben Bulben, Gleniff and Glenade Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; Perrin et al., 2013, 2014). European dry heaths was mapped in detail for the SAC and the total area of the qualifying habitat stated by Perrin et al. (2013) is 648.9ha, covering 10.8% of the SAC. Perrin et al. (2013) report obvious losses of habitat since 1995 of approximately 0.02ha. Further information can be found in Perrin et al. (2013). Further details on this and the following attributes can be found in the Ben Bulben, Gleniff and Glenade Complex SAC conservation objectives supporting document for upland habitats where a summary of the mapping methodology and a brief discussion of restoration potential are also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 4	Dry heath was recorded by Perrin et al. (2013) throughout Ben Bulben, Gleniff and Glenade Complex SAC, particularly on the summit of Ben Bulben, on and around the summit and King's Mountain, the upper slopes of Truskmore, east of the summit of Tievebaun Mountain, in the Gortnagarn and Largy townlands and around the bluffs of the Dooneens. See Perrin et al. (2013) for further information. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	See the uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded four different dry heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on the vegetation communities associated with this habitat is presented in Perrin et al. (2014). See also the Irish Vegetation Classification (Perrin, 2017; www.biodiversityireland.ie/projects/ivc-classification-explorer)
Vegetation composition: lichens and bryophytes	Number of species at a representative number of 2m x 2m monitoring stops	Number of bryophyte or non-crustose lichen species present at each monitoring stop at least three, excluding *Campylopus* and *Polytrichum* mosses	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: number of positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species present at each monitoring stop at least two	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat, which is composed of dwarf shrubs, is presented. See the uplands supporting document for further details
Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of positive indicator species at least 50% for siliceous dry heath and 50-75% for calcareous dry heath	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat, which is composed of dwarf shrubs, is presented. See the uplands supporting document for further details

Vegetation composition: dwarf shrub composition	Percentage cover at a representative number of 2m x 2m monitoring stops	Proportion of dwarf shrub cover composed collectively of bog-myrtle (*Myrica gale*), creeping willow (*Salix repens*) and western gorse (*Ulex gallii*) is less than 50%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species is presented. See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details. The non-native moss *Campylopus introflexus* was recorded by Perrin et al. (2013) within this habitat in the SAC
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush (*Juncus effusus*) less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: senescent ling	Percentage cover at a representative number of 2m x 2m monitoring stops	Senescent proportion of ling (*Calluna vulgaris*) cover less than 50%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids showing signs of browsing	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas	Attribute and target based on Perrin et al. (2014), where the list of sensitive areas is presented. See the uplands supporting document for further details
Vegetation structure: growth phases of ling	Percentage cover in local vicinity of a representative number of monitoring stops	Outside sensitive areas, all growth phases of ling (*Calluna vulgaris*) should occur throughout, with at least 10% of cover in the mature phase	Attribute and target based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.; see Nelson et al., 2019, 2021). Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH. Hepatic mats of the *Calluna vulgaris-Herbertus aduncus* community were recorded within this habitat during the NSUH (Perrin et al., 2013). Any new records should also be considered within this attribute. See the uplands supporting document for further details

4060 Alpine and Boreal heaths

To restore the favourable conservation condition of Alpine and Boreal heaths in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Ben Bulben, Gleniff and Glenade Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; Perrin et al., 2013, 2014). Alpine and Boreal heath was mapped in detail for the SAC and the total area of the qualifying habitat stated by Perrin et al. (2013) is 202.6ha, covering 3.4% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. Further information can be found in Perrin et al. (2013). Further details on this and the following attributes can be found in the Ben Bulben, Gleniff and Glenade Complex SAC conservation objectives supporting document for upland habitats where a summary of the mapping methodology is also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 5	Alpine and Boreal heath was recorded by Perrin et al. (2013) throughout the SAC, particularly around the summit areas of Ben Bulben and Truskmore and the summit and surrounding slopes of Tievebaun with patches of the habitat occurring around the summit of King's Mountain. See Perrin et al. (2013) for further information. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	See the uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded two Alpine and Boreal heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on the vegetation communities associated with this habitat is presented in Perrin et al. (2014). See also the Irish Vegetation Classification (Perrin, 2017; www.biodiversityireland.ie/projects/ivc-classification-explorer)
Vegetation composition: lichens and bryophytes	Number of species at a representative number of 2m x 2m monitoring stops	Number of bryophyte or non-crustose lichen species present at each monitoring stop at least three	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of positive indicator species at least 66%	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is presented. See the uplands supporting document for further details
Vegetation composition: dwarf shrub species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrub species at least 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 10%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species is presented. See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details. No non-native species were recorded within this habitat by Perrin et al. (2013)

Vegetation structure: signs of grazing	Percentage of leaves grazed at a representative number of 2m x 2m monitoring stops	Less than 10% collectively of the live leaves of specific graminoids showing signs of grazing	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details, including the list of specific graminoids
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids and crowberry (*Empetrum nigrum*) showing signs of browsing	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning within the habitat	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.; see Nelson et al., 2019, 2021). Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH. Hepatic mats of the *Calluna vulgaris-Herbertus aduncus* community were recorded within this habitat during the NSUH (Perrin et al., 2013). Any new records should also be considered within this attribute. See the uplands supporting document for further details

5130 Juniperus communis formations on heaths or calcareous grasslands

To maintain the favourable conservation condition of *Juniperus communis* formations on heaths or calcareous grasslands in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The total area of *Juniperus communis* formations on heath or calcareous grasslands in Ben Bulben, Gleniff and Glenade Complex SAC is unknown. The habitat was not recorded in the SAC during the National Survey of Upland Habitats (NSUH) by Perrin et al. (2013); although specimens of juniper (*Juniperus communis*) were recorded in the SAC, they were not abundant enough to create a formation
Habitat distribution	Occurrence	No decline, subject to natural processes	See the notes for Habitat area above
Juniper formation size	Number and proximity of juniper plants	At least 50 juniper plants present with each plant separated by no more than 20m	Attribute and target based on O'Neill and Martin (2018). A juniper formation is defined by O'Neill and Martin (2018) as any cluster of ≥50 juniper plants where no plant is more than 20m from another. In practice, this means that juniper plants should achieve a minimum density of 25 plants per hectare to qualify as a formation
Vegetation structure: female fruiting plants	Percentage in a representative number of 5m x 5m monitoring stops or in an *ad hoc* count of 50 plants	Fruiting females comprise at least 10% of juniper plants rooted in plot in at least 50% of stops or in an *ad hoc* count of 50 plants	Attribute and target based on Cooper et al. (2012) and O'Neill and Martin (2018)
Vegetation structure: seedling recruitment	Presence in a representative number of 5m x 5m monitoring stops	At least one seedling recorded in at least one monitoring stop	Attribute and target based on O'Neill and Martin (2018). Juniper seedlings are defined as plants less than 15cm high that are still flexible and single-stemmed, or with only two branches at most
Vegetation structure: live juniper	Percentage in a representative number of 5m x 5m monitoring stops or across the site as a whole	At least 90% of juniper plants rooted in plot alive in at least 75% of stops or across the site as a whole	Attribute and target based on Cooper et al. (2012) and O'Neill and Martin (2018)
Vegetation composition: negative indicator species	Percentage in a representative number of 5m x 5m monitoring stops	Total cover of negative indicator species to be less than 10% in at least 50% of stops	Attribute and target based on O'Neill and Martin (2018) where the list of negative indicator species is also presented
Physical structure: germination niches	Percentage in a representative number of 5m x 5m monitoring stops	At least 5% bare soil and/or at least 5% bare rock in at least 25% of stops	Attribute and target based on O'Neill and Martin (2018). Bare soil is important as a germination micro-site and bare rock can also contribute, particularly at the soil-rock interface and in limestone pavement grikes
Formation structure: browning/die-back of plants	Percentage of juniper cover in a representative number of 5m x 5m monitoring stops	Browning or dead juniper branches (excluding fully dead plants) comprise no more than 20% of total juniper cover in plot in at least 75% of stops	Attribute and target based on O'Neill and Martin (2018)
Formation structure: evidence of browsing and bark stripping	Occurrence across a representative number of 5m x 5m monitoring stops	Recent browsing of juniper plants and bark stripping and trampling due to browsers evident in no more than 75% of stops	Attribute and target based on O'Neill and Martin (2018). This attribute concerns bark stripping by animals. Bark stripping or damage from abrasion by rock is not included here. It should be noted, however, that distinguishing between the two may be difficult
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.; see Nelson et al., 2019, 2021)

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

To restore the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The National Survey of Upland Habitats (NSUH; Perrin et al., 2013) surveyed Ben Bulben, Gleniff and Glenade Complex SAC in 2012, mapping large areas which contain this habitat. The Irish Semi-natural Grassland Survey (ISGS; O'Neill et al., 2013) surveyed seven sites in the SAC in 2009 and 2010. Combining the results from both of these surveys gives an area of 96.56ha of 6210 within this SAC (see map 6). It is important to note that further unsurveyed areas of the habitat may be present within the SAC. It should also be noted that the habitat occurs in intimate association with other habitats, including other Annex I habitats, and therefore, these habitats sometimes cannot easily be mapped or considered separately. Conservation objectives for all co-occurring habitats should be used in conjunction with each other as appropriate
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 6	The distribution is based on the mapping of the NSUH (Perrin et al., 2013) and the ISGS (O'Neill et al., 2013). The habitat is widespread across the SAC, but is most common on the grassy slopes. In places its occurrence is patchy. Note that further unsurveyed areas of the habitat may be present within the SAC
Vegetation composition: positive indicator species	Number at a representative number of 2m x 2m monitoring stops; within 20m surrounding area of monitoring stops	At least 7 positive indicator species present in monitoring stop or, if 5–6 present in stop, additional species within 20m of stop; this includes at least two 'high quality' positive indicator species present in stop or within 20m of stop	Attribute and target based on O'Neill et al. (2013) and Martin et al. (2018), where the lists of positive indicator species, including high quality indicators, are also presented. A small number of additional positive indicators for upland examples of this habitat are also provided (Martin et al., 2018). These documents should be consulted for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Negative indicator species collectively not more than 20% cover, with cover of an individual species not more than 10%	Attribute and target based on O'Neill et al. (2013) and Martin et al. (2018), where the list of negative indicator species is presented
Vegetation composition: non-native species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of non-native species not more than 1%	Attribute and target based on O'Neill et al. (2013) and Martin et al. (2018)
Vegetation composition: woody species and bracken	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of woody species (except certain listed species) and bracken (*Pteridium aquilinum*) not more than 5%	Woody species that can occur above 5% cover are juniper (*Juniperus communis*), burnet rose (*Rosa spinosissima*), mountain avens (*Dryas octopetala*) and hoary rock-rose (*Helianthemum oelandicum*). However, cover of these species above 25% may indicate transition to another Annex I habitat such as Alpine and Boreal heaths (4060) or *Juniperus communis* formations (5130). Attribute and target based on O'Neill et al. (2013) and Martin et al. (2018). Scrub and bracken encroachment has been noted as an issue for this habitat in some areas in this SAC (O'Neill et al., 2013)
Vegetation structure: broadleaf herb:grass ratio	Percentage at a representative number of 2m x 2m monitoring stops	Broadleaf herb component of vegetation between 40% and 90%	Attribute and target based on O'Neill et al. (2013) and Martin et al. (2018). Broadleaf herb component of vegetation between 30% and 40% may be allowed to pass on expert judgement (Martin et al., 2018)

Vegetation structure: sward height	Percentage at a representative number of 2m x 2m monitoring stops	At least 30% of sward between 5cm and 40cm tall	Attribute and target based on O'Neill et al. (2013) and Martin et al. (2018)
Vegetation structure: litter	Percentage cover at a representative number of 2m x 2m monitoring stops	Litter cover not more than 25%	Attribute and target based on O'Neill et al. (2013) and Martin et al. (2018). The sward becoming rank, with high litter cover, has been mentioned as an issue for this habitat in some areas in the SAC (O'Neill et al., 2013)
Physical structure: bare soil	Percentage cover at a representative number of 2m x 2m monitoring stops	Not more than 10% bare soil	Attribute and target based on O'Neill et al. (2013) and Martin et al. (2018)
Physical structure: grazing or disturbance	Area in local vicinity of a representative number of monitoring stops	Area of the habitat showing signs of serious grazing or disturbance less than 20m²	Attribute and target based on O'Neill et al. (2013) and Martin et al. (2018)

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

To restore the favourable conservation condition of Species-rich *Nardus* grassland, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)* in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Areas of habitat referable to Species-rich *Nardus* grassland* have been mapped at both the Sligo and Leitrim sides of this large SAC (NPWS internal files; O'Neill et al., 2009), but further data are needed in both cases to confirm the nature and extent of the habitat area. The total area of the habitat is thus not currently known for Ben Bulben, Gleniff and Glenade Complex SAC
Habitat distribution	Occurrence	No decline, subject to natural processes	See the notes for habitat area above
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	At least 7 positive indicator species present in monitoring stop	Attribute and target based on O'Neill et al. (2013) and Perrin et al. (2014), both of which present the list of positive indicator species for this habitat. A range of positive indicator species are known to occur in the habitat in the SAC
Vegetation composition: high quality indicator species	Number of species at a representative number of 2m x 2m monitoring stops	The list of positive indicators for a monitoring stop to include at least 2 'high quality' indicator species for base-rich examples of the habitat, and at least 1 for base-poor examples	Attribute and target based on O'Neill et al. (2013) and Perrin et al. (2014), both of which present the list of positive indicator species for this habitat
Vegetation composition: species richness	Number of species at a representative number of 2m x 2m monitoring stops	Species richness at each monitoring stop at least 25 species, with bryophytes and lichens included	Attribute and target based on O'Neill et al. (2013) and Perrin et al. (2014). Species richness is a key characteristic of 6230 Nardus grasslands* which distinguishes it from species-poor *Nardus* swards that are very common in the uplands of Ireland and the UK. All vascular plants, bryophytes and terricolous macrolichens are counted
Vegetation composition: non-native species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of non-native species not more than 1%	Attribute and target based on O'Neill et al. (2013) and Perrin et al. (2014). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Negative indicator species collectively not more than 20% cover, with cover of an individual species not more than 10%	Attribute and target based on O'Neill et al. (2013) and Perrin et al. (2014), both of which present the list of negative indicator species for this habitat
Vegetation composition: *Sphagnum* cover	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of *Sphagnum* species not more than 10%	Attribute and target based on O'Neill et al. (2013) and Perrin et al. (2014). High cover of *Sphagnum* mosses is not characteristic of 6230 *Nardus* grasslands* and may indicate changes in hydrology or soil nutrients within the habitat, but is more likely to indicate that the community is inherently a marginal example of the habitat
Vegetation composition: *Polytrichum* cover	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of *Polytrichum* species not more than 25%	Attribute and target based on O'Neill et al. (2013) and Perrin et al. (2014). High cover of *Polytrichum* mosses is not characteristic of 6230 *Nardus* grasslands*. Such levels may indicate changes in hydrology or soil nutrients within the habitat, but are more likely to indicate that the community is inherently a marginal example of the habitat

Vegetation composition: shrubs, bracken and heath cover	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of woody species (shrubs, heathers) and bracken (*Pteridium aquilinum*) collectively not more than 5%	Attribute and target based on O'Neill et al. (2013) and Perrin et al. (2014). High cover of bracken indicates that the habitat may be undergoing succession towards a dense bracken community, and high cover of native trees and shrubs may indicate that the habitat is moving towards scrub or woodland due to lack of grazing. High cover of heather species (above 25%) may indicate transition to a heathland habitat
Vegetation structure: forb to graminoid ratio	Percentage at a representative number of 2m x 2m monitoring stops	Forb component of forb:graminoid ratio is 20-90%	Attribute and target based on O'Neill et al. (2013) and Perrin et al. (2014). Forb richness is characteristic of conservation value swards
Vegetation structure: sward height	Percentage at a representative number of 2m x 2m monitoring stops	At least 25% of sward between 5cm and 50cm tall	Attribute and target based on O'Neill et al. (2013) and Perrin et al. (2014). The lower and upper height limits aim to record overgrazing and undergrazing respectively
Vegetation structure: litter cover	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of litter not more than 20%	Attribute and target based on O'Neill et al. (2013) and Perrin et al. (2014). High levels of leaf litter can be indicative of undergrazing, with a resulting impact on species richness
Physical structure: bare ground	Percentage cover at a representative number of 2m x 2m monitoring stops	Not more than 10% bare ground	Attribute and target based on O'Neill et al. (2013) and Perrin et al. (2014). Notable areas of bare ground can result from overgrazing, use of machinery, human trampling, etc. If excessive, this can result in loss of characteristic species and habitat damage
Physical structure: grazing or disturbance	Area in local vicinity of a representative number of monitoring stops	Area of the habitat showing signs of serious grazing or disturbance less than 20m^2	Attribute and target based on O'Neill et al. (2013) and Perrin et al. (2014). Serious overgrazing or disturbance can impact on species richness, nutrient status, soil stability and habitat integrity
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	Relevant nutrients and their natural ranges are yet to be defined. However, nitrogen deposition is noted as being relevant to this habitat (NPWS, 2013)

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

To maintain the favourable conservation condition of Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Ben Bulben, Gleniff and Glenade Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; Perrin et al., 2013, 2014). Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels was mapped in detail for the SAC and the total area of the qualifying habitat stated by Perrin et al. (2013) is 1.9ha. The upland cliff ledge variant of the habitat was recorded on many of the limestone cliffs in the SAC by Perrin et al. (2013). Further information can be found in Perrin et al. (2013). A summary of the mapping methodology can be found in the Ben Bulben, Gleniff and Glenade Complex SAC conservation objectives supporting document for upland habitats. An additional area of 0.21ha of this habitat was mapped by the Irish Semi-natural Grasslands Survey (O'Neill et al., 2013) on the south side of Glencar Lough. This brings the total area of the habitat known from the SAC to c.2.1ha
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 7	The distribution is based on the mapping of the NSUH (Perrin et al., 2013) and the ISGS (O'Neill et al., 2013)
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	Relevant nutrients and their natural ranges are yet to be defined. However, nitrogen deposition is noted as being relevant to this habitat (NPWS, 2013)
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded two tall herb communities of the upland ledge variant of the habitat within this SAC, namely TH2 -*Cochlearia pyrenaica* tall herb vegetation and TH3 - *Sedum rosea-Angelica sylvestris* tall herb vegetation. Further information on these communities is presented in Perrin et al. (2014)
Vegetation composition: number of positive indicator species	Number of species at a representative number of monitoring stops	At least one positive indicator species at each monitoring stop	The list of positive indicator species for the upland variant of this habitat can be found in the Article 17 habitat assessment for 6430 (NPWS, 2019). See Perrin et al. (2013, 2014) for further details
Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of monitoring stops	Cover of positive indicator species at least 25%	The list of positive indicator species for the upland variant of this habitat can be found in the Article 17 habitat assessment for 6430 (NPWS, 2019). See Perrin et al. (2013, 2014) for further details
Vegetation composition: non-native species	Percentage cover at a representative number of monitoring stops	Cover of non-native species less than 1%	See NPWS (2019) and Perrin et al. (2013, 2014) for further details
Vegetation structure: height/flowering	Percentage/occurrence at a representative number of monitoring stops	At least 50% of tall herb stems should be greater than 20cm tall or signs of flowering/ability to flower should be present	See NPWS (2019) and Perrin et al. (2013, 2014) for further details
Vegetation structure: grazing	Percentage of flowering tall herb shoots grazed at a representative number of monitoring stops	Live shoots of flowering tall herb shoots showing signs of grazing less than 50%	See NPWS (2019) and Perrin et al. (2013, 2014) for further details

Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of monitoring stops	Cover of disturbed bare ground in monitoring stop less than 25% and less than 10% in local vicinity of monitoring stop	See NPWS (2019) and Perrin et al. (2013, 2014) for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.; see Nelson et al., 2019, 2021). Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH. Any new records should be considered within this attribute

7130 Blanket bogs (* if active bog)

To restore the favourable conservation condition of Blanket bogs (* if active bog) in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes	Ben Bulben, Gleniff and Glenade Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; Perrin et al., 2013, 2014). Perrin et al. (2013) state that the total area of blanket bog in the SAC is 2,134.5ha (35.6% of the SAC). This comprises 2,083.5ha of active blanket bog and 51.0ha of inactive blanket bog. Perrin et al. (2013) report obvious losses of habitat since 1995 of approximately 0.86ha. However, this is almost certainly an underestimate, as chronic losses due to erosion since 1995 cannot be quantified (106.5ha were mapped as eroding blanket bog by Perrin et al., 2013). It should be noted also that further restoration of blanket bog would be required in order to fulfil the targets for peat formation and hydrology presented below. See the Ben Bulben, Gleniff and Glenade Complex SAC conservation objectives supporting document for upland habitats for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 8	Blanket bog was recorded by Perrin et al. (2013) throughout Ben Bulben, Gleniff and Glenade Complex SAC. See Perrin et al. (2013) for further information. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	See the uplands supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	From the areas given by Perrin et al. (2013) above, 97.6% of the Annex I blanket bog habitat is currently active. See the uplands supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the uplands supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded five different active blanket bog communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on the vegetation communities associated with this habitat is presented in Perrin et al. (2014). See also the Irish Vegetation Classification (Perrin, 2017; www.biodiversityireland.ie/projects/ivc-classification-explorer)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop at least seven	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is presented. See the uplands supporting document for further details
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes or lichens, excluding *Sphagnum fallax*, at least 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species less than 75%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details, including the list of potentially dominant species

Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species is presented. See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details. Rhododendron (*Rhododendron ponticum*) and the non-native moss *Campylopus introflexus* were recorded within this habitat in the SAC by Perrin et al. (2013)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Last complete growing season's shoots of ericoids, crowberry (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) showing signs of browsing collectively less than 33%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Attribute and target based on Perrin et al. (2014), where the list of sensitive areas is presented. See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: erosion	Percentage area in local vicinity of a representative number of monitoring stops	Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.; see Nelson et al., 2019, 2021). Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH. Any new records should be considered within this attribute. See the uplands supporting document for further details

7140 Transition mires and quaking bogs

To maintain the favourable conservation condition of Transition mires and quaking bogs in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Ben Bulben, Gleniff and Glenade Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; Perrin et al., 2013, 2014). Transition mire was mapped in detail for the SAC and the total area of the qualifying habitat stated by Perrin et al. (2013) is 4.1ha, covering only c.0.1% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. Further details on this and the following attributes can be found in the Ben Bulben, Gleniff and Glenade Complex SAC conservation objectives supporting document for upland habitats where a summary of the mapping methodology is also presented
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 9	Transition mire was recorded by Perrin et al. (2013) scattered throughout the SAC. See Perrin et al. (2013) for further information. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	See the uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded three different transition mire communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014). See also the Irish Vegetation Classification (Perrin, 2018; www.biodiversityireland.ie/projects/ivc-classification-explorer)
Vegetation composition: number of positive indicator species	Number at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at least three for in-filling pools and flushes and at least six for fens	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: number of core positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	At least one core positive indicator species present	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of positive indicator species is at least 25%	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: height	Percentage at a representative number of 2m x 2m monitoring stops	Proportion of live leaves and/or flowering shoots of vascular plants that are more than 15cm above the ground surface should be at least 50%	Attribute and target based on Perrin et al. (2014). This attribute is only applicable to fen and flush examples of the habitat, not to in-filling pool examples. See the uplands supporting document for further details

Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.; see Nelson et al., 2019, 2021). Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH. Any new records should be considered within this attribute. See the uplands supporting document for further details

7220 Petrifying springs with tufa formation (Cratoneurion)*

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

Attribute	Measure	Target	Notes
Habitat area	Square metres	Area stable or increasing, subject to natural processes	Within Ben Bulben, Gleniff and Glenade Complex SAC, 71 polygons were recorded as containing petrifying springs during the National Survey of Upland Habitats (NSUH; Perrin et al., 2013), with an area of 2.6ha (c.26,000m²). The approach to mapping conducted during the NSUH is detailed in Perrin et al. (2014). Note that the NSUH did not undertake a conservation status assessment of the habitat in the SAC; thus, it is not included in the 000623 uplands supporting document. Lyons (2015) mapped 17 springs in total: at Glencar (sub-sites PS038a and PS038b), Glenade, below Eagle's Rock (PS040a-e), Gleniff, Annacoona (PS058a-e), Cormac Reagh's Hole (PS106), Benbulbin Corrie (PS107), Benwiskin (PS108), Eagle's Rock, Glenade (PS113) and Larganavaddoge (PS115), totalling c.10,840m². See Perrin et al. (2013) and Lyons (2015) for further details. See Lyons and Kelly (2016) for further details on this and all attributes. It is important to note that further unmapped springs may be present in the SAC
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 10	See map 10 for the point locations mapped by Lyons (2015) and the point locations of the centroids of the polygons containing the habitat recorded by Perrin et al. (2013)
Hydrological regime: height of water table; water flow	Metres; metres per second	Maintain appropriate hydrological regimes	Petrifying springs rely on permanent irrigation, usually from upwelling groundwater sources or seepage sources (Lyons and Kelly, 2013). In karst areas, water tends to flow away rapidly over bare rock surfaces, even on fairly flat ground (Lyons and Kelly, 2013). Water flow should not be altered anthropogenically. See Lyons and Kelly (2016) for further details. Conifer plantations adjoin the sub-sites PS058e and PS106; harvesting of trees poses a potential risk to the wetland habitats due to disturbance and run-off associated with felling and removing trees (Lyons, 2015)
Physical structure: tufa formations	Seepage rate to the spring and groundwater quality (saturated calcium carbonate, pH, temperature and alkalinity conditions)	Maintain appropriate levels of tufa formation	Petrifying springs are springs that typically form small calcareous or 'tufa' deposits. On contact with the atmosphere at the spring head, carbon dioxide is lost from calcium saturated water to the atmosphere or is depleted by the photosynthetic activities of plants. This results in the precipitation of a calcium carbonate marl or tufa. Seepage flow rates are crucial for the development of tufa. See Lyons (2015) for the main tufa types at the sub-sites surveyed in the SAC
Ecosystem function: water quality - nitrate level	mg/l	Maintain nitrate level at less than 10mg/l	Attribute and target based on Lyons and Kelly (2016). Lyons (2015) recorded baseline nitrate levels of: 2.58mg/l at PS038b; 1.87mg/l at PS040d; <0.07mg/l at PS058b; 1.34mg/l at PS058d; 0.20mg/l at PS058e; 0.39mg/l at PS106; 0.81mg/l at PS107; 0.94mg/l at PS108; 0.32mg/l at PS113 and <0.07mg/l at PS115
Ecosystem function: water quality - phosphate level	µg/l	Maintain phosphate level to less than 15µg/l	Attribute and target based on Lyons and Kelly (2016). Lyons (2015) recorded baseline phosphate levels of: 9µg/l at PS038b; 12µg/l at PS040d; 6µg/l at PS058b; 9µg/l at PS058d; 5µg/l at PS058e; 6µg/l at PS106; 5µg/l at PS107; 5µg/l at PS108; 8µg/l at PS113 and 11µg/l at PS115

Vegetation composition: community diversity	Variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Lyons and Kelly (2016) describe eight plant communities of petrifying springs in Ireland based on relevé data. At PS038a and PS038b, the main community type recorded by Lyons (2015) was *Palustriella commutata-Geranium robertianum* springheads; that at PS040d and PS040e was *Palustriella falcata-Carex panicea* springs; that at PS058e was *Eucladium verticillatum-Pellia endiviifolia* tufa cascades; *Saxifraga aizoides-Seligeria oelandica* springs were recorded at PS058b, PS058c, PS058d, PS107, PS108, PS113 and PS115; and, at PS106, *Palustriella commutata-Agrostis stolonifera* springheads, with *Schoenus nigricans* springs were recorded. Further information on the vegetation communities associated with the habitat is presented in Lyons and Kelly (2016)
Vegetation composition: positive indicator species	Number per spring	At least three positive/high quality indicator species as listed in Lyons and Kelly (2016) and no loss from baseline number	Attribute and target based on Lyons and Kelly (2016), where the lists of positive and high quality indicator species are presented. See Lyons (2015) for baseline numbers and lists of species recorded in the surveyed springs in the SAC
Vegetation composition: negative indicator species	Cover (DAFOR scale)	Potentially negative indicator species should not be Dominant or Abundant; potentially negative woody species should be absent in unwooded springs; invasive species should be absent	Based on Lyons and Kelly (2016), where the lists of potentially negative herbaceous, bryophyte, algal and woody species are presented. See Lyons and Kelly (2016) for further details on potentially negative and potentially invasive species. The potentially negative woody species ash (*Fraxinus excelsior*) was recorded at PS040d, and hawthorn (*Crataegus monogyna*) at PS040d and PS040e, both unwooded springs, but were very rare overall. Lyons (2015) recorded the potentially negative bryophytes *Brachythecium rivulare* at PS058a and PS106, *Cratoneuron filicinum* at PS058b, PS058d and PS058e and *Platyhypnidium riparioides* at PS038a and the potentially negative herbaceous species soft rush (*Juncus effusus*) at PS058b and PS107 and the non-native New Zealand willowherb (*Epilobium brunnescens*) at PS038b, PS058b, PS058e, PS107 and PS113, but none were Dominant or Abundant alone or in combination and the attribute was passed by Lyons (2015)
Vegetation composition: algal cover	Percentage cover at, and in local vicinity of, a representative number of monitoring stops	Cover of algae less than 2%	Algal cover is indicative of nutrient enrichment from multiple sources (McBride et al., 2011)
Vegetation structure: sward height	Centimetres	Field layer height between 10cm and 50cm (except for bryophyte-dominated ground <10cm)	Attribute and target based on Lyons and Kelly (2016)
Physical structure: trampling/dung	Cover (DAFOR scale)	Cover should not be Dominant or Abundant	Attribute and target based on Lyons and Kelly (2016)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat; maintain features of local distinctiveness, subject to natural processes	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.; see Nelson et al., 2019, 2021). Of particular note, the Near Threatened liverwort *Leiocolea bantriensis* (Lockhart et al., 2012) was recorded at PS058b. The Near Threatened mosses *Hymenostylium recurvirostrum* var. *insigne, Orthothecium rufescens* and *Seligeria patula* and the Vulnerable moss *Seligeria oelandica* (Lockhart et al., 2012) were recorded at various sub-sites in the SAC by Lyons (2015). See also the conservation objective for Geyer's whorl snail (*Vertigo geyeri*; Annex II species code 1013) in this volume

7230 Alkaline fens

To restore the favourable conservation condition of Alkaline fens in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes	Ben Bulben, Gleniff and Glenade Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; Perrin et al., 2013, 2014). Alkaline fen was mapped in detail for the SAC and the total area of the qualifying habitat stated by Perrin et al. (2013) is 22.7ha, covering only 0.4% of the SAC. Perrin et al. (2013) report obvious losses of habitat of <0.01ha since 1995. Further details on this and the following attributes can be found in the Ben Bulben, Gleniff and Glenade Complex SAC conservation objectives supporting document for upland habitats where a summary of the mapping methodology is also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 11	Perrin et al. (2013) recorded alkaline fen across the SAC on lower slopes, most frequently below the cliffs at Annacoona. See Perrin et al. (2013) for further details. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	See the uplands supporting document for further details
Ecosystem function: peat formation	Percentage cover of peat-forming vegetation and water table levels	Maintain active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time
Ecosystem function: hydrology	Metres	Maintain, or where necessary restore, appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat
Ecosystem function: water quality	Water chemistry measures	Maintain appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus, with the latter tending to be the limiting nutrient under natural conditions. Water supply should be also relatively calcium-rich
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded four different alkaline fen vegetation communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014). See also the Irish Vegetation Classification (Perrin, 2018; www.biodiversityireland.ie/projects/ivc-classification-explorer)
Vegetation composition: number of positive indicator species (brown mosses)	Number of species at a representative number of 2m x 2m monitoring stops	Number of brown moss species present at each monitoring stop at least one	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details

Vegetation composition: number of positive indicator species (vascular plants)	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive vascular plant indicator species present at each monitoring stop is at least two for small-sedge flushes and at least three for black bog-rush (*Schoenus nigricans*) flush and bottle sedge (*Carex rostrata*) fen	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of brown moss species and positive vascular plant indicator species at least 20% for small-sedge flushes and at least 75% cover for black bog-rush (*Schoenus nigricans*) flush and bottle sedge (*Carex rostrata*) fen	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details. No non-native species were recorded within this habitat during the NSUH (Perrin et al., 2013)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: soft rush and common reed cover	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of soft rush (*Juncus effusus*) and common reed (*Phragmites australis*) less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: height	Percentage of leaves/shoots at a representative number of 2m x 2m monitoring stops	Proportion of live leaves and/or flowering shoots of vascular plants that are more than 5cm above the ground surface should be at least 50%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: tufa formations	Percentage cover in local vicinity of a representative number of 2m x 2m monitoring stops	Disturbed proportion of vegetation cover where tufa is present is less than 1%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.; see Nelson et al., 2019, 2021). Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH. Any new records should be considered within this attribute. See the uplands supporting document for further details

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

To maintain the favourable conservation condition of Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Ben Bulben, Gleniff and Glenade Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; Perrin et al., 2013, 2014). Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) was mapped in detail for the SAC and the total area of the qualifying habitat stated by Perrin et al. (2013) is 37.6ha. This covers 0.6% of the SAC. Perrin et al. (2013) report no significant losses of area of the habitat in the SAC since 1995. Further information can be found in Perrin et al. (2013). Further details on this and the following attributes can be found in the Ben Bulben, Gleniff and Glenade Complex SAC conservation objectives supporting document for upland habitats where a summary of the mapping methodology is also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 12	In Ben Bulben, Gleniff and Glenade Complex SAC, siliceous scree was recorded by Perrin et al. (2013) most notably on the slopes of Tievebaun Mountain and Truskmore. See Perrin et al. (2013) for further information. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	See the uplands supporting document for further details
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes and non-crustose lichen species at least 5%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Proportion of vegetation composed of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is presented. See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at a representative number of 2m x 2m monitoring stops	Proportion of vegetation composed of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details. No non-native species were recorded within this habitat by Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species in local vicinity of a representative number of monitoring stops	At least one positive indicator species present in vicinity of each monitoring stop in block scree	Attribute and target based on Perrin et al. (2014). The list of positive indicator species for this habitat is also presented in Perrin et al. (2014) and is the same as for 8220 Siliceous rocky slopes. Further details can be found in the uplands supporting document
Vegetation composition: grass species and dwarf shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of grass species and dwarf shrubs less than 20%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: bracken, native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken (*Pteridium aquilinum*), native trees and shrubs less than 25%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: grazing and browsing	Percentage of leaves/ shoots grazed/browsed at a representative number of 2m x 2m monitoring stops	Live leaves of forbs and shoots of dwarf shrubs showing signs of grazing or browsing collectively less than 50%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details

Physical structure: disturbance	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Ground disturbed by human and animal paths, scree running or vehicles less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.; see Nelson et al., 2019, 2021). Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH, including a number of rare and threatened bryophyte species. Hepatic mats of the *Calluna vulgaris-Herbertus aduncus* community were recorded within this habitat during the NSUH (Perrin et al., 2013). See Perrin et al. (2013) for further details. Any new records should also be considered within this attribute. See the uplands supporting document for further information

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

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes	Ben Bulben, Gleniff and Glenade Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; Perrin et al., 2013, 2014). Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii) was mapped in detail for the SAC and the total area of the qualifying habitat stated by Perrin et al. (2013) is 40.7ha. This covers 0.7% of the SAC. Perrin et al. (2013) report obvious losses of habitat of <0.01ha since 1995. Further information can be found in Perrin et al. (2013). Further details on this and the following attributes can be found in the Ben Bulben, Gleniff and Glenade Complex SAC conservation objectives supporting document for upland habitats where a summary of the mapping methodology is also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 13	Calcareous scree was recorded by Perrin et al. (2013) throughout Ben Bulben, Gleniff and Glenade Complex SAC, notably on the steep upper slopes of Ben Bulben, the summit area and slopes of Kings Mountain, the slopes of Benwiskin, below the corrie of Annacoona, at Glencarbury, south of Slievemore, the lower slopes of Tievebaun and at Cloontypruglish and Craumpaun and Glencar. See Perrin et al. (2013) for further information. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	See the uplands supporting document for further details
Vegetation composition: positive indicator fern and *Saxifraga* species	Number of species in local vicinity of a representative number of monitoring stops	Number of ferns and *Saxifraga* indicators in vicinity of each monitoring stop at least one	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: positive indicator species	Number of species in local vicinity of a representative number of monitoring stops	Number of positive indicator species in vicinity of each monitoring stop at least three	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: grass species and dwarf shrubs	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrubs and grasses, excluding blue moor-grass (*Sesleria caerulea*), collectively less than 20%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Proportion of vegetation composed of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at a representative number of 2m x 2m monitoring stops	Proportion of vegetation composed of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). Excessive cover of the non-native New Zealand willowherb (*Epilobium brunnescens*) was recorded in the habitat in the SAC by Perrin et al. (2013). See the uplands supporting document for further details
Vegetation composition: bracken, native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken (*Pteridium aquilinum*), native trees and shrubs less than 25%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details

Vegetation structure: grazing and browsing	Percentage of leaves/ shoots grazed/browsed at a representative number of 2m x 2m monitoring stops	Live leaves of forbs and shoots of dwarf shrubs showing signs of grazing or browsing collectively less than 50%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: disturbance	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Ground disturbed by human and animal paths, scree running, vehicles less than 10%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.; see Nelson et al., 2019, 2021). Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH, including a number of rare and threatened bryophyte species, the Vulnerable holly fern (*Polystichum lonchitis*) and the Near Threatened species Irish saxifrage (*Saxifraga rosacea* subsp. *rosacea*) and moonwort (*Botrychium lunaria*) which were recorded in the habitat in the SAC. See Perrin et al. (2013) for further information. Any new records should be considered within this attribute. See the uplands supporting document for further details

8210 Calcareous rocky slopes with chasmophytic vegetation

To restore the favourable conservation condition of Calcareous rocky slopes with chasmophytic vegetation in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes	Ben Bulben, Gleniff and Glenade Complex SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; Perrin et al., 2013, 2014). Calcareous rocky slopes with chasmophytic vegetation was mapped in detail for the SAC and the total area of the qualifying habitat stated by Perrin et al. (2013) is 58.3ha. This covers 1.0% of the SAC. Perrin et al. (2013) report obvious losses of habitat since 1995 of approximately 0.04ha. Further information can be found in Perrin et al. (2013). Further details on this and the following attributes can be found in the Ben Bulben, Gleniff and Glenade Complex SAC conservation objectives supporting document for upland habitats where a summary of the mapping methodology is also presented
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 14	Calcareous rocky slopes was recorded throughout Ben Bulben, Gleniff and Glenade Complex SAC by Perrin et al. (2013), most notably at Benwiskin, Annacoona and the cliffs at and eastward of Cloontyprughlish and Crumpaun. See Perrin et al. (2013) for further information. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain pH and soil nutrient status within natural ranges	See the uplands supporting document for further details
Vegetation composition: positive indicator fern and *Saxifraga* species	Number of species in local vicinity of a representative number of monitoring stops	Number of ferns and *Saxifraga* indicators in vicinity of each monitoring stop at least one	Attribute and target based on Perrin et al. (2014) where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: positive indicator species	Number of species in local vicinity of a representative number of monitoring stops	Number of positive indicator species in vicinity of each monitoring stop at least three	Attribute and target based on Perrin et al. (2014) where the list of positive indicator species for this habitat is presented. Further details can be found in the uplands supporting document
Vegetation composition: non-native species	Percentage cover in local vicinity of a representative number of monitoring stops	Proportion of vegetation composed of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details. Perrin et al. (2013) recorded excessive cover of the non-native New Zealand willowherb (*Epilobium brunnescens*) in the habitat in the SAC
Vegetation composition: bracken, native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken (*Pteridium aquilinum*), native trees and shrubs less than 25%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: grazing and browsing	Percentage of leaves/ shoots grazed/browsed in local vicinity of a representative number of monitoring stops	Live leaves of forbs and shoots of dwarf shrubs showing signs of grazing or browsing collectively less than 50%	Attribute and target based on Perrin et al. (2014). See the uplands supporting document for further details

Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species on the Flora (Protection) Order, 2015 (FPO) and/or Red Lists (Byrne et al., 2009; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.). Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC, e.g. the FPO listed and Critically Endangered moss *Encalypta rhaptocarpa* (Lockhart et al., 2012) which was subsequently recorded in association with the habitat by Hodd (2016), and added any new records collected during the NSUH in the habitat, including a number of other rare and threatened bryophyte species and the Endangered tea-leaved willow (*Salix phylicifolia*) and the Vulnerable species northern rock-cress (*Cardaminopsis petraea*; also FPO listed) and fringed sandwort (*Arenaria ciliata*) (Wyse Jackson et al., 2016). See Perrin et al. (2013) for further information. Any additional records should be considered within this attribute. See the uplands supporting document for further details

1013 Geyer's Whorl Snail *Vertigo geyeri*

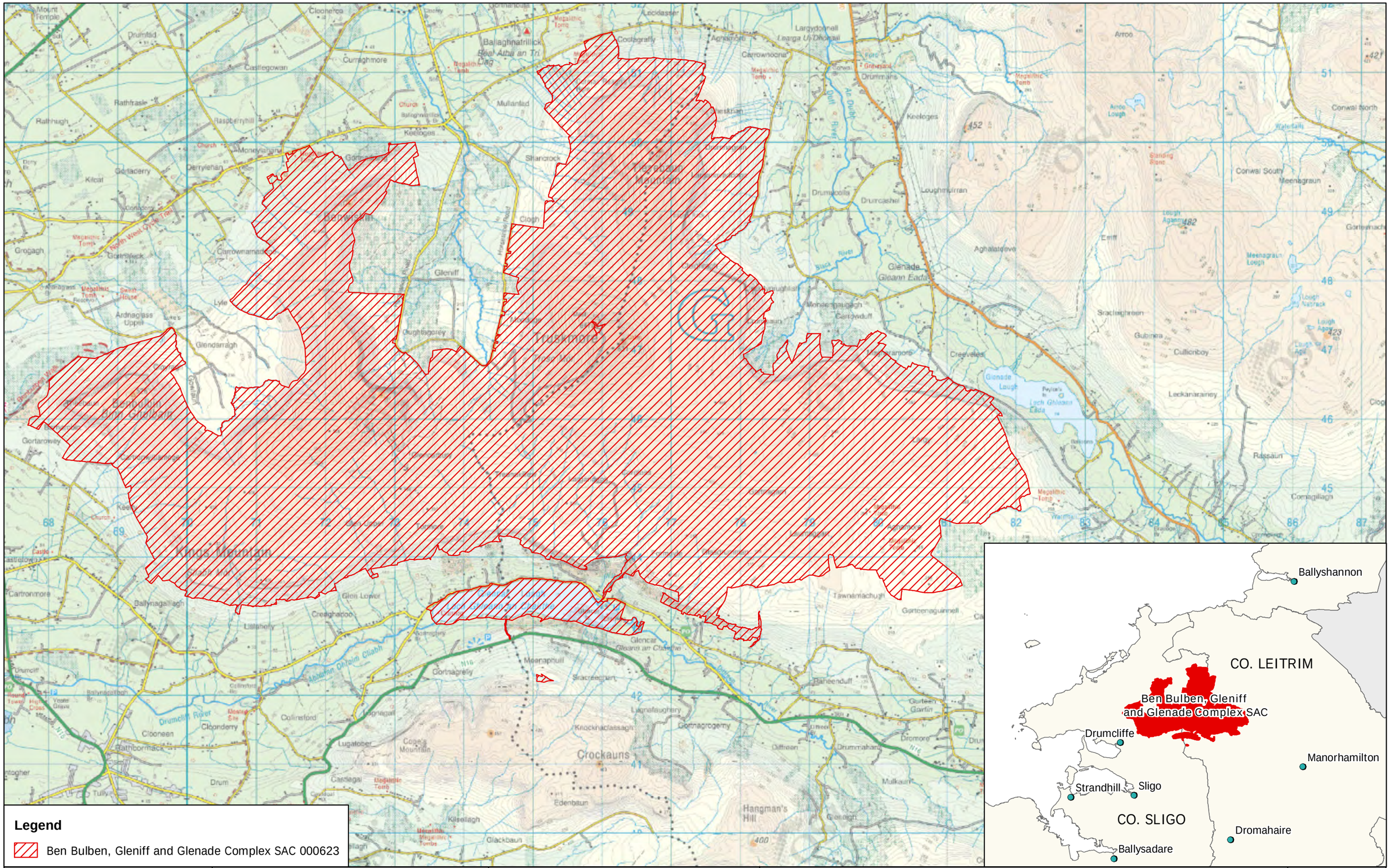
To maintain the favourable conservation condition of Geyer's Whorl Snail (*Vertigo geyeri*) in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Number of occupied 1km squares	No decline except through natural processes. There are two known sites for this species in the SAC within the 1km grid squares G7748, G7749, G7849, G7850 and G7542	Geyer's whorl snail (*Vertigo geyeri*) has been recorded from eight 1km grid squares that overlap this SAC. The location data from five of the 1km grid squares are good quality and precise. This is taken as the baseline figure. These five 1km squares are: G7748, G7749, G7849, G7850 and G7542 and only these are mapped on map 15. See details for the sites Meenaphuil (site code VgCAM01) and Tievebaun (site code VgCAM02) in Moorkens and Killeen (2011), Long and Brophy (2019) and Brophy and Long (2019). The records from the remaining three 1km squares are vague and the status of the species and/or precise location of the occupied habitat in each has not been confirmed. These squares are G7644, G7548 and G7848
Occurrence in suitable habitat	Percentage positive records in a representative number of samples	No decline, subject to natural processes. Baseline figures of at least 67% positive samples in optimal habitat and 33% in suboptimal habitat are set	The species should be present in at least 67% of sample points within areas of optimal habitat and in 33% of sample points in suboptimal habitat. See Moorkens and Killeen (2011), Brophy and Long (2019) and Long and Brophy (2019) for description of sampling and assessment methods and for definitions of optimal and suboptimal habitat
Habitat area	Hectares	Area of suitable habitat stable or increasing, subject to natural processes; no less than 12.4ha of at least suboptimal habitat	The baseline survey by Moorkens and Killeen (2011) determined that there should be at least 12.4ha of habitat in at least suboptimal condition within all occupied sites in the SAC. See Moorkens and Killeen (2011), Brophy and Long (2019) and Long and Brophy (2019) for description of sampling and assessment methods and for definitions of optimal and suboptimal habitat
Habitat quality: soil wetness	Assessment in a representative number of samples	No decline, subject to natural processes	Within occupied Geyer's whorl snail (*Vertigo geyeri*) habitat, soil wetness should be suitable for the species in 50% of sample points within optimal habitat and in 25% of sample points in suboptimal habitat. This should be assessed following the methodology and definitions in Moorkens and Killeen (2011), Brophy and Long (2019) and Long and Brophy (2019)

1355 Otter *Lutra lutra*

To maintain the favourable conservation condition of Otter (*Lutra lutra*) in Ben Bulben, Gleniff and Glenade Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. Favourable Conservation Status (FCS) target, based on 1980/81 survey findings, is 88% in SACs. Current range is estimated at 93.6% (Reid et al., 2013)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 167.31ha along river banks/lake shoreline/ around ponds	No field survey. Areas mapped to include 10m terrestrial buffer, identified as critical for otters (NPWS, 2007), along rivers and around water bodies
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 85.13km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake) habitat	Hectares	No significant decline. Area mapped and calculated as 47.45ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (NPWS, 2007)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk and Moorhouse, 1991: Kruuk, 2006)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006; Reid et al., 2013)
Barriers to connectivity	Number	No significant increase. For guidance, see map 16	Otters will regularly commute across stretches of open water up to 500m. e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed



Legend

Ben Bulben, Gleniff and Glenade Complex SAC 000623

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 1:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: November 2021

Sligo/Leitrim Uplands SPA 004187

Sligo/Leitrim Uplands SPA 004187

Sligo/Leitrim Uplands SPA 004187

Glenade Lough SAC 001919

Ben Bulben, Gleniff and Glenade Complex SAC 000623

Sligo/Leitrim Uplands SPA 004187

Legend

- Ben Bulben, Gleniff and Glenade Complex SAC 000623
- Sligo/Leitrim Uplands SPA 004187
- Glenade Lough SAC 001919

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 2:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
OVERLAPPING AND ADJACENT SITES

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

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: November 2021

Legend

- Ben Bulben, Gleniff and Glenade Complex SAC 000623
- OSI Discovery Series County Boundary

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

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

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 3:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
WET HEATH

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

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: December 2021

Legend

- Ben Bulben, Gleniff and Glenade Complex SAC 000623
- OSI Discovery Series County Boundary

Cover of 4030 European dry heaths

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

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 4:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
DRY HEATH

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

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: December 2021

Legend

Ben Bulben, Gleniff and Glenade Complex SAC 000623

OSI Discovery Series County Boundary

Cover of 4060 Alpine and Boreal heaths

0%

0.1% - 20%

20.1% - 40%

40.1% - 60%

60.1% - 80%

80.1% - 100%

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 5:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
ALPINE AND BOREAL HEATHS

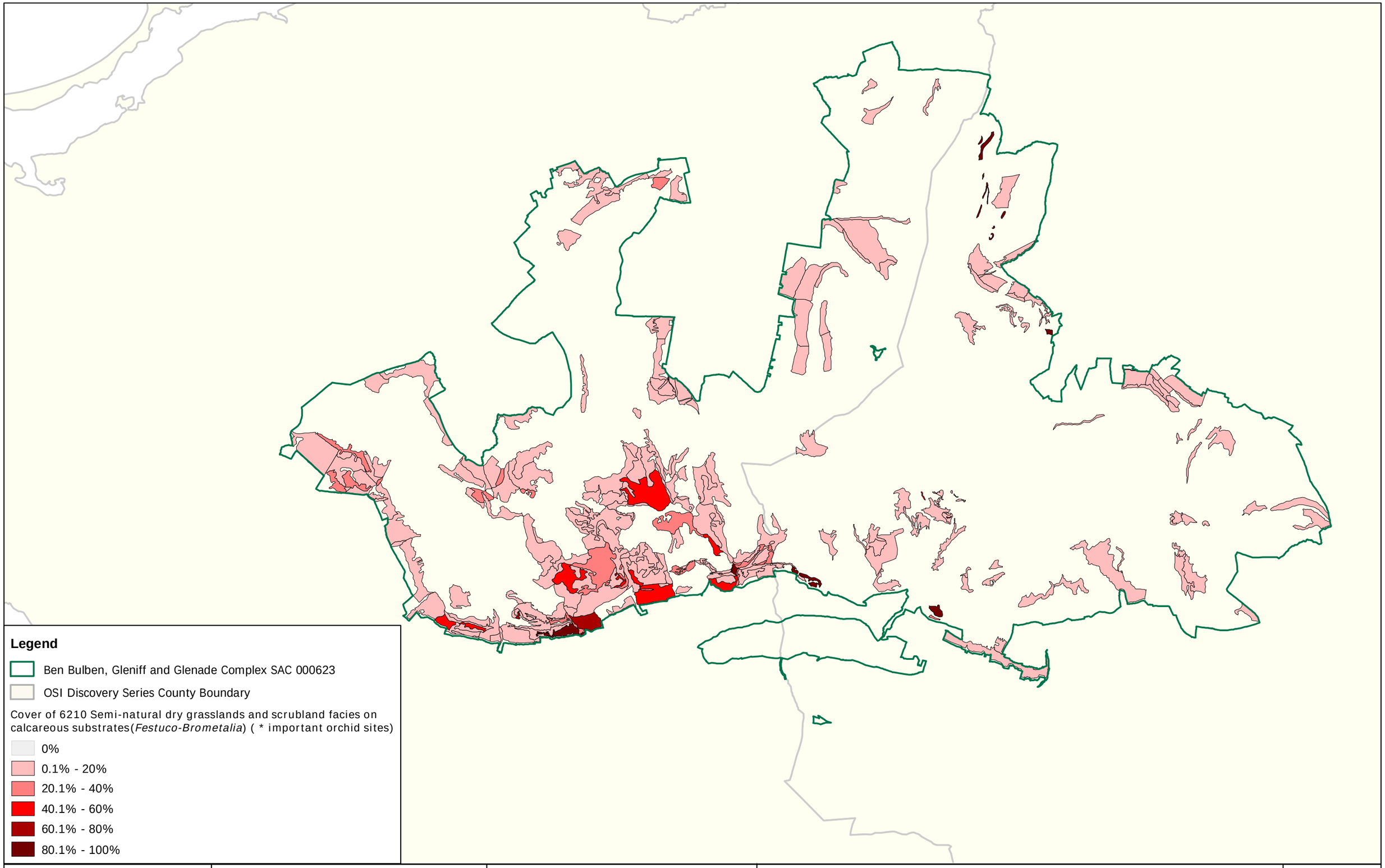
Map to be read in conjunction with the NPWS Conservation Objectives Document

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: December 2021



An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 6:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
ORCHID-RICH CALCAREOUS GRASSLAND

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

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: December 2021

Legend

- Ben Bulben, Gleniff and Glenade Complex SAC 000623
- OSI Discovery Series County Boundary

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

- 0%
- 0.1% - 1%
- 1% - 10%
- 10% - 20%
- 100%

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 7:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
HYDROPHILOUS TALL-HERB SWAMP

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

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: December 2021

Legend

- Ben Bulben, Gleniff and Glenade Complex SAC 000623
- OSI Discovery Series County Boundary

7130 Blanket bogs (* if active bog)

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

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 8:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
BLANKET BOGS

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

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: December 2021

Legend

Ben Bulben, Gleniff and Glenade Complex SAC 000623

OSI Discovery Series County Boundary

7140 Transition mires and quaking bogs

0%

0.1% - 10%

80% - 100%

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 9:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
TRANSITION MIRES

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

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: December 2021

Legend

- 7220 *Petrifying springs with tufa formation (*Cratoneurion*)
- Ben Bulben, Gleniff and Glenade Complex SAC 000623
- OSI Discovery Series County Boundary

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 10:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
PETRIFYING SPRINGS

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

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: December 2021

Legend

- Ben Bulben, Gleniff and Glenade Complex SAC 000623
- OSI Discovery Series County Boundary

7230 Alkaline fens

- 0%
- 0.1% - 20%
- 20% - 40%
- 40% - 60%
- 60% - 80%

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 11:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
ALKALINE FENS

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

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: December 2021

Legend

- Ben Bulben, Gleniff and Glenade Complex SAC 000623
- OSI Discovery Series County Boundary

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

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

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 12:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
SILICEOUS SCREE

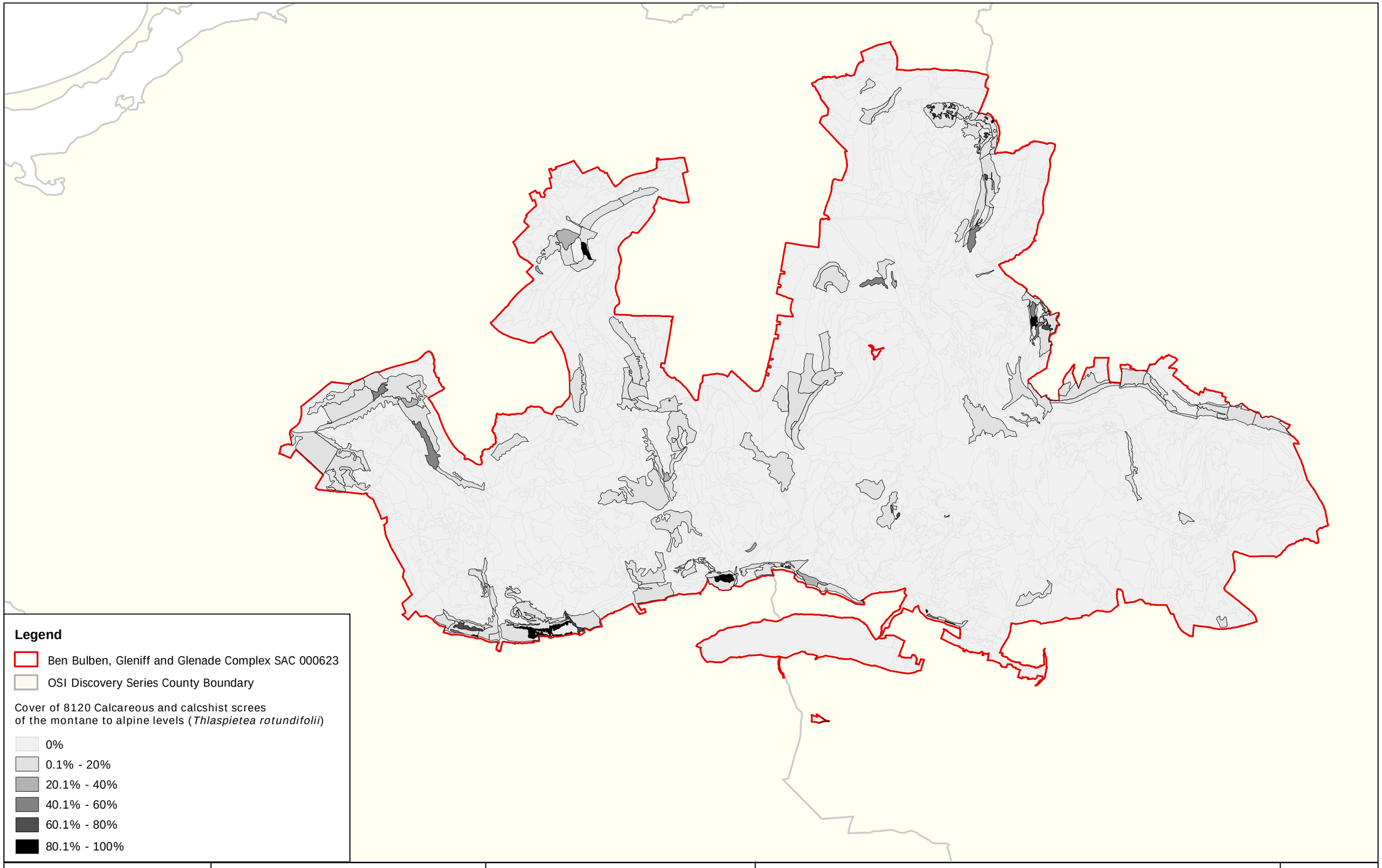
Map to be read in conjunction with the NPWS Conservation Objectives Document

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: December 2021



An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 13:
BEN BULBEN, GLENIFF
AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
CALCAREOUS SCREE

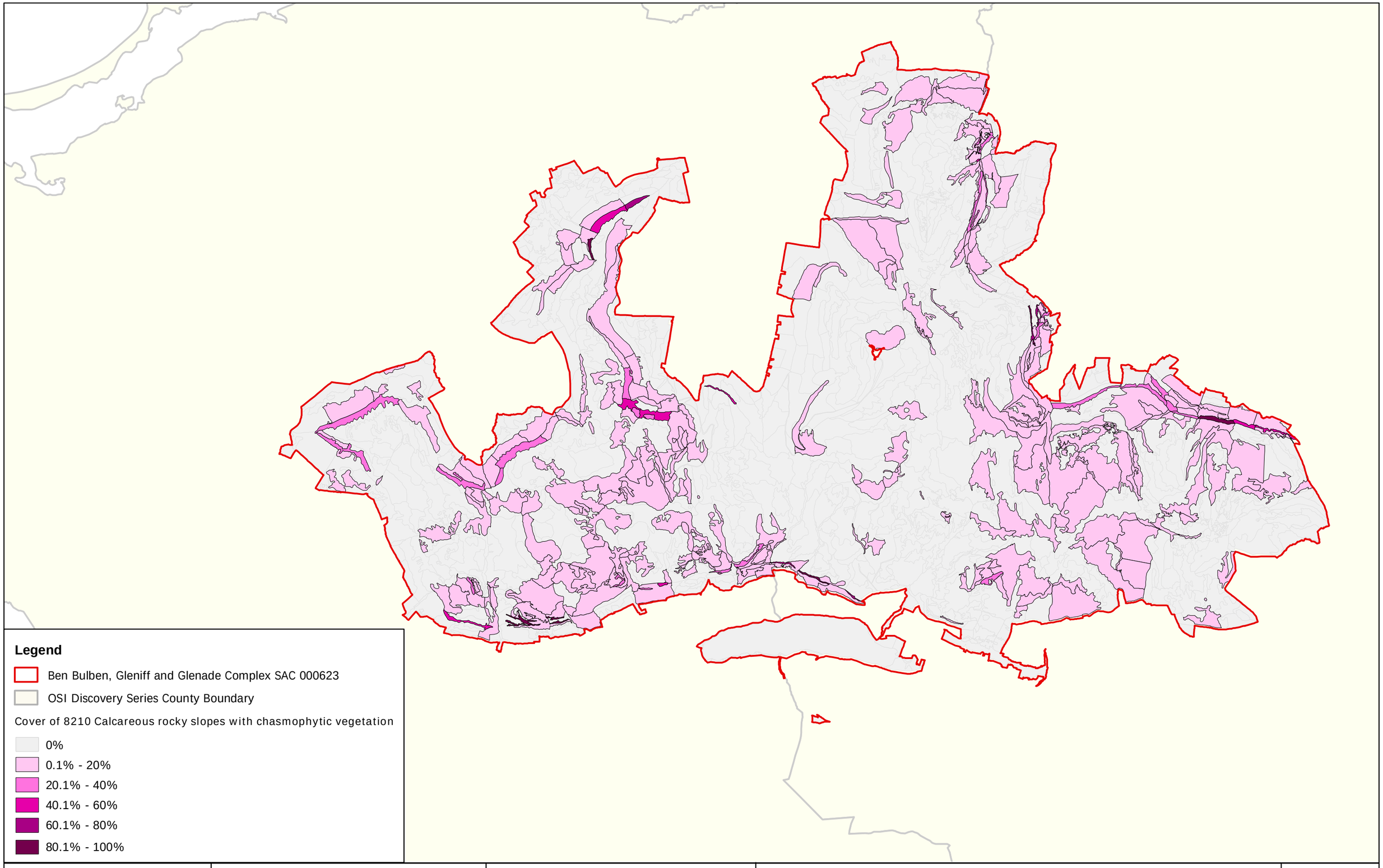
Map to be read in conjunction with the NPWS Conservation Objectives Document

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: December 2021



An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 14:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
CALCAREOUS ROCKY SLOPES

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

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: December 2021

G7850
G7749
G7849
G7748
G7542

Legend

1013 Geyer's whorl snail *Vertigo geyeri* 1km grid squares

Ben Bulben, Gleniff and Glenade Complex SAC 000623

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 15:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
GEYER'S WHORL SNAIL

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

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

Date: December 2021

Legend

- 1355 Otter - *Lutra lutra* commuting 250m buffer
- Ben Bulben, Gleniff and Glenade Complex SAC 000623
- OSI Discovery Series County Boundary

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 16:
BEN BULBEN, GLENIFF AND GLENADE COMPLEX SAC 000623
CONSERVATION OBJECTIVES
OTTER COMMUTING

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

SITE CODE:
SAC 000623; version 3.02
CO. SLIGO/LEITRIM

0 0.5 1 2 Kilometres

N

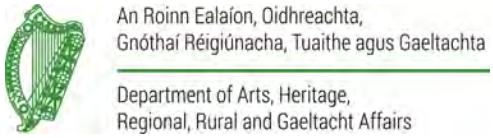
Date: December 2021

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Boleybrack Mountain SAC 002032



National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2016) Conservation Objectives: Boleybrack Mountain SAC 002032. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Notes/Guidelines:

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

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002032	Boleybrack Mountain SAC
3160	Natural dystrophic lakes and ponds
4010	Northern Atlantic wet heaths with *Erica tetralix*
4030	European dry heaths
6410	*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)
7130	Blanket bogs (* if active bog)

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

NPWS Documents

Year :	1990
Title :	A survey to locate lowland blanket bogs of scientific interest in county Donegal and upland blanket bogs in counties Cavan, Leitrim and Roscommon
Author :	Douglas, C.; Dunnells, D.; Scally, L.; Wyse Jackson, M.
Series :	Unpublished report to NPWS
Year :	2010
Title :	Irish Semi-natural Grasslands Survey. Annual Report No.3: Counties Donegal, Dublin, Kildare and Sligo
Author :	O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; McNutt, K.E.; Perrin, P.M.; Delaney, A.
Series :	Irish Semi-natural grassland survey
Year :	2012
Title :	Ireland Red List no. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	Irish semi-natural grasslands survey 2007-2012
Author :	O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; Perrin, P.M.
Series :	Irish Wildlife Manual No. 78
Year :	2013
Title :	A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel
Author :	Roden, C.; Murphy, P.
Series :	Irish Wildlife Manual No. 70
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS
Year :	2016
Title :	Boleybrack Mountain SAC (site code: 2032) Conservation objectives supporting document-upland habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1982
Title :	Eutrophication of waters. Monitoring assessment and control
Author :	OECD
Series :	OECD, Paris
Year :	1988
Title :	The Irish red data book 1. Vascular plants
Author :	Curtis, T.G.F; McGough, H.N.
Series :	Wildlife Service, Dublin
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2008
Title :	Water Quality in Ireland 2004-2006
Author :	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S.; Tierney, D.; Bowman, J.
Series :	EPA, Wexford
Year :	2010
Title :	Water quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	EPA, Wexford
Year :	2012
Title :	The impact of conifer plantation forestry on the ecology of peatland lakes
Author :	Drinan, T.J.
Series :	Unpublished PhD thesis, University College Cork
Year :	2013
Title :	Interpretation manual of European Union habitats- Eur 28
Author :	European Commission- DG Environment
Series :	European Commission
Year :	2015
Title :	Water quality in Ireland 2010-2012
Author :	Bradley, C., Byrne, C., Craig, M., Free, G., Gallagher, T., Kennedy, B., Little, R., Lucey, J., Mannix, A., McCreesh, P., McDermott, G., McGarrigle, M., Ní Longphuirt, S., O'Boyle, S., Plant, C., Tierney, D., Trodd, W., Webster, P., Wilkes, R. & Wynne, C.
Series :	EPA, Wexford
Year :	in prep.
Title :	Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes
Author :	Roden, C.; Murphy, P.
Series :	Unpublished report to NPWS

Spatial data sources

Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3160 (map 2)

3160 Natural dystrophic lakes and ponds

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Natural dystrophic lakes and ponds (3160) are scattered throughout this SAC. There are c.10 lakes larger than 1ha in area and many smaller lakes and pools. Douglas et al. (1990) surveyed the blanket bog at Lackagh and Barleart. Near Lough Kip they noted that wet/quaking vegetation was restricted to lake and river edges. All lakes and pools are upland and, in line with Article 17 reporting (NPWS, 2013), have been mapped as potential 3160 (see map 2). Note: all 3160 pools may not be mapped in the 1:5,000 OSi data. Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, the habitat is widespread in the SAC (see map 2). All lakes have been mapped as potential 3160
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant and invertebrate species, see Article 17 habitat assessment for 3160 (NPWS, 2013) and O Connor (2015)
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.), however, significant further work is necessary to describe the characteristic zonation and other spatial patterns in the other four Annex I lake habitats. Spatial patterns are likely to be relatively simple in 3160 lakes and ponds, with limited zonation
Vegetation distribution: maximum depth	Metres	Maintain maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. A specific target has not yet been set for this lake habitat type. Upland lakes and pools naturally have very clear water and, therefore, maximum depth is expected to be large
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes and pools must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced. Owing to their size and the sensitivity of peatland, 3160 lakes and ponds can easily be damaged or destroyed by drainage
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that habitat 3160 is associated with nutrient-poor peat and silt substrates

Water quality: transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A specific target has yet to be established for this Annex I lake habitat. Habitat 3160 is associated with very clear water. The OECD fixed boundary system set transparency targets for ultra-oligotrophic lakes of ≥12m annual mean Secchi disk depth, and ≥6m annual minimum Secchi disk depth
Water quality: nutrients	µg/l P; mg/l N	Maintain the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species	As a nutrient poor habitat, oligotrophic and Water Framework Directive (WFD) 'high' status targets apply. Where a lake has nutrient concentrations that are lower than these targets, there should be no decline within class, i.e. no upward trend in nutrient concentrations. For 3160 lakes and ponds, annual average TP concentration should be ≤5µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to habitat 3160. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l (The European Communities Environmental Objectives (Surface Waters) Regulations 2009). Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The OECD targets may be more appropriate for habitat 3160: annual average chlorophyll *a* concentration <1µg/l and annual peak chlorophyll *a* concentration ≤2.5µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, habitat 3160 requires WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/ absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in 3160 lakes and ponds should, therefore, be trace/ absent (<5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, habitat 3160 requires high phytobenthos status
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for the lake habitat. The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for 3160 lakes and ponds is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009

Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in soft water lake habitats. Although EC (2013) describes habitat 3160 as having pH 3-6, Drinan (2012) found mean pHs of 5.16 and 5.62 in upland and lowland 3160 lakes, respectively. The target for habitat 3160 is pH >4.5 and <9.0, in line with the surface water standards for soft waters (where water hardness is ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. The specific requirements of lake habitat 3160, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mg/l PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be <50mg/l PtCo. Water colour can be very low (<20mg/l PtCo or even <10mg/l PtCo) in 3160 lakes and ponds, where the peatland in the lake's catchment is intact
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3160	Most 3160 lake and pond shorelines intergrade with blanket bog, heath, flush, poor fen or heath habitats and these support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and can support wetland communities and species of conservation concern

4010 Northern Atlantic wet heaths with Erica tetralix

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Northern Atlantic wet heaths with *Erica tetralix* habitat has not been mapped in detail for Boleybrack Mountain SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 1,400ha. Further details on this and the following attributes can be found in the Boleybrack Mountain SAC conservation objectives supporting document for upland habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	Extensive areas of wet heath have been recorded within the SAC, and field notes from 1998 (NPWS internal files) indicate that the habitat is present towards the centre of the SAC and on the western slopes. Further information can be found within this source and the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	The diversity of wet heath communities within this SAC is unknown. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: cross-leaved heath	Occurrence within 20m of a representative number of 2m x 2m monitoring stops	Cross-leaved heath (*Erica tetralix*) present near each monitoring stop	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of positive indicator species at least 50%	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of *Cladonia* and *Sphagnum* species, *Racomitrium lanuginosum* and pleurocarpous mosses at least 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: ericoid species and crowberry	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of ericoid species and crowberry (*Empetrum nigrum*) at least 15%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: dwarf shrub species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrubs less than 75%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Based on Perrin et al. (2014), where the list of negative indicator species is also presented. See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Based on Perrin et al. (2014). See the uplands supporting document for further details. *Campylopus introflexus* was recorded within this habitat in Boleybrack Mountain SAC in 1998; information from 1998 field notes (NPWS internal files)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Based on Perrin et al. (2014). See the uplands supporting document for further details

Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush (*Juncus effusus*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids, crowberry (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) showing signs of browsing	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of 2m x 2m monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: drainage	Percentage cover in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists, Curtis and McGough (1988) and Lockhart et al. (2012). See the uplands supporting document for further details

4030 European dry heaths

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	European dry heaths have not been mapped in detail for Boleybrack Mountains SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 320ha. Further details on this and the following attributes can be found in the Boleybrack Mountain SAC conservation objectives supporting document for upland habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	Dry heath appears to be confined to the summits and steeper slopes within the SAC; information from the GIS files associated with NPWS (2013). Further information can be found within this source and the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	The diversity of dry heath communities within this SAC is unknown. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: lichens and bryophytes	Number of species at a representative number of 2m x 2m monitoring stops	Number of bryophyte or non-crustose lichen species present at each monitoring stop is at least three, excluding *Campylopus* and *Polytrichum* mosses	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: number of positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species present at each monitoring stop is at least two	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat, which is composed of dwarf shrubs, is also presented. See the uplands supporting document for further details
Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of positive indicator species at least 50% for siliceous dry heath and 50-75% for calcareous dry heath	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat, which is composed of dwarf shrubs, is also presented. See the uplands supporting document for further details
Vegetation composition: dwarf shrub composition	Percentage cover at a representative number of 2m x 2m monitoring stops	Proportion of dwarf shrub cover composed collectively of bog-myrtle (*Myrica gale*), creeping willow (*Salix repens*) and western gorse (*Ulex gallii*) is less than 50%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Based on Perrin et al. (2014) where the list of negative indicator species is also presented. See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details

Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush (*Juncus effusus*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: senescent ling	Percentage cover at a representative number of 2m x 2m monitoring stops	Senescent proportion of ling (*Calluna vulgaris*) cover less than 50%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids showing signs of browsing	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas	Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details
Vegetation structure: growth phases of ling	Percentage cover in local vicinity of a representative number of monitoring stops	Outside sensitive areas, all growth phases of ling (*Calluna vulgaris*) should occur throughout, with at least 10% of cover in the mature phase	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat	This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists, Curtis and McGough (1988) and Lockhart et al. (2012). See the uplands supporting document for further details

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

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

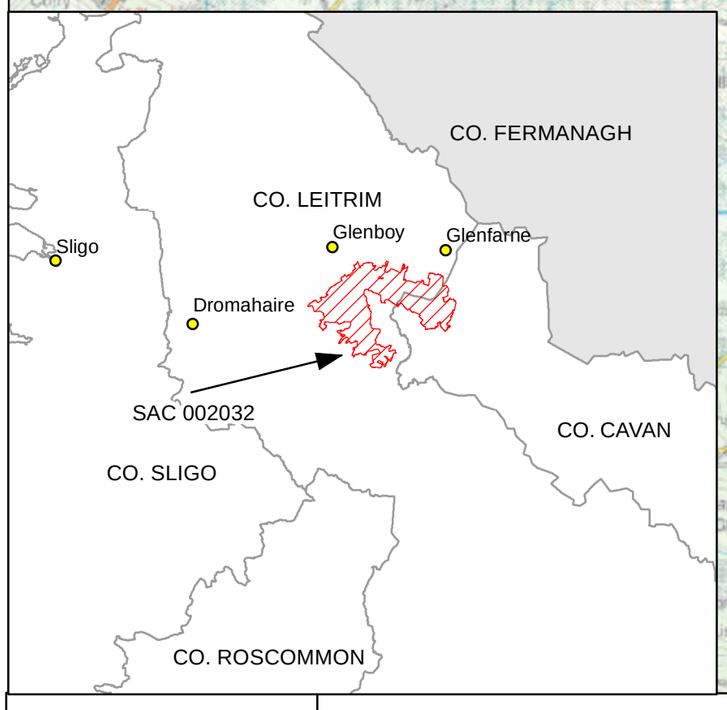
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	*Molinia* meadows have not been mapped for Boleybrack Mountain SAC and thus the total area of the qualifying habitat is unknown. It is noted as occurring in wet peaty areas at low elevations in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

7130 Blanket bogs (* if active bog)

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Blanket bog has not been mapped in detail for Boleybrack Mountain SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 2,000ha. Further information can be found in Douglas et al. (1990). Further details on this and the following attributes can be found in the Boleybrack Mountain SAC conservation objectives supporting document for upland habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	Extensive areas of blanket bog were recorded by Douglas et al. (1990), especially throughout the central areas of the SAC. Further information can be found within this source and the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the uplands supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	See the uplands supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the uplands supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Douglas et al. (1990) recorded different active blanket bogs communities within this SAC. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop is at least seven	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes or lichens, excluding *Sphagnum fallax*, at least 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species less than 75%	Based on Perrin et al. (2014). See the uplands supporting document for further details, including the list of potentially dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Based on Perrin et al. (2014),where the list of negative indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: native trees and scrub	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Based on Perrin et al. (2014). See the uplands supporting document for further details

Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Last complete growing season's shoots of ericoids, crowberry (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) showing signs of browsing collectively less than 33%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: erosion	Occurrence in local vicinity of a representative number of monitoring stops	Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas	Based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists, Curtis and McGough (1988) and Lockhart et al. (2012). See the uplands supporting document for further details



Legend

Boleybrack Mountain SAC 002032

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

MAP 1:
BOLEYBRACK MOUNTAIN SAC CONSERVATION OBJECTIVES SAC DESIGNATION

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

SITE CODE:
SAC 002032; version 3. CO. LEITRIM / CO. CAVAN.

0 0.4 0.8 1.2 1.6 2 km

N

Map Version 1
Date: July 2016

Lough Aneanvore
Lough Avanny
Doo Lough
Lough Natire
Blind Lough
Lough Kip
Lough Nagingare
Lough Naweeloge
Lough Nagloghderg
Lough Naweelion
Tents Lough
Lough Strand
Lackagh Lough
Lough Carran
Lough Altscrahagh
Scardan River
Skeanada River
Owennayle River
Graffy River
Owenmore River
Coollegreane
Tawnylea
Guba
R207
200
400

Legend

Boleybrack Mountain SAC 002032

Indicative Lake Habitats

Potential 3160 Natural dystrophic lakes and ponds

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

MAP 2:
BOLEYBRACK MOUNTAIN SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABITATS

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

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

0 0.45 0.9 1.35 1.8 2.25 km

N

Map Version 1
Date: July 2016

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Conservation Objectives Series

Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625

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Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Notes/Guidelines:

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

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

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

Please note that this SAC adjoins Streedagh Point Dunes SAC (001680). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjoining site as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1996
Title :	Biomar survey of Irish machair sites
Author :	Crawford, I.; Bleasdale, A.; Conaghan, J.
Series :	Irish Wildlife Manual No. 3
Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.
Series :	Unpublished report to NPWS
Year :	2012
Title :	The Conservation Status of Juniper Formations in Ireland
Author :	Cooper, F.; Stone, R.E.; McEvoy, P.; Wilkins, T.; Reid, N.
Series :	Irish Wildlife Manual No. 63
Year :	2013
Title :	Irish semi-natural grasslands survey 2007-2012
Author :	O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; Perrin, P.M.
Series :	Irish Wildlife Manual No. 78
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2015
Title :	Bunduff Lough and Machair/Trawalua/Mullaghmore SAC (site code: 625) Conservation objectives supporting document- coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2015
Title :	Bunduff Lough and Machair/Trawalua/Mullaghmore SAC (site code: 625) Conservation objectives supporting document- marine habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1997
Title :	The BioMar biotope viewer: a guide to marine habitats, fauna and flora in Britain and Ireland
Author :	Picton, B.E.; Costello, M.J.
Series :	Environmental Science Unit, Trinity College Dublin
Year :	2006
Title :	The vegetation of Irish machair
Author :	Gaynor, K.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, vol 106B, No. 3: 311-321

Year :	2008
Title :	The phytosociology and conservation value of Irish sand dunes
Author :	Gaynor, K.
Series :	Unpublished PhD thesis, National University of Ireland, Dublin
Year :	2012
Title :	Subtidal sediment and subtidal reef survey of Bunduff Lough and Machair/Trawalua/Mullaghmore SAC
Author :	MERC
Series :	Unpublished report to the Marine Institute and NPWS
Year :	2012
Title :	Intertidal benthic survey and intertidal reef survey of Bunduff Lough and Machair/Trawalua/Mullaghmore SAC
Author :	MERC
Series :	Unpublished report to the Marine Institute and NPWS
Year :	2013
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author :	Campbell, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin

Spatial data sources

Year :	Interpolated 2014
Title :	1994 BioMar survey; 2011 subtidal survey; 2012 intertidal survey
GIS Operations :	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising
Used For :	1140, 1170, marine community types (maps 3, 5 and 6)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. EPA WFD transitional waterbody data erased from extent. Expert opinion used as necessary to resolve any issues arising
Used For :	1160 (map 4)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present
Used For :	Marine community types base data (map 6)
Year :	2009
Title :	Coastal Monitoring Project 2004-2006. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used
Used For :	2120, 2130, 21A0 (map 7)
Year :	2012
Title :	The conservation status of juniper formations in Ireland
GIS Operations :	Juniper formations polygons clipped to SAC boundary
Used For :	5130 (map 8)
Year :	2015
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1395 (map 8)

Conservation Objectives for : Bunduff Lough and Machair/Trawalua/Mullaghmore SAC [000625]

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 3	Habitat area was estimated as 144ha using OSi data
Community distribution	Hectares	Conserve the following community type in a natural condition: Fine to very fine sand community complex. See map 6	Based on an intertidal survey undertaken in 2012 (MERC, 2012). See marine supporting document for further information

1160 Large shallow inlets and bays

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

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

1170 Reefs

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 5	Habitat area estimated as 1,203ha from a 1994 BioMar survey (Picton and Costello, 1997), 2011 subtidal survey (MERC, 2012) and 2012 intertidal survey (MERC, 2012) and InfoMar data
Distribution	Occurrence	The distribution of reefs remains stable, subject to natural processes. See map 5 for mapped distribution	Based on information from a 1994 BioMar survey (Picton and Costello, 1997), 2011 subtidal survey (MERC, 2012) and 2012 intertidal survey (MERC, 2012) and InfoMar data
Community structure	Biological composition	Conserve the following community types in a natural condition: Intertidal reef community complex; *Laminaria*-dominated community complex. See map 6	Reef mapping based on information from a 1994 BioMar survey (Picton and Costello, 1997), 2011 subtidal survey (MERC, 2012) and 2012 intertidal survey (MERC, 2012) and InfoMar data. See marine supporting document for further details

2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes)

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

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

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Trawalua - 75.18ha; Bunduff - 36.66ha; Mullaghmore - 68.48ha. See map 7	Based on data from Coastal Monitoring Project (CMP) (Ryle et al. 2009). Habitat was surveyed and mapped at two sub-sites and data for the Mullaghmore sub-site was derived from aerial photos (2000) and internal NPWS files to give a total estimated area of 180.32ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 7 for known distribution	Based on data from Ryle et al. (2009). Fixed dune habitat is well represented at all sub-sites, with large areas at Trawalua, Mullaghmore and a smaller area at Bunduff. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Ryle et al. (2009). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. At Bunduff, there are some coastal protection measures in the form of sand-trap fencing and marram grass (*Ammophila arenaria*) planting as part of a dune management project. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes	Based on data from Gaynor (2008) and Ryle et al. (2009). At Trawalua, there are a significant number of tracks throughout the fixed dune habitat. The fixed dunes at Bunduff are naturally eroded in some areas particularly on the seaward side. Some small blowouts at the southwestern part of the site were revegetating at the time of the CMP survey. See coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward	Based on data from Gaynor (2008) and Ryle et al. (2009). All of the sub-sites are grazed to varying extents. At Bunduff the main land use is light to moderate grazing by sheep, cattle and horses. At Trawalua, the fixed dune habitat is lighly grazed and even undergrazed in places. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in Ryle et al. (2009)	Based on data from Gaynor (2008) and Ryle et al. (2009). The fixed dunes at Trawalua support a typical complement of species. At Bunduff, the CMP noted an abundance of orchids (bee orchid (*Ophrys apifera*) and frog orchid (*Coeloglossum viride*)) in the fixed dunes. The parasitic species dodder (*Cuscuta epithymum*) was also abundant at the time of survey. See coastal habitats supporting document for further details

Vegetation composition: negative indicator species (including *Hippophae rhamnoides*)	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (*Hippophae rhamnoides*) has never been recorded from this SAC and should remain absent. At Bunduff, ragwort (*Senecio jacobaea*), creeping thistle (*Cirsium arvense*), perennial rye-grass (*Lolium perenne*) and bramble (*Rubus fruticosus*) were recorded by the CMP in fixed dune habitat. At Trawalua, ragwort (*Senecio jacobaea*), perennial rye-grass (*Lolium perenne*) and nettle (*Urtica dioica*) were recorded in fixed dunes. See coastal habitats supporting document for further details
Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control	Based on data from Ryle et al. (2009). At Bunduff, burnet rose (*Rosa pimpinellifolia*) and low-growing juniper (*Juniperus communis*) was recorded in the fixed dune. See coastal habitats supporting document for further details

21A0 Machairs (* in Ireland)

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Bunduff - 48.82ha; Trawalua - 33.39ha; Mullaghmore - 4.18ha. See map 7	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Habitat was surveyed and mapped at two sub-sites and data for the Mullaghmore sub-site was derived from aerial photos (2000) and internal NPWS files to give a total estimated area of 86.38ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 7 for known distribution	Based on data from Ryle et al. (2009). Both Bunduff and Trawalua have extensive areas of machair that mostly occur in the flat areas between fixed dune ridges and areas of alkaline marsh/fen. At Bunduff, machair accounts for approximately 50% of the total sand dune habitat. At Trawalua, machair accounts for approximately 30% of the total sand dune resource. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See coastal habitats supporting document for further details
Physical structure: hydrological and flooding regime	Water table levels; groundwater fluctuations	Maintain natural hydrological regime	Based on data from Ryle et al. (2009), Crawford et al. (1996) and Gaynor (2006). See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of machair habitat, subject to natural processes	Based on data from Ryle et al. (2009). At Trawalua there are a significant numbers of tracks through the machair habitat. See coastal habitats supporting document for further details
Vegetation structure: sward height	Centimeters	Maintain structural variation within sward	Based on data from Gaynor (2006, 2008) and Ryle et al. (2009). All of the sub-sites are grazed to varying extents. At Bunduff, the main land use is light to moderate grazing by sheep, cattle and horses. Rabbits (*Oryctolagus cuniculus*) also graze the machair at this site. At Trawalua, the machair habitat is grazed by cattle, sheep and horses and the sward is kept low. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in Ryle et al. (2009)	Based on data from Crawford et al (1996), Gaynor (2006) and Ryle et al. (2009). Notable species include the Annex II liverwort species petalwort (*Petalophyllum ralfsii*), which has been recorded at Bunduff. The areas of wet machair/alkaline fen are very species-rich, often containing 40-50 plant species in an area of 4m². See coastal habitats supporting document for further details as well as the conservation objectives for Alkaline fens (7230) and *Petalophyllum ralfsii* (1395)

Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. At Bunduff, the CMP recorded ragwort (*Senecio jacobaea*). This species was also recorded at Trawalua, along with perennial rye-grass (*Lolium perenne*). See coastal habitats supporting document for further details
Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control	Based on data from Ryle et al. (2009). At Bunduff, gorse (*Ulex europaeus*) was recorded in the machair as were heath species such as ling (*Calluna vulgaris*). See coastal habitats supporting document for further details
Vegetation composition: bryophytes	Percentage cover	Should always be at least an occasional component of the vegetation	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details

5130 Juniperus communis formations on heaths or calcareous grasslands

To restore the favourable conservation condition of *Juniperus communis* formations on heaths or calcareous grasslands in Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

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

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

To maintain the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia) in Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

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

7230 Alkaline fens

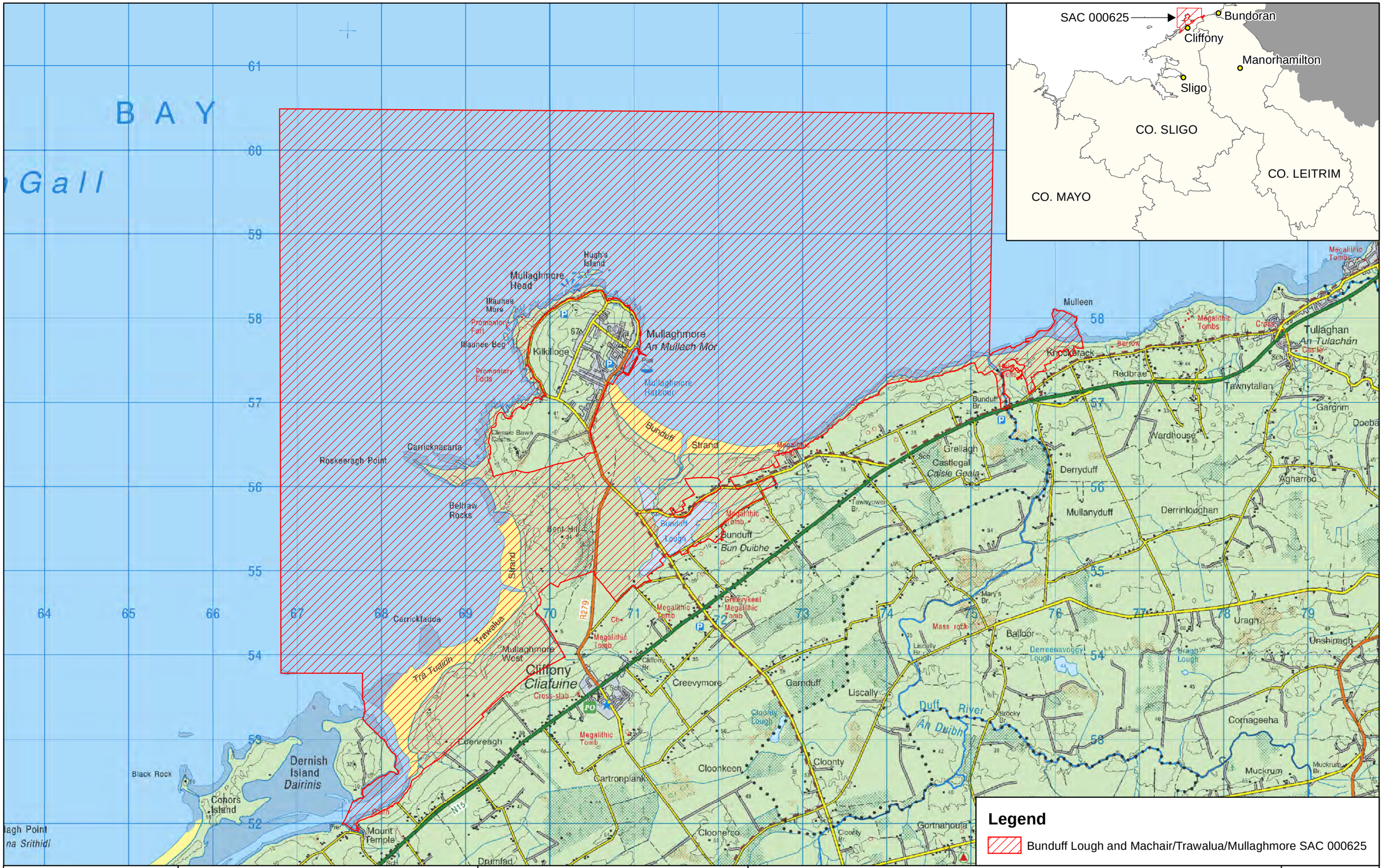
To maintain the favourable conservation condition of Alkaline fens in Bunduff Lough and Machair/Trawalua/Mullaghmore SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Extent of this habitat within the SAC is unknown. It occurs in complex mosaic with other habitats, including Annex I habitats such as Machairs (21A0) (Ryle et al., 2009; O'Neill et al., 2013, NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See note for area above. The main area of fen within the SAC occurs immediately to the west and north of Bunduff Lough (NPWS internal files)
Hydrological regime	Metres	Appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat
Peat formation	Flood duration	Active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time (Jim Ryan, pers. comm.)
Water quality: nutrients	Water chemistry measures	Appropriate water quality to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus with the latter tending to be tbe limiting nutrient
Vegetation composition: typical species	Percentage cover	Maintain vegetation cover of typical species including brown mosses and vascular plants	Mosses listed for fen at this SAC include *Campylium stellatum, Scorpidium revolvens, Ctenidium molluscum, Calliergonella cuspidata and Philonotis fontana*. Common vascular plant species include water horsetail (*Equisetum fluviatile*), jointed rush (*Juncus articulatus*), devil's-bit scabious (*Succisa pratensis*), marsh pennywort (*Hydrocotyle vulgaris*), ragged-robin (*Lychnis flos-cuculi*), creeping bent (*Agrostis stolonifera*), grass of parnassus (*Parnassia palustris*), bog pimpernel (*Anagallis tenella*), long-stalked yellow sedge (*Carex lepidocarpa*), black sedge (*C. nigra*), flea sedge (*C. pulicaris*) and dioecious sedge (*C. dioica*). Orchid species are also frequent with common twayblade (*Listera ovata*), common spotted orchid (*Dactylorhiza fuchsii*) and marsh helleborine (*Epipactis palustris*) (NPWS internal files)
Vegetation composition: trees and shrubs	Percentage cover in local vicinity	Cover of scattered native trees and shrubs less than 10%	Scrub and trees will tend to invade if fen conditions become drier. NPWS internal files report scattered multi-stemmed trees over much of the habitat. Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)
Physical structure: disturbed bare ground	Percentage cover at a representative number of monitoring stops and in local vicinity	Cover of disturbed bare ground less than 10%. Where tufa is present, disturbed bare ground less than 1%	While grazing may be appropriate in this habitat, excessive area of disturbed bare ground may develop due to unsuitable grazing regimes. Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)
Physical structure: drainage	Percentage cover in local vicinity	Areas showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%	Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)

1395 Petalwort *Petalophyllum ralfsii*

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

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



Legend

Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625

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MAP 1:
BUNDUFF LOUGH AND MACHAIR / TRAWALUA / MULLAGHMORE SAC CONSERVATION OBJECTIVES SAC DESIGNATION

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

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Feb 2015

SAC 000625

SAC 001680

Legend

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

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MAP 2:
BUNDUFF LOUGH AND MACHAIR / TRAWALUA / MULLAGHMORE SAC
CONSERVATION OBJECTIVES
ADJOINING DESIGNATIONS

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

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

0 1 2 3 km

N

Map Version 1
Date: Feb 2015

Legend

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

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Department of Arts, Heritage and the Gaeltacht

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

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

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Feb 2015

Legend

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

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Arts, Heritage and the Gaeltacht

MAP 4:
BUNDUFF LOUGH AND MACHAIR / TRAWALUA / MULLAGHMORE SAC
CONSERVATION OBJECTIVES
LARGE SHALLOW INLETS AND BAYS

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

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Feb 2015

Legend

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

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Department of
Arts, Heritage and the Gaeltacht

MAP 5:
BUNDUFF LOUGH AND MACHAIR / TRAWALUA / MULLAGHMORE SAC
CONSERVATION OBJECTIVES
REEFS

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

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Feb 2015

Legend

Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625

OSi Discovery Series County Boundary

Marine Community Types

Fine to very fine sand community complex

Intertidal reef community complex

Laminaria-dominated community complex

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Department of Arts, Heritage and the Gaeltacht

MAP 6:
BUNDUFF LOUGH AND MACHAIR / TRAWALUA / MULLAGHMORE SAC
CONSERVATION OBJECTIVES
MARINE COMMUNITY TYPES

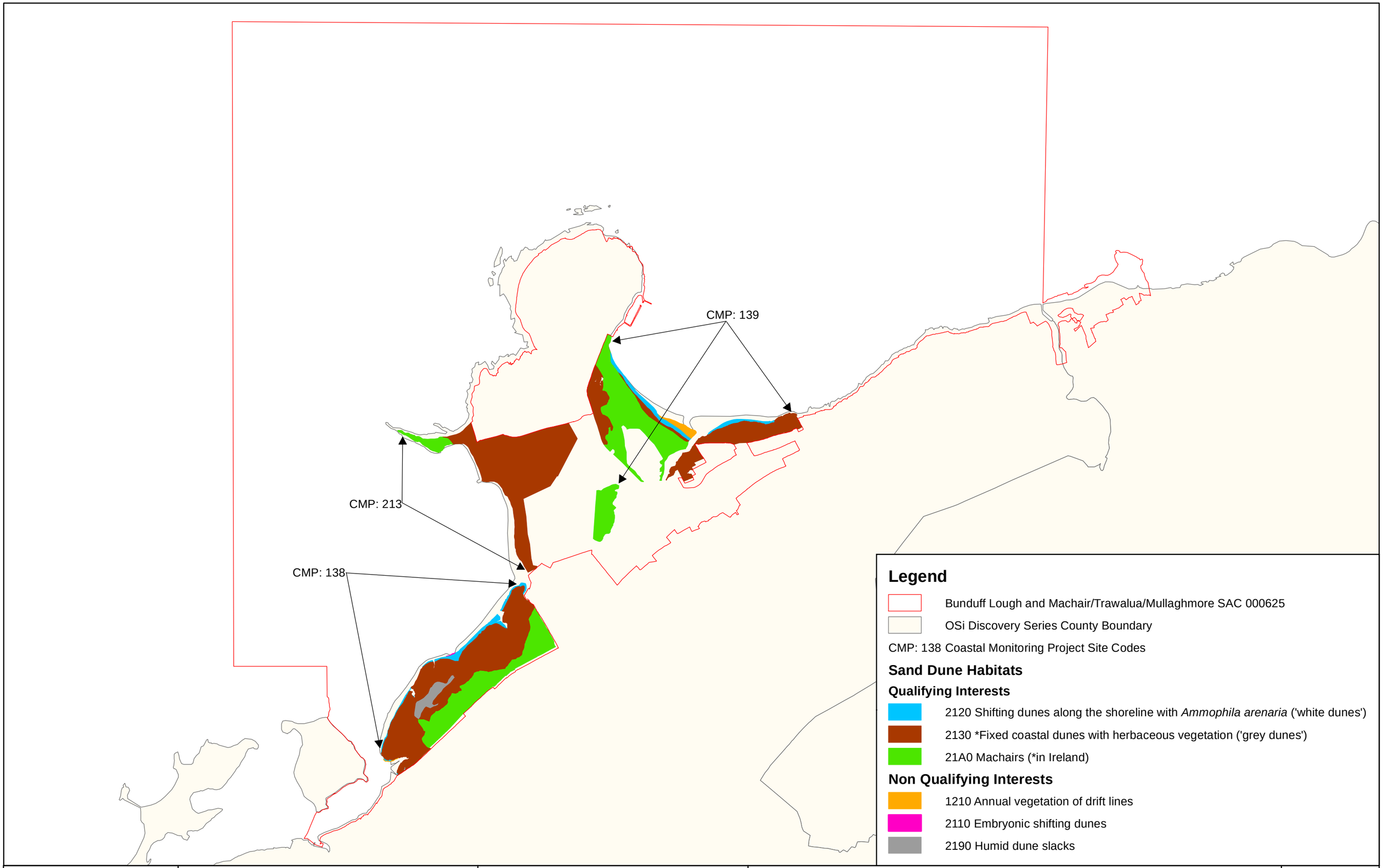
Map to be read in conjunction with the NPWS Conservation Objectives Document.

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Feb 2015



Legend

- Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625
- OSi Discovery Series County Boundary

CMP: 138 Coastal Monitoring Project Site Codes

Sand Dune Habitats

Qualifying Interests

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

Non Qualifying Interests

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

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Department of Arts, Heritage and the Gaeltacht

MAP 7:
BUNDUFF LOUGH AND MACHAIR / TRAWALUA / MULLAGHMORE SAC
CONSERVATION OBJECTIVES
SAND DUNE HABITATS

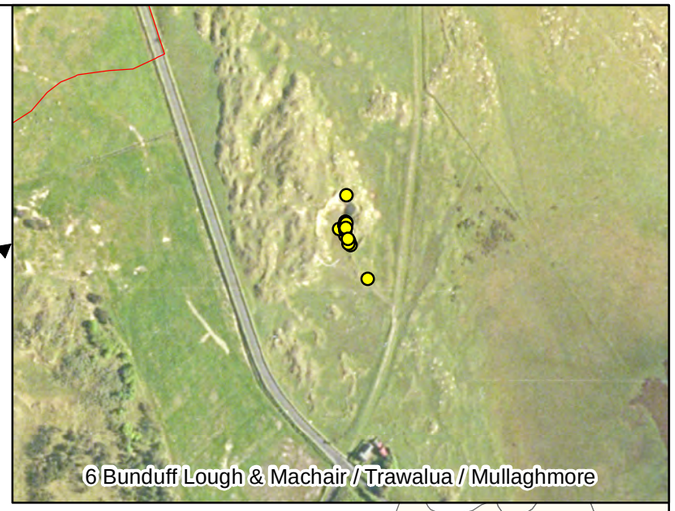
Map to be read in conjunction with the NPWS Conservation Objectives Document.

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Feb 2015



SO14

Legend

- Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625
- 1395 Petalwort - *Petalophyllum ralfsii*
- 5130 *Juniperus communis* formations on heaths or calcareous grasslands
- OSi Discovery Series County Boundary

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Department of Arts, Heritage and the Gaeltacht

MAP 8:
BUNDUFF LOUGH AND MACHAIR / TRAWALUA / MULLAGHMORE SAC
CONSERVATION OBJECTIVES
JUNIPER FORMATIONS & PETALWORT

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

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

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Feb 2015

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Corratirrim SAC 000979

National Parks and Wildlife Service,
Department of Culture, Heritage and the Gaeltacht,

90 King Street North, Dublin 7, D07 N7CV, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@chg.gov.ie

Citation:

NPWS (2019) Conservation Objectives: Corratirrim SAC 000979. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

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

Notes/Guidelines:

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

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000979	Corratirrim SAC

8240	Limestone pavements*

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1977
Title :	Areas of Scientific Interest in Co. Cavan
Author :	Goodwillie, R.N.
Series :	Unpublished Report
Year :	2009
Title :	Ireland Red List No. 2: Non-marine molluscs
Author :	Byrne, A.; Moorkens, E.A.; Anderson, R.; Killeen, I.J.; Regan, E.C.
Series :	Ireland Red List series, NPWS
Year :	2010
Title :	Ireland Red List No. 4: Butterflies
Author :	Regan, E.C.; Nelson, B.; Aldwell, B.; Bertrand, C.; Bond, K.; Harding, J.; Nash, D.; Nixon, D.; Wilson, C.J.
Series :	Ireland Red List series, NPWS
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	National survey of limestone pavement and associated habitats in Ireland
Author :	Wilson, S.; Fernandez, F.
Series :	Irish Wildlife Manuals, No. 73
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red List Series, NPWS

Other References

Year :	1996
Title :	Plant records from Co. Cavan (H30)
Author :	Reilly, P.
Series :	Irish Naturalists' Journal, 25(5): 189
Year :	2001
Title :	The Flora of County Cavan
Author :	Reilly, P.A.
Series :	Occasional Papers No. 13. National Botanic Gardens, Dublin

Spatial data sources

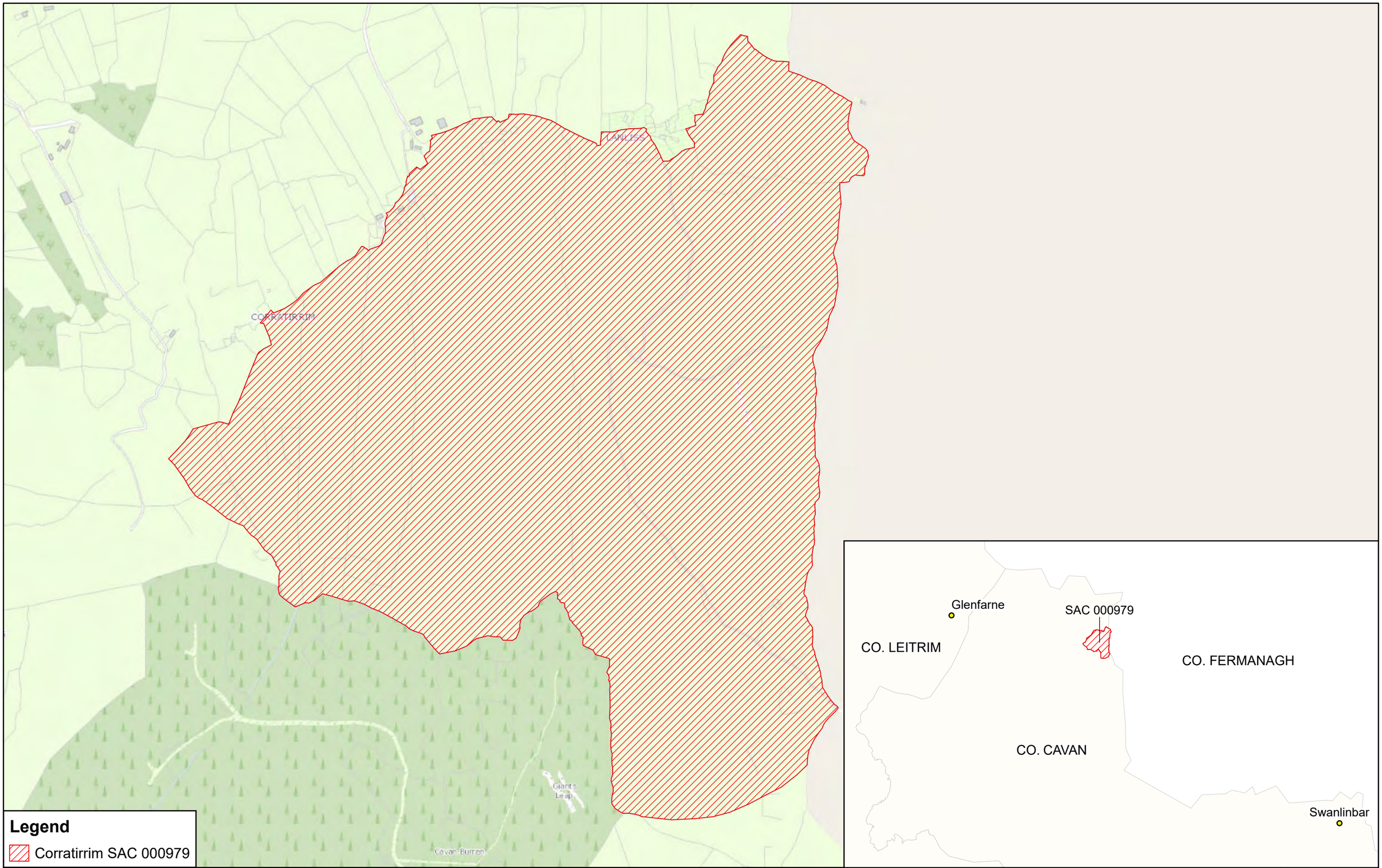
Year :	2013
Title :	National Survey of Limestone Pavement and Associated Habitats in Ireland distribution data
GIS Operations :	Dataset clipped to the SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	8240 (map 2)

8240 Limestone pavements

To maintain the favourable conservation condition of Limestone pavements* in Corratirrim SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Limestone pavements* in Corratirrim SAC occurs where Carboniferous limestone that underlies the shales and grits that form the Cuilcagh range, outcrops at the surface. The habitat occurs in intimate association with species-rich calcareous grassland and also in association with acidic grassland, heath and scrub habitats in the SAC. Therefore, these habitats cannot easily be mapped or considered separately. Wilson and Fernandez (2013) mapped the indicative area of limestone pavement, including mosaics with associated habitats, as 12.9ha (see map 2)
Habitat distribution	Occurrence	No decline. Map 2 shows indicative distribution, including mosaics with other habitats	See the notes for Habitat area above. Distribution based on data from Wilson and Fernandez (2013). This habitat can be split into exposed pavement and wooded pavement. In Corratirrim SAC, the limestone pavement habitat, particularly in the centre of the SAC where it occurs, consists of clints and grikes up to c.45cm deep, with some areas of limestone slabs and shattered pavement also present (NPWS internal files)
Vegetation composition: positive indicator species	Number at a representative number of monitoring stops	At least seven positive indicator species present	Positive indicator species for exposed and wooded pavement are listed in Wilson and Fernandez (2013). Positive indicator species recorded in exposed pavement in the SAC include herb-robert (*Geranium robertianum*), mossy saxifrage (*Saxifraga hypnoides*), mountain everlasting (*Antennaria dioica*), ivy (*Hedera helix*), wild thyme (*Thymus polytrichus*), early dog-violet (*Viola reichenbachiana*), early purple-orchid (*Orchis mascula*), hart's-tongue fern (*Asplenium scolopendrium*), maidenhair spleenwort (*A. trichomanes*), wall-rue (*A. ruta-muraria*), brittle bladder-fern (*Cystopteris fragilis*), male-fern (*Dryopteris filix-mas*) and the moss *Ctenidium molluscum*. Low growing hawthorn (*Crataegus monogyna*) occurs, and yew (*Taxus baccata*) is also found in the habitat on the eastern slopes (NPWS internal files)
Vegetation composition: bryophyte layer	Percentage at a representative number of monitoring stops	Bryophyte cover at least 50% on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Collective cover of negative indicator species on exposed pavement not more than 1%	Negative indicator species are listed in Wilson and Fernandez (2013). Negative indicator species for wooded pavement overlap with non-native species (below)
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1% on exposed pavement; on wooded pavement not more than 10% with no regeneration	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: scrub	Percentage at a representative number of monitoring stops	Scrub cover no more than 25% of exposed pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: bracken cover	Percentage at a representative number of monitoring stops	Bracken (*Pteridium aquilinum*) cover no more than 10% on exposed pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation structure: woodland canopy	Percentage at a representative number of monitoring stops	Canopy cover on wooded pavement at least 30%	Attribute and target based on Wilson and Fernandez (2013)

Vegetation structure: dead wood	Occurrence in a representative number of monitoring stops	Sufficient quantity of dead wood on wooded pavement to provide habitat for saproxylic organisms	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Physical structure: disturbance	Occurrence in a representative number of monitoring stops	No evidence of grazing pressure on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)
Indicators of local distinctiveness	Occurrence	Indicators of local distinctiveness are maintained	This includes species on the Flora (Protection) Order, 2015 (FPO) and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.) and other rare or localised species, as well as archaeological and geological features, which often support distinctive species. The FPO listed and Vulnerable small-white orchid (*Pseudorchis albida*) has been recorded in the SAC (Reilly, 1996, 2001; NPWS internal files), but cannot be specifically assigned to this habitat



Legend

Corratirrim SAC 000979

An Roinn Cultúir, Oidhreachta agus Gaeltachta
Department of Culture, Heritage and the Gaeltacht

MAP 1:
CORRATIRRIM SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000979; version 3.01. CO. CAVAN

0 80 160 240 320 Meters

N

Map Version 1
Date: Jan 2019

Legend

- 8240 Limestone pavements
- Corratirrim SAC 000979
- OSi Discovery Series County Boundary

An Roinn Cultúir, Oidhreachta agus Gaeltachta
Department of Culture, Heritage and the Gaeltacht

MAP 2:
CORRATIRRIM SAC
CONSERVATION OBJECTIVES
LIMESTONE PAVEMENT

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

SITE CODE:
SAC 000979; version 3.01. CO. CAVAN

0 80 160 240 320 Meters

N

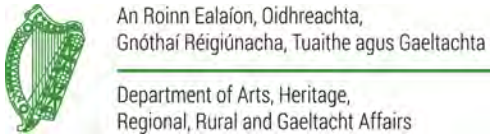
Map Version 1
Date: Feb 2019

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Cuilcagh - Anierin Uplands SAC 000584



National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2016) Conservation Objectives: Cuilcagh - Anierin Uplands SAC 000584. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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- the conservation status of its typical species is favourable.

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- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

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5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

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

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

NPWS Documents

Year :	1990
Title :	A survey to locate lowland blanket bogs of scientific interest in county Donegal and upland blanket bogs in counties Cavan, Leitrim and Roscommon
Author :	Douglas, C.; Dunnells, D.; Scally, L.; Wyse Jackson, M.
Series :	Unpublished report to NPWS
Year :	2009
Title :	Irish Red List No. 1 - Water beetles
Author :	Foster, G.N.; Nelson, B.H.; O Connor, Á.
Series :	Ireland Red List No. 1
Year :	2013
Title :	Conservation status assessment for petrifying springs
Author :	Lyons, M.D.; Kelly, D.L.
Series :	Unpublished report to NPWS
Year :	2013
Title :	A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel
Author :	Roden, C.; Murphy, P.
Series :	Irish Wildlife Manual No. 70
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2013
Title :	National survey of upland habitats (phase 3, 2012-2013). Site report no. 13: Cuilcagh-Anierin Uplands cSAC (000584), Cos. Cavan and Leitrim
Author :	Perrin, P.M.; Roche, J.R.; Barron, S.J.; Daly, O.H.; Hodd, R.L.; Muldoon, C.S.; Leydon, K.L.
Series :	Unpublished report to NPWS
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS
Year :	2015
Title :	Monitoring methods for *Hamatocaulis vernicosus* (Mitt.) Hedenäs (slender green feather-moss) in the Republic of Ireland
Author :	Campbell, C.; Hodgetts, N.; Lockhart, N.
Series :	Irish Wildlife Manual No. 91

Year :	2016
Title :	Cuilcagh - Anierin Uplands SAC (site code: 584) Conservation objectives supporting document- upland habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1982
Title :	Eutrophication of waters. Monitoring assessment and control
Author :	OECD
Series :	OECD, Paris
Year :	1989
Title :	The genera *Scorpidium* and *Hamatocaulis*, gen. nov., in northern Europe
Author :	Hedenäs, L.
Series :	Lindbergia, 15: 8-36
Year :	1997
Title :	The distribution of aqautic Coleoptera in Northern Ireland. Part 1: Families Haliplidae, Hygrobiidae, Noteridae, Dytiscidae and Gyrinidae
Author :	Nelson, B., Foster, G., Weyl, R.; Anderson, R.
Series :	Bulletin of the Irish Biogeographical Society, 20: 179-296
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
Year :	2000
Title :	A guide to habitats in Ireland
Author :	Fossitt, J.A.
Series :	The Heritage Council, Kilkenny
Year :	2002
Title :	Deterioration of Atlantic soft water macrophyte communities by acidification, eutrophication and alkalinisation
Author :	Arts, G.H.P.
Series :	Aquatic Botany, 73: 373-393
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2008
Title :	Water Quality in Ireland 2004-2006
Author :	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S.; Tierney, D.; Bowman, J.
Series :	EPA, Wexford
Year :	2008
Title :	*Agabus melanarius* Aubé, 1937 (Coleoptera: Dytiscidae) a water beetle new to Ireland
Author :	Nelson, B.
Series :	The Coleopterist, 17: 151-153

Year :	2009
Title :	The identification, characterization and conservation value of isoetid lakes in Ireland
Author :	Free, G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 19 (3): 264–273
Year :	2010
Title :	Water quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	EPA, Wexford
Year :	2012
Title :	The impact of conifer plantation forestry on the ecology of peatland lakes
Author :	Drinan, T.J.
Series :	Unpublished PhD thesis, University College Cork
Year :	2013
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author :	Campbell, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2013
Title :	Interpretation manual of European Union habitats- Eur 28
Author :	European Commission- DG Environment
Series :	European Commission
Year :	2015
Title :	Water quality in Ireland 2010-2012
Author :	Bradley, C., Byrne, C., Craig, M., Free, G., Gallagher, T., Kennedy, B., Little, R., Lucey, J., Mannix, A., McCreesh, P., McDermott, G., McGarrigle, M., Ní Longphuirt, S., O'Boyle, S., Plant, C., Tierney, D., Trodd, W., Webster, P., Wilkes, R. & Wynne, C.
Series :	EPA, Wexford
Year :	in prep.
Title :	Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes
Author :	Roden, C.; Murphy, P.
Series :	Unpublished report to NPWS

Spatial data sources

Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitats and to resolve any issues arising
Used For :	3110, 3160 (map 2)
Year :	2013
Title :	National Survey of Upland Habitats
GIS Operations :	Habitat dataset for site clipped to SAC boundary. Relevant QI selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	4010, 4030, 4060, 6230, 7130, 7140, 7220, 8110, 8220 (maps 3 to 11)
Year :	2016
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1393 (map 12)

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

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Lake habitat 3110 is considered to occur in the larger lakes in Cuilcagh - Anierin Uplands SAC, such as Loughs Nambrack, Derrynananta, Munter Eolus and Knockgorm. Its exact distribution in the SAC is unknown however, as no specific information on the lake vegetation is currently available. Lake habitat 3110 is likely to co-occur with habitat 3160 in most/all lakes. In line with Article 17 reporting (NPWS, 2013), all lakes larger than 1ha have been mapped as 'potential 3110' (see map 2). Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, the exact distribution of lake habitat 3110 in the SAC is not known. In map 2, all lakes larger than 1ha (based on 1:5,000 data) have been mapped as potential 3110. All lakes are upland, at altitudes of higher than 350m
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant species, see the Article 17 habitat assessment for 3110 (NPWS, 2013) and the lake habitats supporting document (O Connor, 2015). A number of rare and threatened water beetle and water bug species have been recorded on the Fermanagh side of Cuilcagh (Nelson et al., 1997), but the lakes and ponds in this SAC have not been surveyed
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.), however, significant further work is necessary to describe the characteristic zonation and other spatial patterns in the other four Annex I lake habitats
Vegetation distribution: maximum depth	Metres	Maintain maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. An indicative target has not yet been set for this lake habitat type. Water clarity is expected to be high in upland 3110 lakes, resulting in a large maximum depth of vegetation
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced

Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that lake habitat 3110 is associated with a range of nutrient-poor substrates, from stones, cobble and gravel, through sands, silt, clay and peat. Substratum particle size is likely to vary with depth and along the shoreline within a single lake
Water quality: transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A specific target has yet to be established for this Annex I lake habitat. Habitat 3110 is associated with very clear water, particularly upland examples. The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m
Water quality: nutrients	µg/l P; mg/l N	Maintain the concentration of nutrients in the water column at sufficiently low levels to support the habitat and its typical species	As a nutrient-poor habitat, oligotrophic and Water Framework Directive (WFD) 'high' status targets apply. Where a lake has nutrient concentrations that are lower than these targets, there should be no decline within class, i.e. no upward trend in nutrient concentrations. For lake habitat 3110, annual average TP concentration should be ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3110. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l. The annual average chlorophyll *a* concentration should be <2.5µg/l and the annual peak chlorophyll *a* concentration should be ≤8.0µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, habitat 3110 requires WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/ absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in lake habitat 3110 should, therefore, be trace/ absent (<5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, habitat 3110 requires high phytobenthos status
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for the lake habitat. The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for lake habitat 3110 is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009

Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in soft water lake habitats. In Europe, acidification of isoetid lakes can lead to loss of isoetids and dominance by submerged *Sphagnum* mosses and *Juncus bulbosus* (Arts, 2002). The specific requirements of lake habitat 3110, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. For lake habitat 3110, and adopting a precautionary approach based on Arts (2002), minimum pH should not be <5.5 pH units. Maximum pH should be <9.0 pH units, in line with the surface water standards established for soft waters (where water hardness is ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mg/l PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be <50mg/l PtCo. Water colour can be very low (<20mg/l PtCo or even <10mg/l PtCo) in lake habitat 3110, where the peatland in the lake's catchment is intact
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3110	Most lake shorelines have fringing habitats of reedswamp, other swamp, fen, marsh or wet woodland that intergrade with and support the structure and functions of the lake habitat. In this SAC, active blanket bog and heath communities dominate lake shorelines. Transition mire, fen, flush and grassland may also occur. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species richness than the lake habitats themselves

3160 Natural dystrophic lakes and ponds

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

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

Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes and pools must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced. Owing to their size and the sensitivity of peatland, 3160 lakes and pools can easily be damaged or destroyed by drainage
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that habitat 3160 is associated with nutrient-poor peat and silt substrates
Water quality: transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A specific target has yet to be established for this Annex I lake habitat. Habitat 3160 is associated with very clear water. The OECD fixed boundary system set transparency targets for ultra-oligotrophic lakes of ≥12m annual mean Secchi disk depth, and ≥6m annual minimum Secchi disk depth
Water quality: nutrients	µg/l P; mg/l N	Maintain the concentration of nutrients in the water column at sufficiently low levels to support the habitat and its typical species	As a nutrient-poor habitat, oligotrophic and Water Framework Directive (WFD) 'high' status targets apply. Where a lake has nutrient concentrations that are lower than these targets, there should be no decline within class, i.e. no upward trend in nutrient concentrations. For 3160 lakes and pools, annual average TP concentration should be ≤5µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3160. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l (The European Communities Environmental Objectives (Surface Waters) Regulations 2009). Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The OECD targets may be more appropriate for habitat 3160: annual average chlorophyll *a* concentration <1µg/l and annual peak chlorophyll *a* concentration ≤2.5µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, lake habitat 3160 requires WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/ absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in 3160 lakes and ponds should, therefore, be trace/ absent (<5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, lake habitat 3160 requires high phytobenthos status

Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for the lake habitat. The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for 3160 lakes and pools is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in soft water lake habitats. Although EC (2013) describes habitat 3160 as having pH 3-6, Drinan (2012) found mean pHs of 5.16 and 5.62 in upland and lowland 3160 lakes, respectively. The target for habitat 3160 is pH >4.5 and <9.0, in line with the surface water standards for soft waters (where water hardness is ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. The specific requirements of habitat 3160, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mgl PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be <50mg/l PtCo. Water colour can be very low (<20mg/l PtCo or even <10mg/l PtCo) in 3160 lakes and pools where the peatland in the lake's catchment is intact
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3160	Most 3160 lake and pool shorelines intergrade with active blanket bog, heath, flush or fen habitats and these support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and can support wetland communities and species of conservation concern

4010 Northern Atlantic wet heaths with Erica tetralix

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes	Cuilcagh - Anierin Uplands SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013 and Perrin et al., 2014). Northern Atlantic wet heaths with *Erica tetralix* was mapped in detail for this SAC (Perrin et al., 2013) and the total current area of the qualifying habitat stated is 80.8ha, covering 0.8% of the SAC. Perrin et al. (2013) report obvious losses of habitat since 1995 of approximately 0.06ha. A summary of the mapping methodology, a brief discussion of restoration potential and further details on this and the following attributes can be found in the Cuilcagh - Anierin Uplands SAC conservation objectives supporting document for upland habitats
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 3	Small areas of wet heath were recorded by Perrin et al. (2013) throughout this SAC. Patches occur near the summit of Benbrack and in the vicinity of Alteen. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded four different wet heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: cross-leaved heath	Occurrence within 20m of a representative number of 2m x 2m monitoring stops	Cross-leaved heath (*Erica tetralix*) present near each monitoring stop	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of positive indicator species at least 50%	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of *Cladonia* and *Sphagnum* species, *Racomitrium lanuginosum* and pleurocarpous mosses at least 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: ericoid species and crowberry	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of ericoid species and crowberry (*Empetrum nigrum*) at least 15%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: dwarf shrub species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrubs less than 75%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Based on Perrin et al. (2014), where the list of negative indicator species is also presented. See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Based on Perrin et al. (2014). See the uplands supporting document for further details. The non-native moss *Campylopus introflexus* was recorded within this habitat by Perrin et al. (2013) with evidence that severe burning was facilitating the colonisation of this species.

Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush (*Juncus effusus*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids, crowberry (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) showing signs of browsing	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of 2m x 2m monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: drainage	Percentage cover in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details

4030 European dry heaths

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

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

Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Based on Perrin et al. (2014), where the list of negative indicator species is also presented. See the uplands supporting document for further details. The non-native moss *Campylopus introflexus* was recorded within this habitat by Perrin et al. (2013), but did not form extensive carpets
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush (*Juncus effusus*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: senescent ling	Percentage cover at a representative number of 2m x 2m monitoring stops	Senescent proportion of ling (*Calluna vulgaris*) cover less than 50%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids showing signs of browsing	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas	Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details
Vegetation structure: growth phases of ling	Percentage cover in local vicinity of a representative number of monitoring stops	Outside sensitive areas, all growth phases of ling (*Calluna vulgaris*) should occur throughout, with at least 10% of cover in the mature phase	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat and no decline in status of hepatic mats associated with this habitat	Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details

4060 Alpine and Boreal heaths

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Cuilcagh - Anierin Uplands SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013 and Perrin et al., 2014). The total current area of Alpine and Boreal heath in the SAC stated by Perrin et al. (2013) is 92.5ha, covering 1.0% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology and further details on this and the following attributes can be found in the Cuilcagh - Anierin Uplands SAC conservation objectives supporting document for upland habitats
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 5	Alpine and Boreal heath was recorded by Perrin et al. (2014) on the high ground across the SAC. A large expanse was recorded on the summit ridge of Cuilcagh. It also notably occurred on the summit of the Playbank, with scattered patches across the summit area of Benbrack. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded four different Alpine and Boreal heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: lichens and bryophytes	Number of species at a representative number of 2m x 2m monitoring stops	Number of bryophyte or non-crustose lichen species present at each monitoring stop is at least three	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of positive indicator species at least 66%	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: dwarf shrub species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrub species at least 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 10%	Based on Perrin et al. (2014), where the list of negative indicator species is presented. See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Based on Perrin et al. (2014). See the uplands supporting document for further details. The non-native moss *Campylopus introflexus* was recorded within this habitat by Perrin et al. (2013), but did not form extensive carpets
Vegetation structure: signs of grazing	Percentage of leaves browsed at a representative number of 2m x 2m monitoring stops	Less than 10% collectively of the live leaves of specific graminoids showing signs of grazing	Based on Perrin et al. (2014). See the uplands supporting document for further details, including the list of specific graminoids

Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Less than 33% collectively of the last complete growing season's shoots of ericoids and crowberry (*Empetrum nigrum*) showing signs of browsing	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning within the habitat	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should considered within this attribute. See the uplands supporting document for further details

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

To restore the favourable conservation condition of Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)* in Cuilcagh - Anierin Uplands SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Cuilcagh - Anierin Uplands SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013 and Perrin et al., 2014). Species-rich *Nardus* grassland* was mapped in detail for this SAC and the total current area stated by Perrin et al. (2013) is 1.4ha, covering 0.01% of the SAC. Perrin et al. (2013) report no obvious losses of habitat since 1995. A summary of the mapping methodology and further details on this and the following attributes can be found in the Cuilcagh - Anierin Uplands SAC conservation objectives supporting document for upland habitats
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 6	Species-rich *Nardus* grassland* was recorded by Perrin et al. (2013) in the north-east of the SAC on the slopes around Cuilcagh. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded two different species-rich *Nardus* grassland* communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species present at each monitoring stop is at least seven	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: high quality indicator species	Number of species at a representative number of 2m x 2m monitoring stops	At least two high quality species for base-rich examples of the habitat and at least one for base-poor examples of the habitat	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: species richness	Number of species at a representative number of 2m x 2m monitoring stops	Species richness at each monitoring stop at least 25	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: non-native species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of non-native species less than or equal to 1%	Based on Perrin et al. (2014). See the uplands supporting document for further details. *Epilobium brunnescens* was recorded within this habitat by Perrin et al. (2013), with a relatively high cover score of 15% within the single monitoring stop
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of negative indicator species individually less than or equal to 10% and collectively less than or equal to 20%	Based on Perrin et al. (2014), where the list of negative indicator species is also presented. See the uplands supporting document for further details
Vegetation composition: *Sphagnum* cover	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of *Sphagnum* species less than or equal to 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details

Vegetation composition: *Polytrichum* cover	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of *Polytrichum* species less than or equal to 25%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: scrub, bracken and heath cover	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of scrub, bracken (*Pteridium aquilinum*) and heath collectively less than or equal to 5%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: forb to graminoid ratio	Percentage cover at a representative number of 2m x 2m monitoring stops	Forb component of forb:graminoid ratio is 20-90%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: sward height	Sward height at a representative number of 2m x 2m monitoring stops	Proportion of the sward between 5cm and 50cm tall is at least 25%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: litter cover	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of litter less than or equal to 20%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than or equal to 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: grazing or disturbance	Percentage cover in local vicinity of a representative number of monitoring stops	Area of the habitat showing signs of serious grazing or disturbance less than 20m²	Based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details

7130 Blanket bogs (* if active bog)

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes	Cuilcagh - Anierin Uplands SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013 and Perrin et al., 2014). Perrin et al. (2013) state that the current total area of blanket bog is 5,934.8ha (61.1% of the SAC). This comprises 5861.1ha of active blanket bog and 73.7ha of inactive blanket bog. Perrin et al. (2013) also report obvious losses of habitat since 1995 of approximately 5.1ha. However, this is almost certainly an under-estimate, as chronic losses due to erosion since 1995 cannot be quantified (78.5ha were mapped as eroding blanket bog by Perrin et al. (2013)). It should be noted that further restoration of blanket bog would be required in order to fulfil the targets for peat formation and hydrology presented below. A summary of the mapping methodology and a brief discussion of restoration potential are presented in the Cuilcagh - Anierin Uplands SAC conservation objectives supporting document for upland habitats
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 7	Extensive areas of blanket bogs were recorded by Perrin et al. (2013) throughout this SAC. A summary of the mapping methodology is presented in the uplands supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the uplands supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	From the habitat areas given by Perrin et al. (2013) above, 98.8% of the Annex I blanket bog habitat is currently actively peat-forming. See the uplands supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the uplands supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded five different active blanket bogs communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop is at least seven	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes or lichens, excluding *Sphagnum fallax*, at least 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species less than 75%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented. See the uplands supporting document for further details

Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Based on Perrin et al. (2014). See the uplands supporing document for further details. The non-native species *Campylopus introflexus* was recorded within 33.3% of blanket bogs monitoring stops recorded by Perrin et al. (2013), but its cover was not sufficiently high to cause any of these stops to fail
Vegetation composition: native trees and scrub	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Last complete growing season's shoots of ericoids, crowberry (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) showing signs of browsing collectively less than 33%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: erosion	Occurrence in local vicinity of a representative number of monitoring stops	Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas	Based on Perrin et al. (2014). See the uplands supporting document for further details
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details

7140 Transition mires and quaking bogs

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

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

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

7220 Petrifying springs with tufa formation (Cratoneurion)

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

Attribute	Measure	Target	Notes
Habitat area	Square metres	Area stable or increasing, subject to natural processes	Within Cuilcagh - Anierin Uplands SAC, eight polygons were recorded as having petrifying springs during the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013). The polygons were recorded mainly around the Cuilcagh massif. The overall area of habitat 7220* is given in Perrin et al. (2013) as 0.1ha. The approach to mapping conducted during the NSUH is detailed in Perrin et al. (2014). Note that the NSUH did not undertake a conservation status assessment of this habitat and thus it is not included in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 9	This habitat has been recorded from eight polygons within the SAC. Four of the polygons are predominantly covered with the Fossitt (2000) habitat poor fen and flush (PF2), three of the polygons predominantly contain the Annex I habitat Blanket bog (7130*) and the majority of the final polygon supports the Fossitt (2000) habitat wet grassland (GS4). Lyons and Kelly (2013) recognise three main sub-types of spring: wooded springs, inland non-wooded springs and coastal springs. The springs in this SAC fall into the second sub-type, within which springs on steep sites are recognised as a distinct sub-group
Hydrological regime: height of water table/ water flow	Metres/metres per second	Maintain appropriate hydrological regimes	The hydrological regimes of individual springs are currently unknown in detail. Petrifying springs rely on permanent irrigation, usually from upwelling groundwater sources or seepage sources (Lyons and Kelly, 2013)
Water quality	Water chemistry measures	Maintain oligotrophic and calcareous conditions	Water chemistry is currently unknown for springs in this SAC. Characteristically, petrifying spring water has high values for pH, alkalinity and dissolved calcium and is oligotrophic (Lyons and Kelly, 2013)
Vegetation composition: typical species	Occurrence	Maintain typical species	The bryophytes *Palustriella commutata* (*Cratoneuron commutatum*) and *Cratoneuron filicinum* are diagnostic of petrifying springs (EC, 2013) and are found in this habitat in the SAC (Perrin et al., 2013). *Palustriella commutata* is diagnostic for identifying the NSUH vegetation community SPG2i, this being synonymous with 7220*. Other bryophyte species recorded within the SAC (Perrin et al., 2013), which are listed in Appendix 1 A-C of Lyons and Kelly (2013) as being indicative of petrifying springs are: *Aneura pinguis*, *Bryum pseudotriquetrum*, *Campylium stellatum*, *Fissidens adianthoides*, *Hymenostylium recurvirostrum* var. *recurvirostrum*, *Jungermannia atrovirens*, *Palustriella falcata*, *Pellia endiviifolia*, *Philontis calcarea* and *Pohlia wahlenbergii*

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

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

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

Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	Perrin et al. (2013) compiled and mapped existing rare and notable plant records for the SAC and added any new records collected during the NSUH survey. No relevant species were recorded in this habitat, however, new records should be considered within this attribute. See the uplands supporting document for further details

8220 Siliceous rocky slopes with chasmophytic vegetation

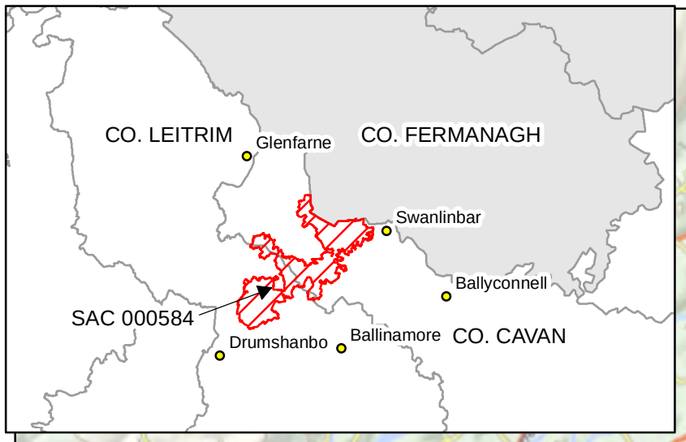
To maintain the favourable conservation condition of Siliceous rocky slopes with chasmophytic vegetation in Cuilcagh - Anierin Uplands SAC, which is defined by the following list of attributes and targets:

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

1393 Slender Green Feather-moss *Drepanocladus vernicosus*

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

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



Gubaveeny
R207
R206
The Black River
The Shannon
Srah Grouga River
Ballinamagh River
Owenbrean River
Mother River
R200
Glangevlin
Owenmore River
Swanlinbar
N67
Claddagh River
Dowra
River Shannon
Corry
Ballinagleragh
Yellow River
Aroosagh River
Cladagh or Swanlinbar River
River Erne
Derrynacreeve
Owensallagh River
Lough Allen
R280
R207
Stony River
Corlough
R202
Bawnboy
Bawnboy River
Derradda
River Blackwater
Largan Mountain

Legend

Cuilcagh-Anierin Uplands SAC 000584

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

MAP 1:
CUILCAGH - ANIERIN UPLANDS SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

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

0 1 2 3 4 km

N

Map Version 1
Date: July 2016

Coollegreane
Dowra
Glangevlin
Corry
Ballinagleragh
Lough Allen
Lough Cratty
Lough Cam
Altshallan Lough
Lough Nambrack
Knockgorm Lough
Munter Eolus Lough
Derrynananta Lough
Bartonny Lough
Lough Nabellbeg
Corlough
R200
R207

Legend

Cuilcagh Anierin Uplands SAC 000584

Indicative Lake Habitats

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

Potential 3160 Natural dystrophic lakes and ponds

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MAP 2:
CUILCAGH - ANIERIN UPLANDS SAC
CONSERVATION OBJECTIVES
LAKE HABITATS

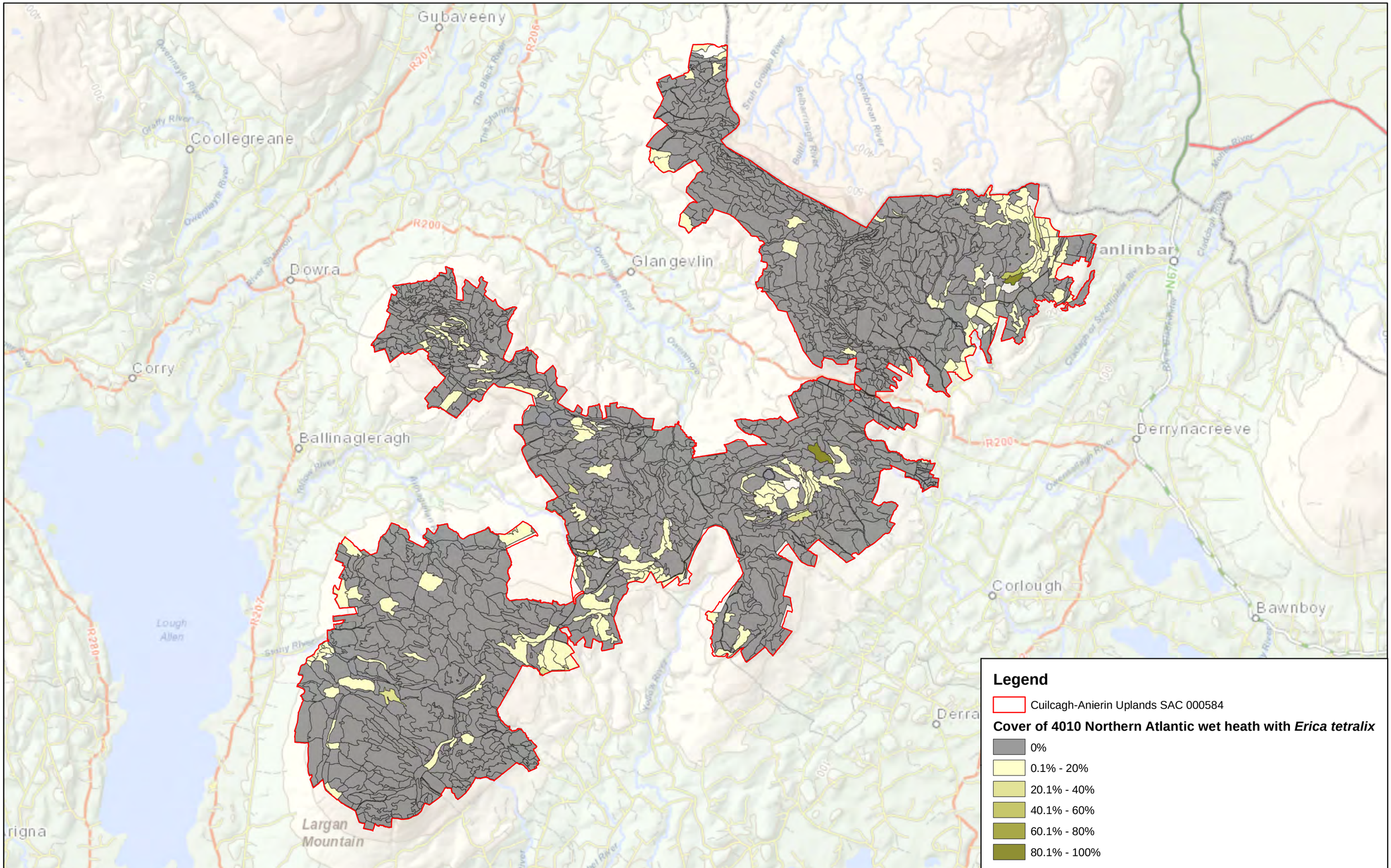
Map to be read in conjunction with the NPWS Conservation Objectives Document.

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

0 0.7 1.4 2.1 2.8 3.5 km

N

Map Version 1
Date: July 2016



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MAP 3:
CUILCAGH - ANIERIN UPLANDS SAC
CONSERVATION OBJECTIVES
WET HEATH

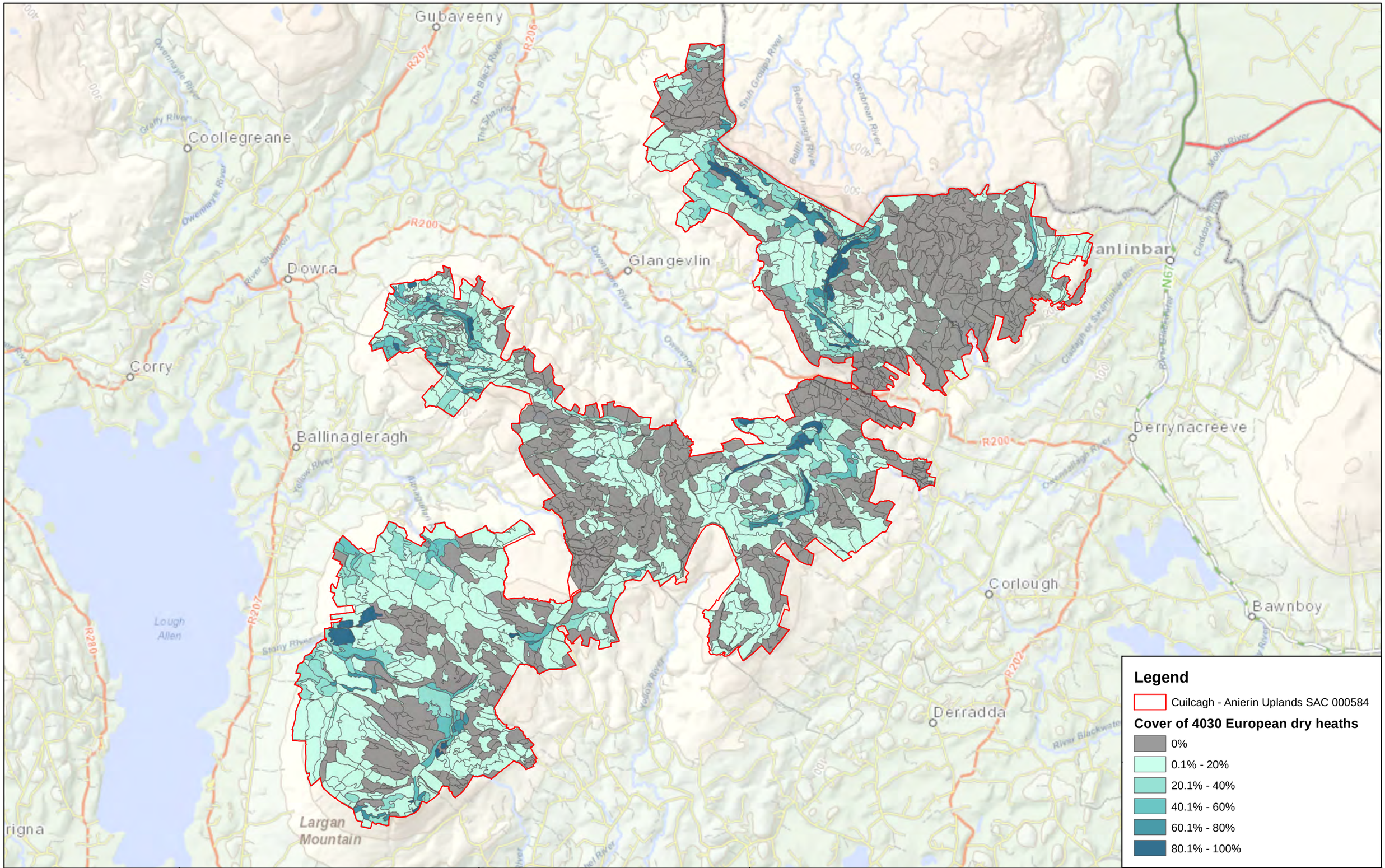
Map to be read in conjunction with the NPWS Conservation Objectives Document.

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

0 1 2 3 4 5 km

N

Map Version 1
Date: Julyl 2016



Legend

Cuilcagh - Anierin Uplands SAC 000584

Cover of 4030 European dry heaths

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

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MAP 4:
CUILCAGH - ANIERIN UPLANDS SAC
CONSERVATION OBJECTIVES
DRY HEATHS

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

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

0 1 2 3 4 5 km

N

Map Version 1
Date: July 2016