

Lough Nillan Bog (Carrickatlieve) SAC (site code 165)
Conservation objectives supporting document
- upland habitats

NPWS

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1 Introduction

Achieving Favourable Conservation Status (FCS) is the overall objective to be reached for all Annex I habitat types and Annex II species of European Community interest listed in the Habitats Directive 92/43/EEC. It is defined in positive terms, such that a habitat type or species must be prospering and have good prospects of continuing to do so.

Almost 19% of Ireland can be considered to support upland habitats (Perrin *et al.*, 2009). The importance of these areas for biodiversity conservation is unquestionable, with numerous upland habitat types listed under Annex I of the EU Habitats Directive and many rare and threatened bird and other animal species being associated with these habitats. This is reflected in the fact that over 40% of the total terrestrial area currently selected for designation as Special Areas of Conservation (SAC) in Ireland lies above 150 m in altitude.

The Scoping Study and Pilot Survey of Upland Habitats (Perrin *et al.*, 2009) was commissioned by the National Parks and Wildlife Service (NPWS) with the primary remit of devising an appropriate strategy and methodologies for conducting a National Survey of Upland Habitats (NSUH). Four phases of the NSUH have subsequently been conducted between 2010 and 2014. The Annex I habitats that are the primary focus of the NSUH are listed in Table 1. To date, Lough Nillan Bog (Carrickatlieve) SAC has not been surveyed as part of the NSUH.

Table 1: Annex I habitats that occur in Irish uplands and which are primary focus habitats for the NSUH. The habitat in bold is listed as a Qualifying Interest for Lough Nillan Bog (Carrickatlieve) SAC.

Habitat code	Habitat name
4010	Northern Atlantic wet heaths with <i>Erica tetralix</i>
4030	European dry heaths
4060	Alpine and Boreal heaths
6230	Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)*
7130	Blanket bogs (* if active)
7140	Transition mires and quaking bogs
7150	Depressions on peat substrates of the Rhynchosporion
7230	Alkaline fens
8110	Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>)
8120	Calcareous and calcshist screes of the montane to alpine levels (<i>Thlaspietea rotundifolii</i>)
8210	Calcareous rocky slopes with chasmophytic vegetation
8220	Siliceous rocky slopes with chasmophytic vegetation

* Denotes a priority habitat under the EU Habitats Directive

1.1 Lough Nillan Bog (Carrickatlieve) SAC

Lough Nillan Bog (Carrickatlieve) SAC was surveyed in 1990. The results of this survey are reported in Douglas *et al.* (1990).

It is a medium-sized upland SAC, being 41.6 km² in extent. Lough Nillan Bog (Carrickatlieve) SAC is located about 1 km south of Glenties in Co. Donegal (O.S. Discovery Series map 11). The highest

summits, Silver Hill (600 m) and Carnaween (521 m), are in the east of the SAC. There are a series of lakes within the SAC of which Lough Magrath More and Lough Anna are the largest. The SAC is bounded in the north by farmland, with occasional forestry plantations a significant habitat along the remainder of the boundary. The SAC is underlain by metamorphic siltstones and intrusive igneous rock.

1.2 Mapping methodology

A detailed habitat survey of Lough Nillan Bog (Carrickatlieve) SAC, utilising the methodology presented in Perrin *et al.* (2014), has not been conducted. Therefore, the data currently available are not sufficient to facilitate the production of an accurate habitat map.

All current relevant datasets for Annex I habitats that occur in Irish uplands were summarised within the GIS files associated with NPWS (2013) and these were utilised to calculate an approximate area for the sole Qualifying Interest listed for Lough Nillan Bog (Carrickatlieve) SAC.

1.3 Potential for habitat restoration

It will be clear later in this document that restoration management for 7130 Blanket bogs (* if active) in this SAC is required, as the conservation objective for the habitat is to restore favourable conservation condition. Areas that might be restored to active blanket bog could include inactive bog, bare eroding bog and recent cutover bog, and also areas of drained deep peat or older cutovers which currently support other types of vegetation such as heath. These latter areas may currently be classified as other Annex I habitats (e.g. 4010). Restoration of priority 7130 habitat may therefore result in loss in the area and distribution of other Annex I habitats.

2 Conservation objectives

A site-specific conservation objective aims to define the favourable conservation condition of a habitat or species at site level. The maintenance of habitats and species within sites at favourable condition will contribute to the maintenance of Favourable Conservation Status (FCS) of those habitats and species at a national level.

Conservation objectives are defined using attributes and targets that are based on parameters as set out in the Habitats Directive for defining favourable status, namely area, range, and structure and functions.

The *Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland* (Perrin *et al.*, 2014) have been used as a basis for setting most site-specific attributes and targets for uplands habitats. Attributes and targets may change/become more refined as further information becomes available.

Objectives for habitats have been set with reference to Perrin *et al.* (2014). To date no detailed survey has been undertaken to assess the area or structure and functions of Blanket bogs (* if active) in this SAC. Therefore, in the absence of site-specific data the National Conservation Assessment (NCA) for the Annex I habitat (NPWS, 2013) was utilised to indicate the condition of the habitat in the SAC. The NCA for Blanket bogs (* if active) was Unfavourable – Bad for both area and structure and functions. If area and structure and functions were both assessed as “Favourable” the objective

for that habitat is to maintain favourable conservation condition. If either parameter was assessed as “Unfavourable – Inadequate” or “Unfavourable – Bad” the objective for that habitat is to restore favourable conservation condition.

This document provides supporting information for the attributes of the conservation objectives of upland habitats, given in the main conservation objectives document for the SAC. The two documents should be read in conjunction with each other.

The conservation objective for the Annex I habitat dealt with in this supporting document is as follows:

- To restore the favourable conservation condition of Blanket bogs (* if active) in Lough Nillan Bog (Carrickatlieve) SAC.

3 Area

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. The target is for the habitat area to be stable or increasing. An approximate baseline figure is presented in Table 2.

Table 2: Extent of the Annex I habitat that is listed as a Qualifying Interest for Lough Nillan Bog (Carrickatlieve) SAC. *denotes priority habitat.

Annex I code	Habitat	Area (ha)	% of SAC
7130	Blanket bogs (* if active)	2,600	63

As mentioned earlier, the area of habitat 7130 comprises active and inactive blanket bog. The most frequent example of the latter encountered in the NSUH is described in Perrin *et al.* (2014) as a monospecific sward of *Eriophorum angustifolium* on eroded bog where a reasonable depth of peat remains. Note however, that while examples of this community occur on re-deposited, eroded peat, these areas will not have the structural, hydrological or functional characteristics of naturally formed blanket bog.

4 Range

The habitat’s range at site level, in the form of habitat distribution, has not been recorded as no detailed mapping of the SAC has been undertaken. The target is that there should be no decline.

5 Structure and functions

Structure and functions relates to the physical components of a habitat (“structure”) and the ecological processes that drive it (“functions”). For upland habitats these include a range of aspects such as soil chemistry, vegetation composition, hydrological regime, community diversity, habitat quality, species occurrence, indicators of local distinctiveness, disturbed ground, evidence of burning and negative species occurrence. These structure and functions are expanded on in the sections below.

At Lough Nillan Bog (Carrickatlieve) SAC the structure and functions of 7130 Blanket bogs (* if active) have not been assessed in the field as there has been no recent detailed habitat survey.

5.1 Ecosystem function

Ecosystem function is assessed primarily through consideration of soil nutrient levels. For 7130 Blanket bogs (*if active), additional consideration is given to peat formation and hydrology.

5.1.1 Ecosystem function: soil nutrients

An attribute to assess the soil nutrients is common to each of the upland habitats with a view to maintain the soil nutrient status within the natural range suited to the habitat. Relevant nutrients and natural ranges have yet to be defined. Nitrogen deposition and associated acidification are noted as being relevant to all upland habitats in NPWS (2013). The target for each habitat is to maintain the soil nutrients status within the natural range.

5.1.2 Ecosystem function: peat formation

Ecosystem function of 7130 Blanket bogs (* if active) is further assessed through peat formation. Perrin *et al.* (2014) established an overriding assessment of blanket bog structure and functions based on the proportion of degraded bog within a site which includes eroding bog and cutover bog which would previously have been this Annex I habitat. If more than 1% of the combined area of active bog (Annex I habitat *7130), inactive bog (Annex I habitat 7130), eroded bog (habitat category PB5 – Fossitt 2000) and recently cutover bog (habitat PB4 – Fossitt 2000) is inactive, eroded or cutover then it should be assessed as Unfavourable – Inadequate even if the result of the monitoring stops were more positive. If more than 5% of the combined area is inactive, eroded or cutover it is assessed as Unfavourable – Bad.

The EU habitats interpretation manual (EC, 2013) defines active blanket bog as “still supporting a significant area of vegetation that is normally peat-forming”. For the purposes of defining favourable conservation condition of the Annex I habitat, the target is that at least 99% of the total Annex I blanket bog area is active bog.

5.1.3 Ecosystem function: hydrology

Ecosystem function of 7130 Blanket bogs (* if active) is further assessed through assessment of hydrology. Drains (cut for purposes of peat cutting, afforestation etc.) and erosion gullies impact on the hydrology of blanket bog in the local vicinity. The target is for the natural hydrology to be unaffected by drains and erosion gullies. The process of restoring hydrological integrity may impact areas of heath habitats as discussed in Section 1.3.

5.2 Community diversity

Douglas *et al.* (1990) recorded habitat and plant species data from Lough Nillan Bog (Carrickatlieve) SAC. Some of the vegetation data collected by Douglas *et al.* (1990) did appear to correspond to the provisional list of vegetation communities which is detailed in the NSUH manual (Perrin *et al.*, 2014). From the data presented in Douglas *et al.* (1990), it is clear that vegetation community diversity does exist within the SAC with four 7130 Blanket bogs* communities identified. These are BB1 - *Schoenus nigricans* - *Eriophorum angustifolium* bog, BB2 - *Schoenus nigricans* - *Sphagnum* spp., BB4 - *Trichophorum germanicum* - *Eriophorum angustifolium* bog, and BB5 - *Calluna vulgaris* - *Eriophorum*

spp. bog. The target is to maintain the variety of vegetation communities within the 7130 Blanket bogs (* if active) subject to natural processes.

5.3 Vegetation composition

Vegetation composition is assessed through a range of attributes tailored to each of the habitats. In general terms they establish minimum thresholds for the occurrence, or cover, of desirable species and maximum thresholds for undesirable species.

5.3.1 Vegetation composition: positive indicator species

An attribute for positive indicator species is common to each of the upland Annex I habitats and habitat-specific lists of the positive indicator species are presented in the NSUH manual (Perrin *et al.* 2014). A positive species criterion is set to ensure that vegetation remains representative of the habitat and is not degrading or succeeding to a different habitat. The target by which this attribute is measured varies between habitats. Descriptions of these habitats can be found in the NSUH manual (Perrin *et al.*, 2014).

For some habitats a certain number of positive indicator species are required. At least seven positive indicator species are required for 7130 Blanket bogs (* if active).

5.3.2 Vegetation composition: other desirable species

Other elements of vegetation composition which can collectively be regarded as being desirable are also established with a range of habitat specific targets set.

Lichens and bryophytes

Minimum thresholds for cover of lichens and bryophytes are set for habitats where a plentiful lichen/moss layer is characteristic, including 7130 Blanket bogs (* if active). Within the habitat-specific targets for these attributes, the specific species, or groups of species which are required, are listed together with any exclusions e.g. *Sphagnum fallax* can be indicative of degraded bog so is excluded from the 7130 Blanket bogs (* if active) assessment.

5.3.3 Vegetation composition: negative indicator species

A percentage cover threshold for negative indicator species has been established for 7130 Blanket bogs (* if active). Presence of these species would likely indicate undesirable impacts of management such as overgrazing, undergrazing, nutrient enrichment, agricultural improvement or impacts on hydrology. The percentage threshold is generally set quite low such that impacts can be reversed before they become more severe.

5.3.4 Vegetation composition: non-native species

An attribute for non-native species is common to each of the upland Annex I habitats, including 7130 Blanket bogs (* if active). Non-native species can be invasive and have deleterious effects on native vegetation. The target for each habitat is for the total cover of non-native species to be less than 1%. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances.

5.3.5 Vegetation composition: undesirable native species

For many habitats, including 7130 Blanket bogs (* if active), maximum percentage cover thresholds for undesirable native species are also set. These are detailed below.

Native trees and shrubs

Tree and shrub cover is assessed for 7130 Blanket bogs (* if active). High cover of native trees and shrubs would indicate that the habitat may be succeeding towards scrub or woodland due to lack of grazing or due to the habitat drying out.

Potential dominant species

For 7130 Blanket bogs (* if active) a maximum threshold is given for bog species which could potentially dominate the habitat, reflecting a reduction in diversity. The selected species are ling (*Calluna vulgaris*), many-stalked spike-rush (*Eleocharis multicaulis*), hare's-tail cottongrass (*Eriophorum vaginatum*), purple moor-grass (*Molinia caerulea*), black bog-rush (*Schoenus nigricans*) and deergrass (*Trichoporum germanicum*). The target is for cover of each of the potential dominant species to be less than 75%.

5.4 Vegetation structure

Vegetation structure is assessed through a number of attributes tailored to individual habitats. These measures assess levels of grazing and browsing, burning and *Sphagnum* condition.

5.4.1 Browsing and grazing

Browsing is generally measured through viewing the last complete season's shoots of particular species and assessing the proportion which shows signs of having been browsed. The species which are assessed for browsing are generally the dwarf shrub species: ericoids, crowberry (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*). The target for 7130 Blanket bogs (* if active) is for less than 33% of shoots to show signs of grazing.

5.4.2 Burning

Fires can be part of the natural cycle of heath and peatlands and may also be used as a valuable management tool to promote a diversity of growth phases in ling. However, currently most hill fires in Ireland are intentionally started to encourage grass growth for livestock. Fires which are too intense, too frequent, too extensive or which occur in sensitive areas are damaging to habitats. An assessment of burning is made for 7130 Blanket bogs (* if active). Habitat-specific lists of sensitive areas where burning should not occur are presented in Perrin *et al.* (2014). Examples of sensitive areas are: 'areas where soils are thin and less than 5 cm deep' and 'pools, wet hollows, hags and erosion gullies, and within 5-10 m of the edge of watercourses'.

7130 Blanket bogs (* if active) has the target of there being no sign of burning into the moss, liverwort or lichen layer or exposure of peat surface due to burning and no signs of burning in sensitive areas.

5.4.3 Sphagnum condition

Disturbance to *Sphagnum* should be assessed for 7130 Blanket bogs (* if active). High levels of disturbed *Sphagnum* would indicate undesirable levels of grazers. The target is for less than 10% of the *Sphagnum* cover to be crushed, broken and/or pulled up.

5.5 Physical structure

The physical structure of upland habitats can be damaged by drainage, walking trails, unsuitable levels of grazing and erosion. Physical structure is assessed through a number of attributes tailored to each of the habitats. Elements which are assessed for the various habitats comprise disturbed bare ground, drainage and erosion; these are detailed below.

5.5.1 Disturbed bare ground

Disturbance can include hoof marks, wallows, human foot prints, vehicle and machinery tracks. Excessive disturbance can result in loss of characteristic species and presage erosion for heaths and peatlands. The target is set at there being less than 10% disturbed ground.

5.5.2 Drainage

Drainage can result in loss of characteristic species and transition to drier habitats. This attribute is applied to 7130 Blanket bogs (* if active). The target is the area showing signs of drainage from heavy trampling, tracking or ditches to be less than 10%.

5.5.3 Erosion

Erosion is assessed for 7130 Blanket bogs (* if active). Erosion leads to loss of peat from the blanket bog system, increases in peat sediment in nearby water courses, loss of blanket bog habitat and drainage. The target for the habitat is less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas. The greater bog mosaic incorporates the blanket bog itself and associated vegetation types and non-vegetation cover types that appear to have been derived from former blanket bog, including, but not limited to bare peat, loose rock, gravel and running water.

5.6 Indicators of local distinctiveness

Douglas *et al.* (1990) noted rare and notable plant records for the SAC. Rare species (those considered at least Near Threatened on the appropriate Red Data List) which can be assigned to a particular habitat should be considered indicators of local distinctiveness for habitats. The target is for no decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat.

Where hepatic mats of the *Calluna vulgaris-Herbertus aduncus* community have been recorded within a particular habitat these should also be listed as indicators of local distinctiveness. No assessment of the conservation status of this community has been conducted but proposals for such an assessment are presented in Barron & Perrin (2014). The target for these hepatic mats is for no decline in status of hepatic mats associated with this habitat.

6 References

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- Douglas, C., Dunnells, D., Scally, L. & Wyse-Jackson, M. (1990) A survey to locate lowland blanket bogs of scientific interest in county Donegal and upland blanket bogs in counties Cavan, Leitrim and Roscommon. Unpublished report to National Parks and Wildlife Service, Office of Public Works, Dublin, Ireland.
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