

Owenduff/Nephin Complex SAC (site code 000534)

Conservation objectives supporting document

- blanket bogs and associated habitats

NPWS

Version 1

July 2017

Contents

1	Introduction	1
1.1	Owenduff/Nephin Complex SAC.....	2
1.2	Mapping methodology	2
1.3	Potential for habitat restoration.....	2
2	Conservation objectives.....	2
3	Area.....	3
4	Range	4
5	Structure and functions	4
5.1	Ecosystem function	4
5.1.1	Ecosystem function: soil nutrients	5
5.1.2	Ecosystem function: peat formation	5
5.1.3	Ecosystem function: hydrology	5
5.2	Community diversity	5
5.3	Vegetation composition	6
5.3.1	Vegetation composition: positive indicator species.....	6
5.3.2	Vegetation composition: other desirable species.....	6
5.3.3	Vegetation composition: negative indicator species	7
5.3.4	Vegetation composition: non-native species.....	7
5.3.5	Vegetation composition: undesirable native species.....	7
5.4	Vegetation structure	8
5.4.1	Browsing and grazing.....	8
5.4.2	Burning.....	9
5.4.3	<i>Sphagnum</i> condition.....	9
5.4.4	Vegetation height.....	9
5.5	Physical structure.....	9
5.5.1	Disturbed bare ground	9
5.5.2	Drainage.....	9
5.5.3	Erosion	10
5.6	Indicators of local distinctiveness	10
6	References.....	11

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 EU 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 150m 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 since been completed between 2010 and 2014. The principle aims of the NSUH are to map all habitats within a site and to assess the conservation condition of the relevant Annex I habitats, listed in Table 1 below.

The conservation objectives attributes and targets, which are based on the monitoring criteria developed by the NSUH, have been applied to the Annex I habitats listed as Qualifying Interests for Owenduff/Nephin Complex SAC (see Table 1 and Section 2).

Several blanket bog sites within Owenduff/Nephin Complex SAC were surveyed by Foss & McGee (1987) and Douglas *et al.* (1989) as part of a wider blanket bog survey project across Ireland carried out by NPWS between 1987 and 1991 (see Conaghan, 2000). A turf-cutting site within the SAC was surveyed in 2015 (NPWS internal files).

Table 1: Annex I habitats that occur in Irish uplands and which are primary focus habitats for the NSUH. Habitats in bold are those that are listed as Qualifying Interests for Owenduff/Nephin Complex 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 bog)
7140	Transition mires and quaking bogs
7150	Depressions on peat substrates of the Rhynchosporion
7230	Alkaline fens
8110	Siliceous screes 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 Owenduff/Nephin Complex SAC

Owenduff/Nephin Complex SAC is a large SAC at 27,064ha in extent. The SAC incorporates the Owenduff River catchment and most of the Nephin Beg mountain range in Co. Mayo (O.S. Discovery Series maps 22, 23, 30 and 31). The western boundary of the SAC roughly follows the N59 road from Mulranny northwards towards Bangor, and the N59 road (Bangor/Bellacorick) and the Owenmore River mark the northern boundary of the SAC, with forestry plantations flanking the eastern edge. The southern boundary of the SAC is set back from the N59 road (Mulranny/Newport). Certain areas of the Owenduff/Nephin Complex SAC are state-owned, forming part of Ballycroy National Park. The highest peak in the SAC is Slieve Carr (721m). Notable lakes include Lough Feeagh, Bunaveela Lough and the corrie lake, Corryloughaphuill Lough. Geologically the area is mostly underlain by quartzites, gneisses and schists.

1.2 Mapping methodology

A detailed habitat mapping survey of Owenduff/Nephin Complex 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 were summarised within the GIS files associated with NPWS (2013) and these were utilised to calculate an approximate area for 4010 Wet heaths, 4060 Alpine and Boreal heaths and 7130 Blanket bogs (* if active bog) in Owenduff/Nephin Complex SAC. There were no data with which to estimate the approximate area of 7140 Transition mires in the SAC.

1.3 Potential for habitat restoration

Restoration management for 7130 Blanket bogs (* if active bog) in this SAC is required, as the conservation objective for the habitat is to restore favourable conservation condition here. 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 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 that are Qualifying Interests. If such scenarios are identified by restoration management plans, the conservation objectives for these other Qualifying Interests should be adjusted accordingly.

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 of the site-specific attributes and targets for uplands habitats. However, attributes and targets may change/become more refined as further information becomes available.

As no recent detailed survey has been undertaken to assess the area or the structure and functions of 4010 Wet heaths, 4060 Alpine and Boreal heaths, 7130 Blanket bogs (* if active bog) and 7140 Transition mires in Owenduff/Nephin Complex SAC, the National Conservation Assessment (NCA) for each Annex I habitat (NPWS, 2013) was instead utilised to indicate condition of the habitats in the SAC. 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. The NCA for 4010 Wet heaths was Unfavourable – Inadequate for area and Unfavourable – Bad for structure and functions. The NCA for 4060 Alpine and Boreal heaths was Favourable for area and Unfavourable – Bad for structure and functions. The NCA for 7130 Blanket bogs (* if active bog) was Unfavourable – Bad for both area and structure and functions. The NCA for 7140 Transition mires was Unfavourable – Inadequate for area and Unfavourable – Bad for structure and functions.

This document provides supporting information for the attributes of the conservation objectives for 4010 Wet heaths, 4060 Alpine and Boreal heaths, 7130 Blanket bogs (* if active bog) and 7140 Transition mires, given in the main conservation objectives document for Owenduff/Nephin Complex SAC. The two documents should be read in conjunction with each other.

The conservation objective for each of the Annex I habitats dealt with in this supporting document are as follows:

- To restore the favourable conservation condition of Northern Atlantic wet heaths with *Erica tetralix* in Owenduff/Nephin Complex SAC.
- To restore the favourable conservation condition of Alpine and Boreal heaths in Owenduff/Nephin Complex SAC.
- To restore the favourable conservation condition of Blanket bogs (* if active bog) in Owenduff/Nephin Complex SAC.
- To restore the favourable conservation condition of Transition mires and quaking bogs in Owenduff/Nephin Complex 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. Approximate baseline figures are presented in Table 2 for 4010 Wet heaths, 4060 Alpine and Boreal heaths and 7130 Blanket bogs (* if active bog) in Owenduff/Nephin Complex SAC. There were no data with which to estimate the approximate areas of 7140 Transition mires in the SAC.

Table 2: Estimated extent of blanket bog and associated Annex I habitats that are listed as Qualifying Interests for Owenduff/Nepin Complex SAC. *denotes priority habitat.

Annex I code	Habitat	Approximate area (ha)	% of SAC
4010	Wet heaths	4,524	17
4060	Alpine and Boreal heaths	1,150	4
7130	Blanket bogs (* if active bog)	18,393	68
7140	Transition mires	Unknown	Unknown

As mentioned earlier, the area of habitat 7130 comprises active and inactive blanket bogs. The most frequent example of the latter encountered in the NSUH is described in Perrin *et al.* (2014) as a monospecific sward of common cottongrass (*Eriophorum angustifolium*) on eroded bog where a reasonable depth of peat remains. Note, however, that where 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

Each habitat's range at site level, in the form of habitat distribution, has not been recorded in detail as no comprehensive mapping of the SAC has been recently undertaken. However, it is documented that 4010 Wet heaths occur in mosaic with blanket bog and are present on the lower slopes of mountains in the SAC (NPWS, 2006). 4060 Alpine and Boreal heaths occur on summits and ridges above 400–500m, and form a mosaic with bare rock (NPWS internal files). 7130 Blanket bogs (* if active bog) cover most of the western and northern parts of the SAC, as well as much of the upland areas in the east and south. Large areas of intact blanket bog are also present in the centre of the SAC (Foss & McGee, 1987; Douglas *et al.*, 1989; NPWS internal files). 7140 Transition mires occur in locations where bog vegetation merges with base-rich flushes, and at the interface between water bodies and adjacent bog. Examples can be found at Owenglass West, Uggool, Sheeanmore and Lagduff (Foss & McGee, 1987; Douglas *et al.*, 1989; NPWS, 2006). 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 blanket bogs and associated 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 Owenduff/Nepin Complex SAC, the structure and functions of 4010 Wet heaths, 4060 Alpine and Boreal heaths, 7130 Blanket bogs (* if active bog) and 7140 Transition mires 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 bog), 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 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 blanket bogs and all associated 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 bog) 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 results of the monitoring stops data are 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 (European Commission, 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 bog) 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

A variety of wet heath vegetation communities have been noted in this SAC (NPWS, 2006). Two of the communities correspond to NSUH provisional communities, as described in the NSUH manual (Perrin *et al.*, 2014). These comprise WH3 *Calluna vulgaris* – *Molinia caerulea* – *Sphagnum capillifolium* wet/damp heath and WH4 *Trichophorum germanicum* – *Eriophorum angustifolium* wet heath. A variety of blanket bog vegetation communities have also been recorded in this SAC (Foss & McGee, 1987; Douglas *et al.*, 1989; NPWS internal files), five of which correspond to NSUH provisional communities. These comprise BB1 *Schoenus nigricans* – *Eriophorum angustifolium* bog, BB2 *Schoenus nigricans* – *Sphagnum* spp. bog, BB4 *Trichophorum germanicum* – *Eriophorum angustifolium* bog, BB5 *Calluna vulgaris* – *Eriophorum* spp. bog and BB7 *Eriophorum angustifolium* – *Sphagnum austinii* bog. Douglas *et al.* (1989) recorded one transition mire vegetation community that corresponds to the NSUH provisional community PO1a *Menyanthes trifoliata* – *Carex limosa*

infilling pool sub-community. The community diversity of 4060 Alpine and Boreal heaths within the SAC is currently unknown.

The target for the SAC is to maintain the variety of vegetation communities within 4010 Wet heaths, 4060 Alpine and Boreal heaths, 7130 Blanket bogs (* if active bog) and 7140 Transition mires, 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

The attribute for positive indicator species is common to each of the blanket bogs and associated 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 is required. At least seven positive indicator species are required at each monitoring stop for 7130 Blanket bogs (* if active bog).

For some other habitats, a percentage threshold is set. At least 50% cover of positive indicators is required for 4010 Wet heaths and at least 66% cover for 4060 Alpine and Boreal heaths.

7140 Transition mires require at least three positive indicator species for infilling pools and flushes and at least six for fens, and also at least one core positive indicator species present at each monitoring stop. In addition, 25% total cover of positive indicator species is required.

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, such as 4010 Wet heaths and 7130 Blanket bogs (* if active bog), and for 4060 Alpine and Boreal heaths. The latter habitat is not necessarily rich in lichen and bryophyte species, but a minimum amount should still be present. 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 bog) assessment).

Dwarf shrub cover

A minimum threshold cover for dwarf shrubs is set for 4060 Alpine and Boreal heaths. A relatively low threshold of at least 10% is set as loose rock and *Racomitrium lanuginosum* are characteristic elements and are often abundant. A lower cover of dwarf shrubs could indicate that the habitat is transitional to grassland or other montane vegetation.

Cross-leaved heath

Cross-leaved heath (*Erica tetralix*) is specifically mentioned in the formal title of habitat 4010 Wet heaths and is the only characteristic species listed in European Commission (2013). Whilst it is seldom abundant in wet heaths, its presence at high frequencies is considered one of the few characteristics common between the varied communities of this habitat (JNCC, 2009). The target is for the presence of cross-leaved heath within a 20m radius of each monitoring stop.

Ericoid species and crowberry

A dwarf shrub layer with ericoid species is characteristic of 4010 Wet heaths (crowberry (*Empetrum nigrum*) is only rarely present). Low cover of these species would be indicative of chronic overgrazing, burning, etc. The target is for at least 15% cover of these species at each monitoring stop.

5.3.3 Vegetation composition: negative indicator species

A percentage cover threshold for negative indicator species has been established for blanket bog and associated habitats, including those listed as Qualifying Interests for Owenduff/Nepin Complex SAC. Habitat-specific negative indicator species lists have been established for each of the habitats and are presented in Perrin *et al.* (2014). 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 4010 Wet heaths, 4060 Alpine and Boreal heaths, 7130 Blanket bogs (* if active bog) and 7140 Transition mires. 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 two of the habitats present in Owenduff/Nepin Complex SAC, 4010 Wet heaths and 7130 Blanket bogs (* if active bog), maximum percentage cover thresholds for undesirable native species are also set. These are detailed below.

Bracken, native trees and shrubs

The cover of bracken (*Pteridium aquilinum*) and native trees and shrubs is assessed for 4010 Wet heaths. Tree and shrub cover is assessed for 7130 Blanket bogs (* if active bog). High cover of bracken would indicate that the habitat may be succeeding towards a dense bracken community, and 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, for bog habitats, due to the habitat drying out.

Soft rush

High cover of soft rush (*Juncus effusus*) in 4010 Wet heaths would suggest undesirable hydrological conditions. Note, however, that poor flushes dominated by soft rush often naturally occur in mosaic with these habitats. Discrete areas of this separate habitat should not be considered here. The target is for the cover of soft rush to be less than 10%.

Potential dominant species

For 7130 Blanket bogs (* if active bog), 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 (*Trichophorum germanicum*). The target is for cover of each of the potential dominant species to be less than 75%.

Dwarf shrub cover

A dwarf shrub layer is characteristic of 4010 Wet heaths, but the vegetation should be a mixture of dwarf shrub and graminoid species with higher cover of dwarf shrubs being potentially indicative of drainage. A maximum target of 75% is therefore set.

5.4 Vegetation structure

Vegetation structure is assessed through a number of attributes tailored to each of the 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 the heath habitats (4010 and 4060) and 7130 Blanket bogs (* if active bog) is for less than 33% of shoots to show signs of browsing. An additional assessment of grazing of live leaves of specific graminoids is made for 4060 Alpine and Boreal heaths. The specific graminoids are stiff sedge (*Carex bigelowii*), wavy hair-grass (*Deschampsia flexuosa*), sheep's-fescue (*Festuca ovina*) and viviparous sheep's-fescue (*Festuca vivipara*). High levels of grazing of these species in 4060 Alpine and Boreal heaths would be undesirable as grazing is not required to maintain this habitat. The target for 4060 is that less than 10% of the live leaves of specific graminoids collectively show signs of grazing. Grazing levels for 7140 Transition mires are assessed through vegetation height (see Section 5.4.4).

5.4.2 Burning

Fires can be part of the natural cycle of heaths and may, under carefully controlled circumstances, be used as an occasional management tool to promote regeneration of, or diversity of growth phases, in ling (*Calluna vulgaris*). However, currently most hill fires in Ireland are intentionally started to encourage grass growth for livestock. Fires that are too intense, too frequent, too extensive or which occur in sensitive areas are damaging to habitats. An assessment of burning is made for the heath habitats (4010 and 4060) and 7130 Blanket bogs (* if active bog). Habitat-specific lists of sensitive areas where burning should not occur are presented in Perrin *et al.* (2014).

4010 Wet heaths and 7130 Blanket bogs (* if active bog) have the same targets relating to there being no signs 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. The target for 4060 Alpine and Boreal heaths, which does not require burning for the maintenance of the habitat, is for there to be no signs of burning within the habitat.

5.4.3 Sphagnum condition

Disturbance to *Sphagnum* is assessed for habitats 4010 Wet heaths and 7130 Blanket bogs (* if active bog). High levels of disturbed *Sphagnum* would indicate undesirable levels of grazers. For both habitats, the target is for less than 10% of the *Sphagnum* cover to be crushed, broken and/or pulled up.

5.4.4 Vegetation height

Vegetation height is used as an indication of grazing intensity for 7140 Transition mires. The 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%. Vegetation heights lower than these would indicate undesirable levels of grazing.

5.5 Physical structure

The physical structure of the 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 habitats comprise disturbed bare ground, drainage and erosion; these are detailed below.

5.5.1 Disturbed bare ground

This attribute is common to all blanket bog and associated habitats listed as Qualifying Interests for Owenduff/Nepin Complex SAC. 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 for each habitat 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 4010 Wet heaths, 7130 Blanket bogs (* if active bog) and 7140 Transition mires. For each

habitat, 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 bog) as it 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 is that 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

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 the habitat. The target is for no decline in distribution or population sizes of rare, threatened or scarce species associated with the particular habitat.

The Flora (Protection) Order, 2015 (FPO; Statutory Instrument No. 356 of 2015) listed and *Vulnerable* marsh clubmoss (*Lycopodiella inundata*) (Wyse Jackson *et al.*, 2016) is present within the SAC (NPWS, 2006), but cannot be assigned specifically to 4010 Wet heaths.

The *Near Threatened* Alpine clubmoss (*Diphasiastrum alpinum*) (Wyse Jackson *et al.*, 2016) was recorded from the Nephin Beg Range by Praeger (NPWS, 2006) and is known to be associated with 4060 Alpine and Boreal heath.

Several rare and threatened species are present in blanket bog flushes including the EU Habitats Directive Annex II and Annex IV listed, FPO and *Near Threatened* marsh saxifrage (*Saxifraga hirculus*), marsh clubmoss, the FPO and *Near Threatened* bog orchid (*Hammarbya paludosa*) (Wyse Jackson *et al.*, 2016), the Annex II listed, FPO and *Near Threatened* slender green feather-moss (*Hamatocaulis Drepanocladus vernicosus*) and the *Vulnerable* (Lockhart *et al.*, 2012) moss *Tomentypnum nitens* (NPWS, 2006; Campbell *et al.*, 2015; Muldoon *et al.*, 2015; NPWS internal files). Although some of these species cannot be assigned specifically to 7130 Blanket bogs (* if active bog) (i.e. they may be flush/fen species), or to 7140 Transition mires, they do occur in association with the habitats. Marsh saxifrage and slender green feather-moss are Qualifying Interest species for Owenduff/Nephin Complex SAC.

The *Near Threatened* brown beak-sedge (*Rhynchospora fusca*) (Wyse Jackson *et al.*, 2016) is also present within the SAC (NPWS, 2006), but cannot be assigned specifically to 7130 Blanket bogs (* if active bog) or to 7140 Transition mires.

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 the habitat in question.

6 References

- Barron, S.J. & Perrin, P.M. (2014) National Survey of Upland Habitats (Phase 4, 2013-2014) – Summary report. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Campbell, C., Hodgetts, N. & Lockhart, N. (2015) Monitoring methods for *Hamatocaulis vernicosus* Mitt. Hedenäs (Slender Green feather-moss) in the Republic of Ireland. Irish Wildlife Manuals, No. 91. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.
- Conaghan, J. (ed.) (2000) Distribution, ecology and conservation of blanket bogs in Ireland. A synthesis of the reports of the blanket bog surveys carried out between 1987 and 1991 by the National Parks and Wildlife Service. Unpublished report to National Parks and Wildlife Service.
- Douglas, C., Garvey, L., Kelly, L., O'Sullivan, A. & Van Doorslaer, L. (1989) A Survey to Locate Blanket Bogs of Scientific Interest in County Mayo. Unpublished report to the Wildlife Service, Dublin.
- European Commission (2013) Interpretation manual of European Union habitats EUR 28. European Commission, DG Environment.
- Foss, P.J. & McGee, E. (1987) A Survey to Locate Blanket Bogs of Scientific Interest in County Mayo. Unpublished report to the Wildlife Service, Dublin.
- Fossitt, J.A. (2000) A guide to habitats in Ireland. The Heritage Council, Kilkenny.
- JNCC (2009) Common Standards Monitoring guidance for upland habitats. JNCC, Peterborough, UK.
- Lockhart, N., Hodgetts, N. & Holyoak, D. (2012) Ireland Red List No. 8: Bryophytes. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Muldoon, C.S., Waldren, S. & Lynn, D. (2015) Monitoring recommendations for Marsh Saxifrage (*Saxifraga hirculus* L.) in the Republic of Ireland. Irish Wildlife Manuals, No. 88. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.
- NPWS (2006) National Parks and Wildlife Service Conservation Plan for 2006–2011. Owenduff/Nephrin Complex cSAC & SPA Site Codes 000534 & 004098 Co. Mayo. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.
- NPWS (2013) The status of EU protected habitats and species in Ireland. Vol. 2. Habitat assessments. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Perrin, P.M., O'Hanrahan, B., Roche, J.R. & Barron, S.J. (2009) Scoping Study and Pilot Survey for a National Survey and Conservation Assessment of Upland Vegetation and Habitats in Ireland. Unpublished report to National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B. (2014) Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 79. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016) Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.