

# Ecological Value and Condition of Ireland's Uplands



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# Definitions

- Sub-montane - land between 300m and 600m
- Montane\* - land above 600m
- NSUH – unenclosed land above 150m and associated lowland peatlands (western seaboard has extensive unenclosed lowland blanket bog and associated peatlands)
- c. 14% RoI land area >150m



## **Some of the Montane\* peaks**

- Carrauntoohill 1039m (highest)
- Lugnaquilla 925m highest in Leinster
- Galtymore 918m (highest inland)
- Mweelrea 814m (highest in Connaught)
- Comeragh Mts 792m (see image)
- Mangerton 782m
- Croagh Patrick 764m
- Kippure 757m
- Croaghnaun (Achill) 688m

# Range of Variation

- Geography
- Geology
- Soil cover
- Altitude
- Geomorphology
- Distance from sea/oceanicity
- Slopes
- Aspect (microclimate)
- Climate/microclimate (temp/rainfall/humidity)
- Habitats/vegetation



# Range of Upland and associated Habitats

## **Main Fossitt (2000) habitats of Irish uplands**

FL1 Dystrophic lakes  
FL2 Acid oligotrophic lakes  
PB2 Upland blanket bog  
PB3 Lowland blanket bog  
PB4 Cutover bog  
PB5 Eroding blanket bog  
GS3 Dry humid grassland  
GS4 Wet grassland  
PF1 Rich fen and flush  
PF2 Poor fen and flush  
PF3 Transition mire and quaking bog  
HH1 Dry siliceous heath  
HH3 Wet heath Exposed rock  
HH4 Montane heath  
ER1 Exposed siliceous rock  
HD1 Dense bracken  
ER2 Exposed calcareous rock  
Woodland  
ER3 Siliceous scree and loose rock  
WD4 Conifer plantation  
ER4 Calcareous scree and loose rock

## **Annex I Habitats for which condition assessments undertaken in NPWS National Survey of Upland Habitats (NSUH)**

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 bog (\*if active bog)  
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 (*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  
8220 Siliceous rocky slopes with chasmophytic vegetation.

**(not assessed in the NSUH Woodlands/ Lakes/Grasslands/ Petrifying Springs/Cladium fens/Limestone Pavements)**

# Elements of the flora

- Montane (Arctic/Alpine)
- Dwarf shrubs
- Sedges/bog cottons/flowering plants/grasses/ferns
- Bryophytes (mosses including the key *Sphagnum* group and liverworts)
- Lichens (Cladonia group)
- Communities of large leafy liverworts (hepatic mat)
- Habitats Directive Annex II flora
- Wildlife Act Protected flora
- Insectivorous plants (Sundews/Butterworts/Bladderworts)
- Boreal species/Boreal relict species



- Lusitanian species on our heaths and bogs. They have a disjunct distribution (mostly absent Britain but found in northern Spain and Portugal and southern and western Ireland) e.g.
- St Daboeoc's Heath (*Daboecia cantabrica*);
- Mediterranean Heath now called Irish Heath (*Erica erigena*);
- Mackay's Heath (*Erica mackiana*);
- Lusitanian Butterwort *Pinguicula lusitanica*;
- Large-flowered Butterwort (*Pinguicula grandiflora*);
- St. Patrick's Cabbage (*Saxifraga spathularis*);
- Kerry Lily (*Simethis mattiazzii*)

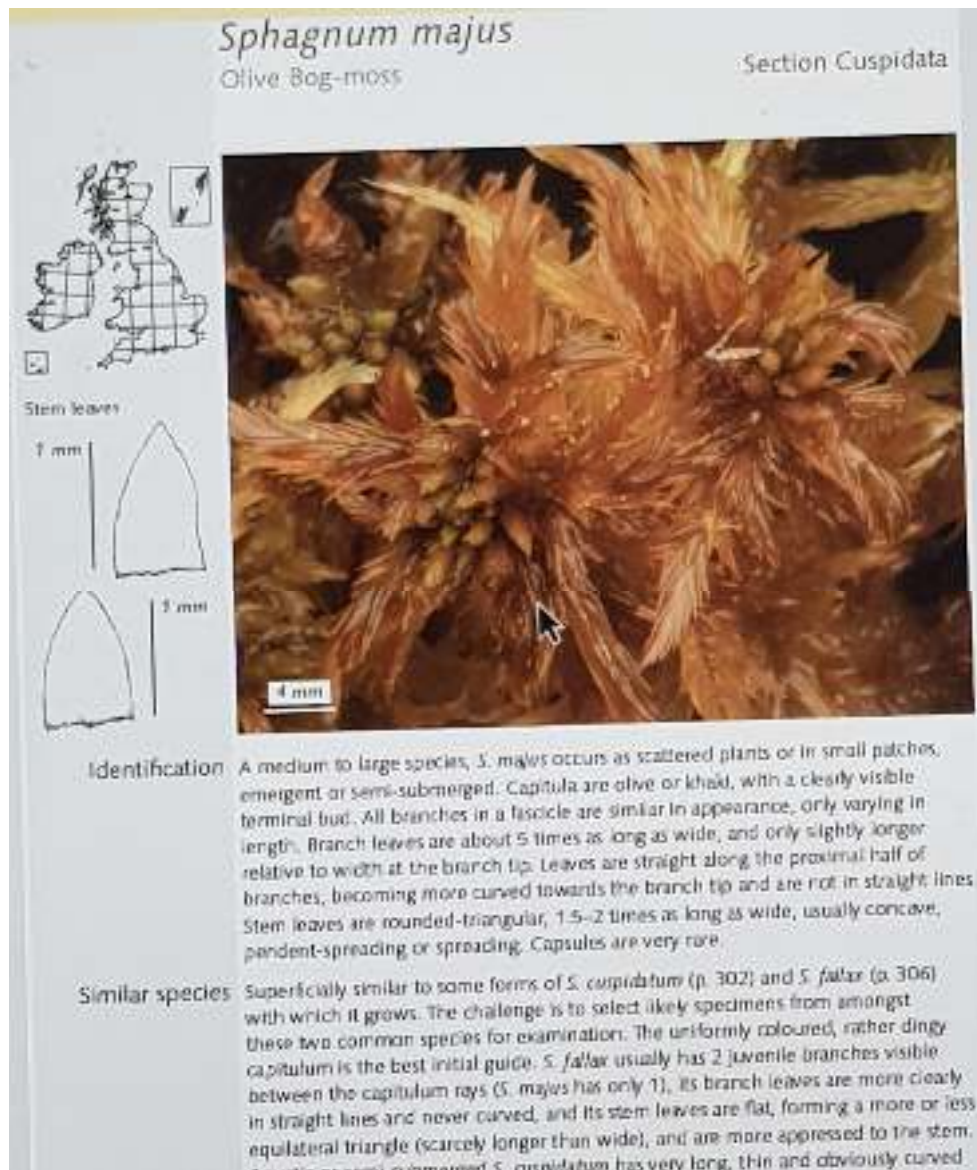


# Large Leafy Liverworts – hepatic mat

In contrast to montane areas of England and Wales Irish mountain share much of the oceanic element of Scottish montane vegetation including high abundance of moss *Racomitrium lanuginosum* and the presence of mixed northern hepatic mat a very localised vegetation of large leafy liverworts of N and E mountain facing slopes (Hodd and Skeffington, 2011a)

- Image shows North Atlantic hepatic mat (large leafy liverwort )community with *Herbertus aduncus*, *Scapania gracilis* and *Pleurozia purpurea*, Ben Gorm (Photo: BEC Consultants).





- New record for Ireland of *Sphagnum majus* from the Slieve Aughty Mountains, Co. Galway
- (a northern species occurring throughout the boreal zone to the edge of the tundra but rare in central Europe - ).

(Recorded by Dr Rory Hodd during the NSUH in 2020! Great credit to Rory!)

# Protected flora of blanket bogs, flushes and lake margins in lowland blanket bogs

## Flora Protection Order

- *Deschampsia setacea* – bare muddy margins along oligotrophic lakes
- Slender Cottongrass (*Eriophorum gracile*) – moderately base rich flushes and lake margins
- *Lycopodiella inundata* – bog pools and the swampy margins of oligotrophic lakes margins of stream and lakes in peatland areas
- *Hypericum canadense* – margins of stream and lakes in peatland areas

## Annex II species

- Marsh Saxifrage (*Saxifraga hirculus*) – base rich fens
- Shining Sickle Moss (*Hamatocaulis vernicosus*) – slightly base enriched flushes
- Slender Naiad (*Najas flexilis*) in lakes in peatland areas

## \*Boreal relict species (Base rich flushes) – unique systems (Mayo and Galway)

- *Paludella squarrosa* – base rich flushes and fens
- *Leiocolea ruthiana* – base rich flushes and fens
- *Tomentypnum nitens* – base rich flushes. A scarce and declining species of calcareous fens, usually those which are rich in sedges (*Carex* species) and brown mosses such as *Campylium* and *Scorpidium*. It is very rare in southern Britain, but remains tolerably frequent in upland mires in the central Scottish Highlands, and in the Borders and northern England, where it tends to grow where flushes spread onto flatter ground.
- *Meesia triquetra* – base rich flushes (another marvellous discovery as this species was believed to be extinct in Ireland: great credit due to Caoimhe Muldoon (RIP) and Rory Hodd)

(\*may be relict of early post-glacial period)

# Mweelrea/Sheeffry/Erriff Complex SAC

Hydrophilous tall herb community with Meadowsweet (*Filipendula ulmaria*), Meadow Buttercup (*Ranunculus acris*), Roseroot (*Sedum rosea*) and Devil's-bit Scabious (*Succisa pratensis*), Mweelrea Mountains (Photo: BEC Consultants).

Rocky cleft in siliceous rocky slope with St Patrick's-cabbage (*Saxifraga spathularis*), Mweelrea Mountains (Photo: BEC Consultants).

Alpine Clubmoss (*Diphasiastrum alpinum*), near summit of Ben Gorm (Photo: BEC Consultants).



# Fauna

## MWSE

Faunal records from during NSUH include

Common Frog (*Rana temporaria*),

Common Lizard (*Lacerta vivipara*),

Irish Hares (*Lepus timidus* subsp. *hibernicus*),

Fox (*Vulpes vulpes*),

Badger (*Meles meles*),

Rabbit (*Oryctolagus cuniculus*),

Dipper (*Cinclus cinclus* subsp. *hibernicus*),

Red Grouse (*Lagopus lagopus*),

Mountain Pipit (*Anthus pratensis*),

Swallow (*Hirundo rustica*),

Siskin (*Carduelis spinus*),

Golden Plover (*Pluvialis apricaria*),

Kestrel (*Falco tinnunculus*)

Raven (*Corvus corax*).

Previous records include:

Otter (*Lutra lutra*),

Freshwater Pearl Mussel (*Margaritifera margaritifera*),

Atlantic Salmon (*Salmo salar*),

Narrow-mouthed Whorl Snail (*Vertigo angustior*)

Cover's Whorl Snail (*V. geyeri*), all of the above are listed on Annex II of the EU Habitats Directive.

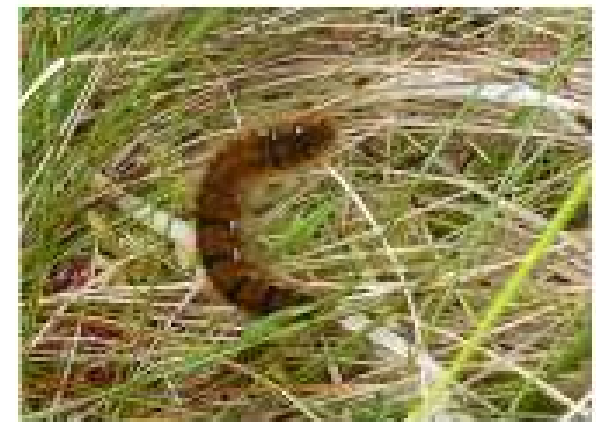
Chough (*Pyrrhocorax pyrrhocorax*), listed on Annex I of the Birds Directive, also previously been noted onsite.

Arctic Charr (*Salvelinus alpinus*), listed as Vulnerable by Whilde (1993), also been recorded from the cSAC.

Greenland White-fronted Goose (*Anser albifrons flavicollis*), listed on Annex I of the Birds Directive, known to utilise bog and wet grassland within the site but their numbers have declined substantially in recent decades.

Martin (*Falco columbarius*), listed on Annex I of the Birds Directive, also previously been noted.

Peregrine (*Falco peregrinus*), listed on Annex I of the Birds Directive, also previously been noted.



# National Survey of Upland Habitat Objectives and Data

To classify and map the location and area of upland habitats within a range of upland sites using standard schemes (Fossitt, 2000) and Annex I habitat classes of the EU Habitats Directive)

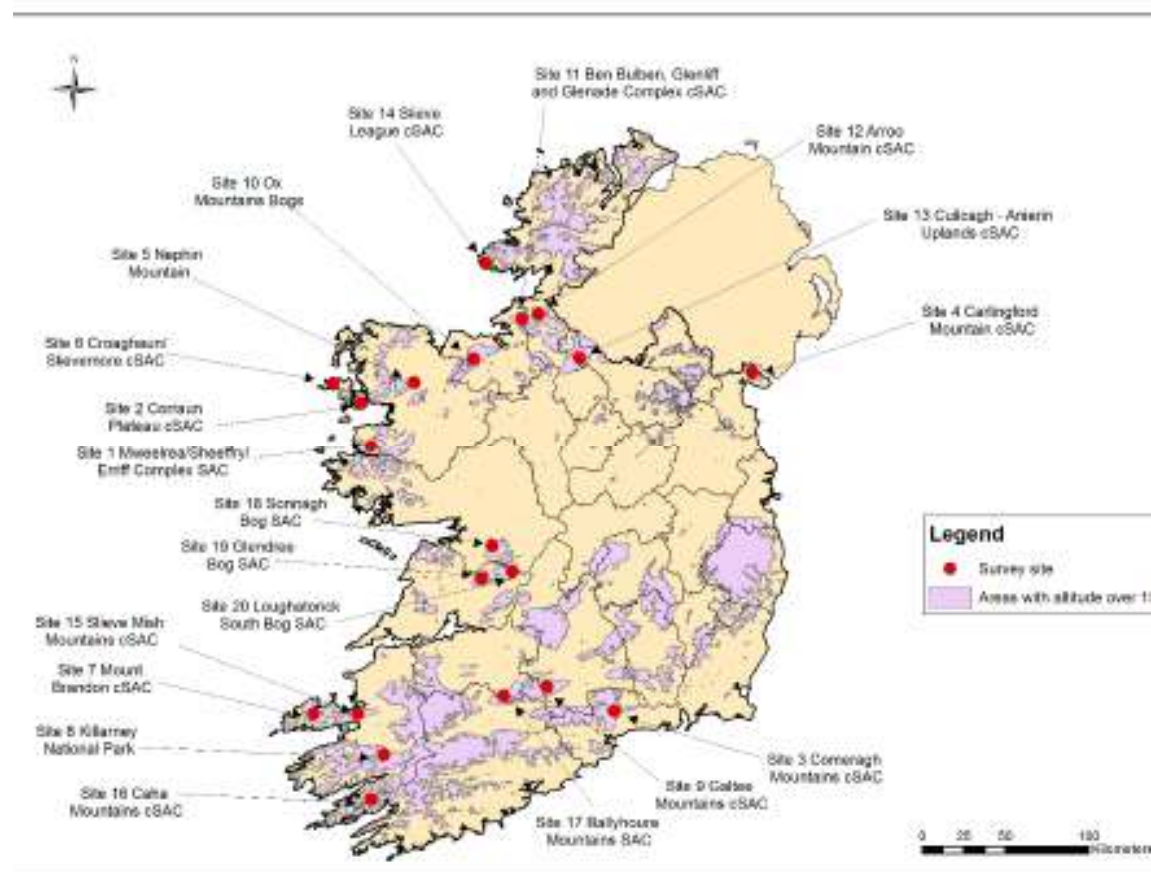
To assess the conservation status of a suite of upland and associated lowland Annex I habitats and to improve knowledge on the plant communities and flora that make up the habitats.

Methodologies devised during a scoping study and pilot survey of upland habitats (Perrin *et al.*, 2009 presented in the Irish Wildlife Manual No. 48 (Perrin *et al.*, 2010) however revised survey guidelines were presented in Irish Wildlife Manual No. 79 (Perrin *et al.*, 2014). Additional data recorded in NSUH survey 2020 and in 2022 survey (Slieve Bloom Mts SAC).

- The conservation assessment procedure involves evaluation of habitat condition indicators at a network of monitoring stops (point samples) distributed across the range of these habitats at the surveyed sites. The data provides a scientific baseline for monitoring and reporting of site habitat condition and reporting into the future.
- The data also provide a scientific basis to inform policies and strategies for the maintenance (or restoration) of favourable conservation status of upland Annex I habitats.
- Selected sites have to date largely comprised upland Special Areas of Conservation (SACs) though reporting on the national resource of National habitat is required under Hab. Dir. Art 17 reporting to the EU Commission on conservation status of Annex habitats.

## Distribution of sites surveyed through the National Survey of Upland Habitats and (shading shows areas above 150m alt)

1. Mweelrea/Sheefry/Erriff Complex SAC
2. Corraun Plateau SAC
3. Comeragh Mts SAC
4. Carlingford Mt SAC
5. Nephin Mt (not designated)
6. Croaghaura/Slievemore SAC
7. Mount Brandon SAC
8. Killarney Nat. Park (plots only)
9. Galtee Mts SAC
10. Ox Mt Bogs SAC
11. Ben Bulbin, Gleniff & Glenade SAC
12. Arroo Mt SAC
13. Culcagh-Anierin Uplands SAC
14. Slieve League SAC
15. Slieve Mish SAC
16. Caha Mts SAC
17. Ballyhoura Mts SAC
18. Sonnagh Bog SAC
19. Glendree Bog SAC
20. Loughatorick South Bog SAC



# Condition Assessment of Upland Annex I Habitats

## Range/Area/Structure and Function/ Impacts/ Threats/ Trends/ Future Prospects assessed for Art 17 reporting

- Losses in Range and/or Area of habitats are assessed;
- At site level a stratified random suite of baseline plots (2mx2m) per Annex habitat is assessed
- Record species (for blanket bog would expect characteristic blanket bog species groups: dwarf shrubs/cyperaceous species/flowering plants/bryophytes and lichens).
- Vegetation structure is assessed (dwarf shrubs/sward layer /moss lawns or hummocks/lichens etc)
- Physical factors such as exposed peat are assessed

(See full list of assessment criteria in Irish Wildlife Manual No. 79 on npws.ie)

## Data to help identify plant communities that may indicate priority Annex I habitat **Active** (peat-forming) blanket bog

- Total% Cover of Sphagnum species (new)
- Characteristic microtopography (lawns/hummocks/hollows) (new)
- Acrotelm thickness (upper fibrous living layer) (new)
- Add (4m x 4m to capture bog microtopography)
- **Active** bogs have priority status under the Habitats Directive. The term "active" must be taken to mean still supporting a significant area of vegetation that is normally peat-forming.

# Plots

All assessment indicators need to pass for a stop to pass.

The indicators were adapted from the UK's Common Standards Monitoring (JNCC 2009).

Where NSUH sites included commonage land, comparisons were made between NSUH and Commonage Framework Plan sub-unit assessment and the 10mx10m station survey data (from c. 2000) with respect to shared indicators (area of bare peat, cover and height of Ling heather (*Calluna vulgaris*), and sward height). This gave some indication of trends in condition since that survey for heath and blanket bog in commonages.

Baseline Sample Plot 2m x 2 m



# NSUH Sites and Annex 1 Habitats/Monitoring Plots)

| Annex I code | Habitat                                     | Mweelrea | Corraun | Comeraghs | Carlingford | Nephin | Croaghnaun | Brandon | Killarney | Galtees | Ox | Ben Bulbin | Arroo | Cuillcagh | Slieve League | Slieve Mish | 16. Caha | 17. Ballyhouras | 18. Sonnagh | 19. Glendree | 20. Loughatorick | Total |
|--------------|---------------------------------------------|----------|---------|-----------|-------------|--------|------------|---------|-----------|---------|----|------------|-------|-----------|---------------|-------------|----------|-----------------|-------------|--------------|------------------|-------|
| 4010         | Wet heath                                   | 35       | 15      | 4         | 4           | 13     | 4          | 25      | 28        | 11      | 11 | 0          | 5     | 2         | 6             | 35          | 23       | 12              | 8           | 11           | 18               | 270   |
| 4030         | Dry heath                                   | 11       | 4       | 9         | 10          | 4      | 9          | 18      | 9         | 25      | 7  | 7          | 6     | 12        | 8             | 12          | 4        | 8               | 1           | 0            | 2                | 166   |
| 4060         | Alpine and Boreal heath                     | 9        | 16      | 4         | 2           | 6      | 4          | 10      | 3         | 4       | 1  | 5          | 4     | 5         | 5             | 9           | 2        | 1               | 0           | 0            | 0                | 90    |
| *6230        | Species-rich <i>Nardus</i> upland grassland | 5        | 1       | 1         | 1           | 1      | 1          | 3       | 0         | 0       | 2  | 0          | 0     | 1         | 1             | 2           | 2        | 0               | 0           | 0            | 0                | 21    |
| *7130/7130   | Blanket bog                                 | 39       | 13      | 10        | 4           | 8      | 10         | 18      | 13        | 15      | 46 | 12         | 11    | 39        | 9             | 17          | 12       | 6               | 14          | 9            | 6                | 311   |
| 7140         | Transition mires                            | 3        | 0       | 0         | 0           | 0      | 0          | 2       | 0         | 0       | 4  | 1          | 1     | 4         | 1             | 2           | 2        | 1               | 1           | 2            | 3                | 27    |
| 7150         | <i>Rhynchosporion</i> depressions           | 16       | 2       | 0         | 0           | 0      | 0          | 2       | 4         | 0       | 4  | 0          | 1     | 1         | 1             | 0           | 2        | 0               | 0           | 0            | 1                | 34    |
| 7230         | Alkaline fen                                | 9        | 0       | 0         | 0           | 1      | 0          | 2       | 1         | 2       | 4  | 2          | 2     | 2         | 1             | 1           | 1        | 0               | 1           | 1            | 2                | 32    |
| 8110         | Siliceous scree                             | 10       | 1       | 4         | 1           | 2      | 4          | 9       | 4         | 3       | 2  | 2          | 1     | 4         | 3             | 5           | 3        | 0               | 0           | 1            | 0                | 59    |
| 8120         | Calcareous scree                            | 0        | 0       | 0         | 0           | 0      | 0          | 0       | 0         | 0       | 0  | 8          | 3     | 0         | 1             | 0           | 0        | 0               | 0           | 0            | 0                | 12    |
| 8210         | Calcareous rocky slopes                     | 1        | 0       | 1         | 0           | 0      | 1          | 1       | 0         | 3       | 2  | 11         | 4     | 0         | 1             | 4           | 3        | 0               | 0           | 1            | 1                | 34    |
| 8220         | Siliceous rocky slopes                      | 8        | 0       | 0         | 3           | 2      | 0          | 8       | 3         | 3       | 3  | 0          | 0     | 5         | 2             | 5           | 3        | 2               | 0           | 1            | 1                | 49    |
|              | Total                                       | 146      | 52      | 33        | 25          | 37     | 33         | 98      | 65        | 66      | 86 | 48         | 38    | 75        | 39            | 92          | 57       | 30              | 25          | 26           | 34               | 1105  |

# Area, Structure and Function, Future Prospects, Overall Assessment

Summary of conservation status assessments for Annex I habitats in the Comeragh Mountains cSAC.

| Annex I code | Habitat                              | Area                      | Structure and functions | Future prospects          | Overall assessment |
|--------------|--------------------------------------|---------------------------|-------------------------|---------------------------|--------------------|
| 4010         | Wet heath                            | Unfavourable - Inadequate | Unfavourable - Bad      | Unfavourable - Inadequate | Unfavourable - Bad |
| 4030         | Dry heath                            | Unfavourable - Inadequate | Unfavourable - Bad      | Unfavourable - Bad        | Unfavourable - Bad |
| 4060         | Alpine and Boreal heath              | Favourable                | Unfavourable - Bad      | Favourable                | Unfavourable - Bad |
| *6230        | Species-rich <i>Nardus</i> grassland | Favourable                | Unfavourable - Bad      | Favourable                | Unfavourable - Bad |
| *7130/7130   | Blanket bog                          | Unfavourable - Inadequate | Unfavourable - Bad      | Unfavourable - Bad        | Unfavourable - Bad |
| 8110         | Siliceous scree                      | Favourable                | Unfavourable - Bad      | Favourable                | Unfavourable - Bad |
| 8210         | Calcareous rocky slopes              | Favourable                | Unfavourable - Bad      | Favourable                | Unfavourable - Bad |
| 8220         | Siliceous rocky slopes               | Unfavourable - Inadequate | Unfavourable - Bad      | Favourable                | Unfavourable - Bad |

# Stock impacts on Wet heath

- Blanket bog and associated peatland habitats are prone to erosion where levels of grazing or trampling by stock (usually sheep or deer) are excessive, or where burning or other disturbance of the bog vegetation cover has occurred.
- Intensive grazing or overgrazing by livestock can lead to erosion and damage to the vegetation of the wet heath habitat.
- Perrin *et al.* (2014a, 2014b) recorded overgrazing with 21.9% and 11.8% of wet heath habitat failing respectively due to excessive levels of grazing. This was retained as high-importance pressure for the 2013 to 2019 reporting period.
- *Nardus stricta* being unpalatable spreads on heavily grazed blanket bog and wet heaths
- Meadow Pipit nest needing vegetation cover –this nest was exposed by fire (Cuilcagh /Anierin SAC Uplands)



# Grazing pressure (and forestry plantations) affect vegetation/soils and water quality and flows

Degradation of blanket bog due to livestock, Lugaloughan in Mweelrea/Sheefry/Errif Complex SAC. Eroding peat is visible (NSUH 2010).

In the middle distance the bog to the left of the fenceline that meets the edge of the forestry is visibly more impacted than the land to the east of the fence.

Species-poor *Nardus* grassland occurs in the foreground (Photo: BEC Consultants, 2010).

Results -based agri-environment schemes in Wild Atlantic Nature LIFE Project will seek to reward appropriate management on such sites and monitor response of the vegetation cover.



# Burning of Vegetation

## e.g. wet heath

- Uncontrolled burning can be particularly damaging to the bryophyte layer within wet heath habitat, and can result in peat erosion, desiccation of the habitat and loss of dwarf shrubs which can result in succession to grassland habitats (Hampton 2008). In some cases, the dwarf shrubs may become dominant again, but this can take 15-20 years or more or may not occur with too frequent or severe burning (Glaves *et al.* 2013). Burning of vegetation was recorded within wet heath habitat in the Slieve Mish Mountains SAC (002185) (9.8% of 4010 habitat) (Perrin *et al.* 2014a), Caha Mountains SAC (000093) (2.3% of 4010 habitat) (Perrin *et al.* 2014b), as well as within wet heath habitat in the Blackstairs Mountains (Tubridy *et al.* 2015).
- It is estimated that approximately 0.8% (12.4 km<sup>2</sup>) of the national wet heath habitat area was burnt in the Spring of 2017 (using NPWS\_Approx\_Wildfire\_Locations\_Polygon\_2017.shp in conjunction with the 4010 distribution polygon shapefile).
- In addition to this, the Joint Research Centre (JRC) of the European Commission provides information on fires in the pan-European region via the European Forest Fire Information System (EFFIS). Through its series of technical reports, it has been estimated that over 10,000 ha of open land in Ireland have been affected by fire in 2013, less than 5,000 ha of open land in 2014, approximately 10,000 ha of open land in 2015 and approximately 5,000 ha of open land in 2016 (JRC 2014, 2015, 2016, 2017 respectively), with the majority of fires taking place in upland habitats (JRC 2015), which would include wet heath habitat.



# Drainage and peat cutting



# Drains plus 'Sausage' Machine effects in blanket Bog WMNP

Rewetting of such drained and 'sliced' blanket bog may be difficult due to the series of deep cuts that may still act as conduits for escape of bog water leaving the bog surface desiccated.

Risk of peat failure may possibly be high if drains are blocked as water pressure may build and destabilise the peat mass which is already weakened by the series of closely spaced cuts.

Peat failures have occurred in areas cut in this way (and other factors). Research project on possible contributory factors to 3 major landslides has been commissioned (GSI and NPWS).

(Smaller image is a successfully restored bog blanket in WMNP bog that was on flat terrain and not sausage machine cut)



# Legislation, Policies, Strategies, Plans

- EU Habitats and Birds Directives (Natura 2000 sites)
- EU Water Framework Directive- river basin catchment
- Ireland's Wildlife Acts and Amendments including Flora Protection Orders and Amendments (NHAs)
- Ireland's SAC and SPA Regulations
- Invasive Species EU Regulation (action and 6 - yearly reporting required)
- UN Convention on Biological Diversity (Dec 2022 COP15 will set new goals to 2040)
- UN Framework Convention on Climate Change
- Paris Agreement - sets out a global framework to avoid dangerous climate change by limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C. It also aims to strengthen countries' ability to deal with the impacts of climate change and support them in their efforts. It is the first-ever universal, legally binding global climate change agreement, adopted at the Paris climate conference (COP21) in December 2015.
- UN Climate Change Conference COP26 Glasgow 2021 (Irish Peatland Gathering) – countries pledged to meet again this year to pledge further cuts in GHG emissions.
- EU Biodiversity Strategy for 2030- Through concrete commitments and actions, the plan is for EU countries to put in place effective
- restoration measures to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. As part of this plan, the Commission proposed the EU's first ever Nature Restoration Law which includes an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas, with binding restoration targets for specific habitats and species in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters
- European Green Deal - The European Commission adopted a set of proposals to make the EU's climate, energy, transport and taxation policies fit for reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels.
- National Biodiversity Action Plan (for public consultation later in 2022 the 4th National Biodiversity Action Plan will set the national biodiversity agenda for the period 2023-2027)
- Climate Act and Low Carbon Development (Amendment Act) 2021 and Climate Action Plan
- Ireland's National Peatland Strategy 2015 (public consultation on the mid-term review recently completed). This Strategy will guide the Government's approach to peatlands management and conservation in the future, taking into account current and potential uses of this key resource.
- IPBES (Intergovernmental Panel on Biodiversity and Ecosystem Services) – assesses available knowledge and gathers data.
- Ireland's Prioritised Action Framework (npws website) – the financing - including the co-financing - necessary to maintain or restore protected habitats and species listed in the EU Nature Directives. This is reflected in Prioritised Action Frameworks, which in turn are to have regard to the available sources of funding under relevant EU funding instruments.

# Peatlands, Carbon and Climate

- Blanket bog is a rare peatland type and Ireland possesses 8% of the global blanket bog resource and with Scotland is the most important country in Europe for this habitat; and since UK has left the EU Ireland holds the bulk of the EU resource of blanket bog.
- ;
- Peatlands including blanket bog have a unique capacity to fix and store carbon (C) in accumulating peat;
- Although peatland cover only 3% of the earth's lands they are responsible for more than 30% of worldwide carbon storage;
- This capacity however depends on maintenance of a stable high water table (i.e. at no more than 5 to 10 cm below the bog surface for at least 90% of the time) as low water allows air infiltration and hence microbial decomposition which releases carbon as carbon dioxide.
- Other GHGs such as CH<sub>4</sub> can increase when bogs rewetted (but shorter time in atmosphere)
- Increased export of peat from degraded bogs as silt and DOC entering streams impacting water quality as well as climate



# Restoration of Peatlands - Multiple Benefits

Investment in peatland restoration is needed now, securing the benefits they provide for climate change, water and biodiversity and avoiding the costly consequences of their deterioration.

The United Nations General Assembly, in a resolution of 1 March 2019, proclaimed 2021–2030 [the UN decade on ecosystem restoration](#), with the aim of supporting and scaling-up efforts to prevent, halt and reverse the degradation of ecosystems worldwide and raise awareness of the importance of ecosystem restoration.

The EU Biodiversity Strategy for 2030 aims to ensure that Europe's biodiversity will be put on the path to recovery by 2030 for the benefits of people, the planet, the climate and our economy. It sets out an ambitious EU nature restoration plan with a number of key commitments, including a commitment to put forward a proposal for legally binding EU nature restoration targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon, and to prevent and reduce the impact of natural disasters.

Peatlands are the largest terrestrial stores of carbon and a record of time. However are highly vulnerable to degradation and ecological transformation associated with human induced pressures including climate change. Peatland degradation has negative impacts on water quality and on water and volumes reaching streams and lowlands exacerbating flooding. Recovered bog vegetation structure can retard the rate of surface run-off after rainfall and may delay flood peaks.

It is estimated that at least 25% of the world's peatlands have been damaged or lost, with the scale of deterioration most notable in Western Europe (~ 90%). In European countries with significant peatland cover (> ~ 10%), such as Ireland, Britain, the Netherlands and Germany, peatlands are a significant sources of CO<sub>2</sub>, with European emissions estimated at ~ 5%. In Ireland peatlands are estimated to store 1085 Mega tonnes (Mt) of carbon, this corresponds to 53% of all soil carbon stored in the island of Ireland on just 16% of the land area. Successfully restored and rehabilitated peatlands not only prevent this carbon from being released but has the potential to increase its storage capacity.

Restoring the natural hydrology of the SAC would increase habitat resilience to pressures such as burning and non-native species, as well as increasing resilience to climate-related events, such as droughts or extreme rainfall events.

The close link between climate and nature has been acknowledged in EU-level goals to focus ecosystem restoration efforts on areas with high carbon sequestration potential, as the only actual proven scalable method for carbon removal from the atmosphere. Reducing emissions from land and reversing the situation to one of carbon sequestration is a key element of EUs net zero strategy. Peatlands have a separate mention in the new proposal for an EU Nature Restoration Law.

**UK IUCN Peatland programme: 'We need to promote peatland restoration and the multiple benefits of peatlands through partnerships, strong science, sound policy and effective practice.'**

(Nature-based Solutions measures must however not be used as a screen to delay the rapid phase out of fossil fuel use /it must not delay urgent action to decarbonise our economies (Climate Change COP26 Glasgow).

# Blanket bog Restoration

- Usually needs lead in studies to characterise the ecology and hydrology of the site
- Proofs of efficacy is essential for many reasons including to justify cost invested and suitability of methods used etc;
- If the hydrology is successfully restored the vegetation will generally recover
- The restoration unit should be catchment as the bog restoration is essentially about the appropriate management of water/hydrology in tandem with ecological understanding
- Challenge to upscale restoration as a range of skills are needed (ecology/ hydrology/ geotechnical/machine operation etc)
- Capacity building is necessary as is working in partnership across disciplines and with all stakeholders
- Sites of high biodiversity value but threatened by impacting activity should be prioritised so as not to lose key species/genetic resources. This will benefit not only biodiversity but also climate, water, soil, socio-economic welfare etc.
- Research on blanket bog ecohydrology is required on a range of blanket representative sites (site variation is significant as site are impacted in different ways) to inform restoration science on blanket bogs and hydrologically linked fens, mires, heaths, aquatic systems etc.

# Examples of funding for restoration of peatlands in Ireland

- “The European Investment Bank, the EU’s climate bank, is committed to supporting investment to improve resilience to a changing and more extreme climate. Restoring degraded bogs is crucial to revitalising nature and improving resilience to a changing climate. Beautiful peat habitats across Ireland are vitally important for biodiversity and provide important carbon stores and sinks.” said Christian Kettel-Thomsen, European Investment Bank Vice President.
- National Parks and Wildlife Service and European Investment Bank strengthen support to rehabilitate Irish peatlands (Date Released: Friday, July 1, 2022) and propose technical cooperation to scale up rehabilitation of peatlands with nationwide engagement and strengthened monitoring. The cooperation will further develop the Peatland Finance Ireland initiative, investing in nature and local development This is a new initiative to support the restoration of peatlands and address the climate and biodiversity impact of landscapes degraded by drainage and abstraction.
- **Projects that benefitted blanket bogs:**
  - EU LIFE Project funding (Coillte LIFE project 2003/04) – recovery of afforested blanket bog – NPWS technical advisory role.
  - Kerry EU LIFE improving FPM catchment management for Freshwater Pearl Mussel – via results-based targeted agri-environment scheme among other measures.
  - European Innovation Partnerships (several upland conservation projects in the uplands e.g. Reeks, Blackstairs Mts)
  - EU INTERREG funding (CABB and CANN) – cross-border collaboration on habitat mapping/conservation plans and measures. Included Ox Mountain Bogs SAC – drain blocking at Fiddandarry blanket bog - 2089 peat dam ams in c. 35km of drains in 2021 (BWI and CABB partners with NPWS scientific advice). Ecohydrological monitoring baseline established pre-works (2108 to Sept 2022)
  - EU Integrated LIFE Programme ‘Wild Atlantic Nature’ - partnerships to restore blanket bog and associated habitats in the West and Northwest regions of Ireland (2020 to 2029).
  - NPWS/Intel pilot restoration of drained blanket bog at Liffeyhead Wicklow Mts Nat. Park and SAC (2021 to 2023);

# Peatlands Community Engagement Scheme

- Following a successful call in 2018, 2019, 2020 and 2021 the Peatlands Community Engagement Scheme was also open for applications in 2022 (note: applications deadline is now past).
- This is a competitive fund administered by the Peatlands Management Unit of the Department of Housing, Local Government and Heritage – total fund of €500,000 was available in 2022.
- It seeks to encourage local peatland communities, local groups, local schools and individuals to engage with the Department of Housing, Local Government and Heritage in relation to the conservation and revitalisation of fens, raised and blanket bog Special Areas of Conservation, Natural Heritage Areas and other peatland areas and to promote public engagement with, and awareness of, our natural heritage.
- Applications for a diverse range of initiatives from events, education programmes, conservation management plans, public amenity and recreational measures to invasive species and fire control measures near/within raised and blanket bog Special Areas of Conservation/ Natural Heritage Areas, fens or other raised bog/blanket bog areas and peatlands areas which will encourage communities to enhance their natural surrounding areas and raise awareness of environmental issues and concerns.
- In 2022 successful applicants were awarded funding to support a maximum of 75% of the project eligible costs with a maximum grant of €25,000.

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(Credit for Kippure image (Sarah777); Purple Mt image (Mozzer Cork) - internet images).

Some relevant reports available on [www.npws.ie](http://www.npws.ie) :

- Scoping Study and Pilot survey of Upland Habitats (Barron et al., 2009)
- Guidelines for a national survey and conservation assessment of upland habitats (Perrin et al., 2014) (IWM No. 79)
- NSUH Site Reports with pdf maps (various years and authors) - dates between 2009 and 2020
- Annex Habitat and Species Conservation Status Reports – 2 Vols. (2019).

Thanks also to Teagasc for the invitation to present at the Signpost Webinar Series and Thank You for listening!