Hayeswater, Cumbria

24. Upland acid grassland

Climate Change Sensitivity: **Low**

Introduction

The direct impacts of climate change on upland acid grassland are likely to be outweighed by its impact on how it is managed. However, the loss of habitat space for upland species, coupled with increased competition from lowland and more southerly species, is likely to lead to changes in community composition.

Habitat Description

Upland acid grassland is characterised by vegetation dominated by grasses and herbs, and is found on a range of usually lime-deficient soils which have been derived from acid rocks such as sandstones and acid igneous rocks, and on superficial deposits such as sands and gravels. Although the habitat is typically species-poor, a wide range of communities occur in the UK. Large expanses of acid grassland, uniform in character, occur in the uplands, with much of it being derived from dry heath. While these areas have a limited biodiversity interest, they contribute to the overall conservation interest of upland habitats. Upland is defined as land above the level of agricultural enclosure. This generally occurs at 250 – 300m in England, and typically becomes lower as one travels north.

Upland acid grassland is frequently the result of long-term grazing, where the previous habitats, eg woodland or dwarf shrub heath, has been grazed out. They are found on the open fell and on enclosed 'in-bye' land. The typical constituents of upland acid grassland are sweet vernal grass *Anthoxanthum odoratum*, mat-grass *Nardus stricta*, common wood-rush *Luzula multiflora*, heath bedstraw *Galium saxatile*, tormentil *Potentilla erecta*, and the mosses, springy turf-moss *Rhytidiadelphus squarrosus* and Broom moss *Dicranum scoparium*. The actual grassland type is defined by the dominant species.

The abundant 'white moors' of the uplands are dominated by mat-grass. The unpalatability of mat-grass means that sheep prefer to graze almost any other species present, which further reduces the nature conservation interest of the habitat.

On wetter ground, heath rush *Juncus squarrosus* is the dominant species, although hard rush *Juncus inflexus* and soft rush *Juncus effusus* are also common. This is the typical habitat of moorland edge and in-bye land. These areas of rough pasture are important feeding and nesting grounds for birds such as black grouse *Tetrao tetrix*, curlew *Numenius arquata*, snipe *Gallinago gallinago*, golden plover *Pluvialis apricaria*, redshank *Tringa totanus*, and lapwing *Vanellus vanellus*. Occasionally wavy hair-grass *Deschampsia flexuosa* is the dominant species on upland grassland sites. This is normally a result of burning or sudden cessation of grazing on dwarf shrub heath, which favours wavy hair-grass, and is only of short duration.

Potential climate change impacts

Cause	Consequence	Potential impacts
Higher average temperatures	Longer growing season	■ Phenology may change significantly, with flowering and seed setting occurring earlier in the season. Productivity may increase if not offset by other changes.
Drier summers	Drought	■ Drought can have major impacts on grasslands, but, in the case of this habitat, the already wet conditions mean this is more likely to be an issue in drier areas on the southern and eastern margins of the uplands. Wetter winters will also offset some of the impacts of drier summers, particularly in early summer. Subject to these caveats, drought could potentially alter community composition by favouring deeper rooted species and ruderal species able to colonise gaps in the sward. It might also lead to changes in soil chemistry, with, for example, increased oxidation and decomposition affecting pH and fertility, with effects on species composition.
Wetter winters	Flooding	■ Increased precipitation could increase the risk of surface water run-off and erosion, leading to a reduction in raw water quality in water courses. ■ Increased flooding and water-logging could limit access for management operations.

Adaptation responses

Changing phenology and, potentially, a greater seasonal variation in rainfall means that flexibility in moving stock and stocking density is likely to become more important to ensure good grassland management. This is true both for good agricultural practice and to maintain conservation interests, for example to maintain vegetation structure that supports animal populations.

Some changes in the composition of plant communities may well be inevitable, but are not likely to threaten conservation objectives as the habitat type supports few threatened plant species. They will however need to be recognised when management objectives are being set.

Ongoing efforts to restore the network of upland sites remain valuable. Increasing emphasis may be placed on improving the heterogeneity of sites within the network, and on including areas likely to be buffered from the impacts of climate change.

Some of the potential adaptation options for this habitat are outlined below.

- Increase the flexibility in site management to respond to the increasing variance in seasonal growing conditions, particularly in the timing or duration of grazing.
- Identify areas that are likely to be buffered from the impacts of climate change and have the potential to be refugia, for example north facing slopes and areas with access to permanent sources of water, and ensure these areas are fully protected.
- Increase the structural heterogeneity of larger sites through varying the type and timing of management interventions.
- Build in changing community composition to designation criteria and site evaluation.
- Acid grassland occurs naturally as part of the mosaic of habitats found above the moorland wall, but grazing practices of the past 40 years in particular have seen the area of this habitat increase following the removal of heather by over-grazing. In some areas, the restoration of heather may be desirable for landscape or grouse management purposes. Where this is the case, the initial

action will be to review the timing and extent of grazing. In some instances, further intervention will be required.

- An alternative to the restoration of heather on acid grassland sites would be to introduce or increase the area of trees, scrub and woodland. Gills and edges of water courses are the obvious places to commence this type of restoration, which could also be carried out in tandem with heather restoration. Proposals for increasing tree cover away from gills should include an assessment of likely impact upon other nature conservation interest, especially birds or habitats of international importance.

Curlew *Numenius arquata*

Relevant Environmental Stewardship options

Maintenance of species-rich, semi-natural grassland (HK06)

This option is targeted at the maintenance and protection of areas of species-rich grassland.

Restoration of species-rich, semi-natural grassland (HK07)

This option is targeted at grasslands that are potentially rich in plant and associated animal life. They are often on difficult ground and may have suffered from management neglect or they may have been selected for agricultural improvement. The botanical diversity of such grassland may be enhanced by simply amending existing management practices. However, on many sites pro-active restoration management will be required involving introduction of seeds and creation of gaps for their establishment. Substantial changes of livestock type, timing of grazing or control of dominant species may also be required. The option can also contribute to protecting valued landscapes and archaeology, and the promotion of good soil conditions.

Further information and advice

The Grassland Trust.

Plantlife Guide to grassland habitats.

Key evidence documents

Natural England (2013) **Review of Upland Evidence**. This wide ranging review looked at the evidence relating to biodiversity and ecosystem services in the uplands and the impact of land management activities. The report on moorland grazing and stocking rates is particularly relevant to upland acid grassland.