Targeting of upland grazing management options: supporting guidance on priority species and habitats

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1. Plants: predominantly in rock habitats

Glaucous meadow-grass

Glaucous meadow-grass grows either on ledges on upland lime-rich rock or immediately adjacent to lime-rich rock amongst other grass and plant species. Physical damage to lime-rich rock and overgrazing by livestock should be avoided. The main aim is to implement a grazing regime that allows the grass to grow, flower and set seed followed by removal of the bulk of the vegetation. This should retain an open sward without plant litter building up.

Key points

- avoid physical damage to areas of lime-rich rock
- reduce grazing by mid-May with little grazing from late-May until late August
- remove the bulk of the vegetation following seed-set

Hoary whitlowgrass

Hoary whitlowgrass grows either on ledges on lime-rich rock or associated grassland. Physical damage to lime-rich rock and overgrazing by livestock should be avoided. The main aim is to implement a grazing regime which allows the plant to grow, flower and set seed followed by removal of the bulk of the vegetation. This should retain an open sward without plant litter building up.

Key points

- avoid physical damage to areas of lime-rich rock
- reduce grazing by mid-May with little grazing from late-May until August
- remove the bulk of the vegetation following seed-set

Holly-fern

Holly-fern grows either on lime-rich rock or immediately adjacent to rock amongst grass and other plants. Aim to avoid physical damage to lime-rich rock and overgrazing by livestock. Do not use chemicals to remove bracken within 25 metres of exposed lime-rich rock that could support holly-fern. High levels of grazing could lead to trampling damage.

Key points

- avoid physical damage to areas of lime-rich rock
- do not use chemicals to control bracken on or within 25 metres of exposed lime-rich rock
- avoid excessive trampling and grazing

2. Plants: predominantly in heath / grassland habitats

Field gentian

Field gentian grows in species-rich grassland, particularly on unimproved acid to neutral soils. The main aim is to implement a grazing regime which allows the gentian to grow, flower and set seed followed by removal of the bulk of the vegetation. This should retain an open sward without plant litter building up. Some poaching of the grassland between seed set and the late winter may be beneficial.

Key points

- reduce grazing by mid-May with little grazing from mid-May until late-July / August

- remove the bulk of the vegetation following seed-set

Frog orchid

Frog orchid grows in dry species-rich grassland, which has some natural enrichment. The main aim is to implement a grazing regime that allows the orchid to grow, flower and set seed followed by removal of the bulk of the vegetation. This should retain an open sward without plant litter building up. Some poaching of the grassland between seed set and the late winter may be beneficial.

Key points

- reduce grazing by mid-May with little grazing from mid-May until late-July / August
- remove the bulk of the vegetation following seed-set

Intermediate wintergreen

Intermediate wintergreen grows in mossy heather stands. The main aim is to prevent heather becoming too tall and dense. You should adopt a management regime that retains stands of heather of different ages, including stands of mature and degenerate heather. Low-intensity burning may prevent excessive plant litter building up. Hot fires can damage the seed bed and should be avoided. Some grazing is beneficial, but avoid heavy browsing.

Key points

- retain a mosaic of heather stands of different ages
- avoid hot fires on heathland (e.g. back burning)

Lesser butterfly-orchid

Lesser butterfly-orchid grows in unimproved grassland and heathland. The main aim is to implement a grazing regime that allows the orchid to grow, flower and set seed followed by removal of the bulk of the vegetation. This should retain an open sward without plant litter building up. Some poaching of the grassland between seed set and the late winter may be beneficial. Lesser butterfly-orchid appears able to survive light muirburn.

Key points

- reduce grazing by mid-May with little grazing from mid-May until late-July / August
- remove the bulk of the vegetation following seed-set
- avoid hot fires on heathland (e.g. back burning)

Purple milk-vetch

Purple milk-vetch grows in short, dry grassland, and sometimes in grassland adjacent to rock outcrops containing lime. Purple milk-vetch can flower amongst a short sward less than 15 centimetres in height. Aim to avoid under-grazing by stock and game, including rabbits. Ideally the supporting vegetation should be grazed moderately after flowering to remove the surrounding tall vegetation and grazed at lower levels in the spring and summer to allow flowering.

Key points

- retain short sward of species-rich dry grassland
- avoid under-grazing

Pyramidal bugle

Pyramidal bugle grows on dry heathland or grassland, often on rock ledges or at the edge of areas of whin (gorse). It is one, of only a few, plants that can benefit from periodic muirburn and in particular the periodic burning of whin, which can shade it out. However avoid the permanent removal of whin. Aim for rotational burning of whin bushes every 15 to 25 years.

Key points

- retain areas of whin by periodic burning
- encourage light ground disturbance for seed germination

Small-white orchid

Small-white orchid grows in unimproved grassland and heathland. The main aim is to implement a grazing regime which allows the orchid to grow, flower and set seed followed by removal of the bulk of the vegetation. This should retain an open sward without plant litter building up. Some poaching of the grassland between seed set and the late winter may be beneficial. Small-white orchid appears able to survive light muirburn.

Key points

- reduce grazing by mid-May with little grazing from mid-May until late-July / August
- remove the bulk of the vegetation following seed-set
- avoid hot fires on heathland (e.g. back burning)

3. Plants: predominantly in summits and ridges

Cyphel

Cyphel is an alpine plant which grows on exposed summits and ridges. Trampling and grazing by large numbers of stock and game should be avoided.

Key points

- do not burn on exposed summits and ridges
- avoid excessive trampling and grazing

4. Plants: predominantly in wet upland habitats

Mossy saxifrage

Mossy saxifrage grows on moist upland rocks, often beside small water courses. The main aim is to avoid overgrazing.

Key point

- avoid intensive grazing

5. Plants: predominantly in scrub habitats

Juniper

To retain juniper avoid direct burning and adopt a grazing pattern suitable for dry heath management (0.5–1.5 ewes [0.075–0.22 livestock units] per hectare). Juniper regeneration will benefit from the removal of rough vegetation and a period of ground disturbance, e.g. poaching by livestock or deer. The ground disturbance should be followed by several years of light grazing, increasing to a normal grazing regime once juniper bushes become established. Following seedling establishment burning should be avoided for several decades, as juniper grows very slowly.

Key points

- do not burn mature juniper bushes
- to encourage regeneration of bushes consider a short period of ground disturbance followed by years of no burning

Juniper can be managed as part of your moorland management, or you can choose to manage it under the more specific Managing Scrub of Conservation Value option.

Whortle-leaved willow

Whortle-leaved willow grows either on ledges on upland mineral-rich rock or immediately adjacent amongst heathland or grassland. The main aims are to avoid over-grazing and burning.

Key points

- do not burn areas containing whortle-leaved willow
- implement a low level of extensive grazing

6. Mosses

Rugged collar-moss

Rugged Collar-moss (also known as *Splachnum vasculosum*) is confined to springs and flushes at high altitudes (760–950 metres). The springs are often somewhat mineral-rich but not strongly calcareous.

Overgrazing of sites should be avoided because this results in physical disturbance and deterioration in the water quality in flushes. Similarly, hill tracks and other upland construction projects should avoid known locations for this species or at least pay careful attention to the impact on the natural flows of springs and flushes.

Key points

- avoid intensive grazing
- maintain clean natural flows in spring and flush system
- avoid direct and indirect impacts due to upland track construction

Rusty fork-moss

Rusty fork-moss (more commonly known as *Dicranum spurium*) grows in both dry and wet heathland, usually where there is some shelter offered by leggy heather. Adopt a management regime that retains stands of mature and degenerate heather as part of the natural heather regeneration cycle. The plant tends to be absent from heavily managed heathland that is subject to burning and populations have been lost due to afforestation.

Key points

- retain a mosaic of heather stands of different ages
- do not burn areas known to support rusty fork-moss
- avoid loss of heathland due to afforestation and other land-use changes

7. Lichens

Toninia sedifolia

Toninia sedifolia grows in fissures in calcareous rocks, on old mortar in walls, or on calcareous soil, especially in coastal dunes. With such a wide range of habitat types it is difficult to recommend specific management requirements. Where the species is known to occur avoid shading, e.g. from bracken or bramble, and habitat loss through land-use change. Where the species is known from mortar in walls consider sensitive restoration options such as retaining old sections of wall until new sections have been colonised.

Key points

- avoid shading populations
- avoid loss of calcareous habitat due to changes in land use
- consider sensitive wall restoration where the lichen is known to occur

8. Mammals

Mountain hare

To maintain healthy populations avoid intense culling of mountain hares as this is the main pressure on populations in many areas. Mountain hares will benefit from good moorland management. Thus, measures to reduce grazing pressure and promote better heather growth and more nutritious upland grasses in existing grass-dominated areas only, should help mountain hares.

Aim to produce a diversity of heather with areas of new growth and mature heather. Focus management to improve the nutritional value of the available grasses, away from edges close to in-bye land as these

areas are favoured by brown hares which can compete with mountain hares. Beneficial measures may also include stock disposal and away wintering.

Key points

- good moorland management measures will benefit mountain hares
- the above measures are only likely to be successful in the absence of heavy culling

9. Birds

Black grouse

Throughout the year, black grouse will use a wide range of habitats for nesting, feeding, lekking (displaying), chick-rearing, cover and shelter.

Heather and blaeberry are important foods for adult black grouse throughout the year and grasses, sedges, rushes and herbs might be eaten depending on local availability. Adult females benefit from eating protein-rich foods such as cotton grass buds in the spring as this helps them to get into good breeding condition. Insects, including caterpillars and sawfly larvae, are an important food source for chicks.

Maintaining a range of habitats including wet flushes is therefore important for black grouse.

Key point

- maintain a range of habitats that will provide shelter and food for black grouse

Further information

- black grouse

Cuckoo

Cuckoos are nest ‘parasites’: they lay their eggs in a range of other birds’ nests. In upland habitats their mainhosts are meadow pipits and, where there is scrub, dunnock. Management that benefits these host species therefore benefits cuckoos.

Meadow pipit numbers are highest where there is a mixture of heather and rough grassland. Dunnocks need scrub and woodland to breed.

Management for cuckoos should therefore aim to maintain or create a mix of heather and rough grassland, while maintaining or creating areas of scrub and native broadleaved woodland.

Key point:

- maintain or create a mix of heather and rough grassland, while maintaining or creating areas of scrub and native broadleaved woodland

Curlew

Curlews nest in areas with a mixture of short vegetation and tussocks on bogs, open moorland, rough and damp grassland, and in unimproved hay meadows. Their chicks need patches of short vegetation so they can feed on surface-dwelling invertebrates, such as adult flies (particularly dung flies), adult crane-flies, beetles, caterpillars, sawflies and spiders. However, they also require tussocks or taller patches of vegetation to shelter from predators.

You need to retain and restore rough, damp pasture and traditional hay meadows. In these areas extensively graze to provide taller vegetation through breeding season. Also provide damp areas, wet flushes or small, shallow pools as feeding areas for chicks. In hay meadows, the timing of cutting is critical to avoid killing young curlew.

Key points:

- aim to maintain areas of short and taller patches of vegetation
- retain and restore traditional hay meadows and rough grazing pasture, delaying cutting to avoid killing young curlew

Dotterel

Dotterel breed on flat open uplands, on mountain ridges and on plateaus with sparse vegetation made up of moss, short grass, lichen and bare patches of rock. Numbers are declining in Britain but at present the cause of this decline is unknown. It may be related to climate change or changes to habitats in the wintering areas of North Africa.

The thin soils and moss vegetation of their main habitat in Scotland are vulnerable to erosion and over grazing, so the primary aim of management is to maintain very low stocking rates in this habitat.

Key point

- avoid erosion and over grazing of montane habitats

Dunlin

Dunlin breeding sites in moorland areas are normally in short vegetation, produced by a combination of wet conditions and grazing. They also need areas of open water, typically small pools or water-filled channels close to the nest site. Careful grazing to create areas of short vegetation, and maintaining or restoring wet areas (e.g. by ditch blocking), should be the main aims of management for dunlin.

Key points:

- aim to create some areas of short vegetation and to maintain or restore wet areas

Golden eagle

Upland habitat mainly provides foraging habitat for eagles. Although carrion is an important food source in the winter, eagles require live prey to successfully raise chicks. Habitat management therefore needs to be suitable for the eagles' main prey species – hares, rabbits and grouse.

Although golden eagles have been known to nest on the ground in areas with plentiful prey but no trees or crags, they do not normally do so.

Eagles are sensitive to disturbance in the vicinity of the nest sites and activities like muirburn should be avoided within one kilometre of nest sites in the breeding season (February to July).

Key points:

- good habitat management will encourage suitable prey
- avoid disturbance activities such as muirburn within one kilometre of nest sites in the breeding season

Golden plover

Golden plover breed on open moorland with a mosaic of short heath, blanket bog and wet flushes.

These moorland habitats provide invertebrate food for adults and young. In particular areas of short vegetation, including bare peat, flushes and blanket bog, provide feeding opportunities for adults and chicks that feed on leatherjackets and craneflies, as well as caterpillars, beetles and spiders. Short vegetation, such as on moorland burns, bare ground or short heath, also provide accessible nest sites.

Careful grazing and small-scale burning can create these important areas of short vegetation. Maintaining or restoring wet areas (e.g. by ditch blocking) is also important for foraging chicks.

Key point:

- aim to create some areas of short vegetation by grazing or careful small-scale burning and maintain wet areas

Kestrel

Kestrels feed almost exclusively on small mammals in the Scottish uplands, although they will occasionally take small birds, reptiles and frogs.

Management of moorland to encourage their prey is therefore identical to the other three moorland raptors. The main difference is that kestrels are whole nesters and require buildings, trees or rocky outcrops to nest. In addition to habitat management, to produce the mix of heather and grassland required by their prey, you should aim to retain suitable large trees and any abandoned buildings as nesting sites.

Kestrels also take readily to nest boxes in trees, building or mounted on purpose-made poles.

Key points:

- aim to create a mix of heather and rough grassland with some rank areas at least 30 centimetres tall
- aim to retain suitable large trees and any abandoned buildings as nesting sites

Moorland raptors: hen harrier, merlin and short-eared owl

Hen harriers prey primarily on small mammals, particularly short-tailed field voles and a range of birds, particularly meadow pipits and grouse chicks. Merlin specialise in catching small birds, and short-eared owls feed mainly on small mammals.

All three species prefer to nest in heather-dominated vegetation at least 30 centimetres tall, although harriers and short-eared owls will also nest in tall rushes and bracken. Mixtures of heather and grass appear to be preferred by both voles and meadow pipits.

Management should therefore aim to create a mix of heather and rough grassland with some rank areas at least 30 centimetres tall.

Key point

- aim to create a mix of heather and rough grassland with some rank areas at least 30 centimetres tall

Further information

- hen harriers

Ring ouzel

Ring ouzels normally nests in long heather on steep slopes. They can also nest under bracken and on rock ledges. They feed on earthworms, leatherjackets and other invertebrates in short grassland. If there is not enough of this grassland on the hillsides near the nest, ring ouzels will fly down to in-bye pastures to feed.

Therefore, a mix of heather, grassland and bracken provides the best conditions for breeding ring ouzels. In the late summer and autumn, berries like blaeberry, crowberry and rowan are important food for birds preparing to migrate.

Key point

- aim to produce a mix of heather, grassland and bracken and encourage berries like blaeberry, crowberry and rowan

Skylark

Skylarks can occur in high densities in marginal uplands and uplands where unimproved grasslands and blanket bog predominates. However, inappropriate management (e.g. over burning, drainage, over or under grazing, reseeding or fertilising) can reduce plant diversity with a subsequent loss of invertebrate food for skylarks.

Management for skylarks should therefore aim to produce a diversity of habitat types and structures. You should control grazing to avoid either over or under grazing and undertake small amounts of controlled muirburn to produce open areas for nesting.

Key points

- aim to produce a diversity of habitat types and structures

- control grazing to avoid either over or under grazing
- small amounts of controlled muirburn can produce open areas for nesting

Twite

Twite nest in mature heather or, occasionally, bracken. Availability of seed, especially later in the breeding season appears to be a key requirement for breeding twite. However, these seed sources tend to be on enclosed, in-bye land adjacent to the moorland habitats where they nest.

Moorland management for twite should therefore concentrate on maintaining stands of mature heather and bracken in areas immediately adjacent to hay meadows and unimproved seed rich grassland. These areas should be protected from muirburn and overgrazing.

Key point

- encourage areas of mature heather and bracken in areas immediately adjacent to hay meadows and unimproved seed-rich grassland

Further information

- twite

10. Invertebrates

Bilberry bumble bee

The bilberry bumblee bee is a small bumble bee found generally at altitudes above 300 metres, and strongly associated with heathland / moorland habitats. It may be found down to sea level in Scotland where suitable habitat exists. It forages on different species of flowers at different times of year – key species are bilberry, bell heather, clover, willow and bird's-foot trefoil.

You should maintain and enhance species-rich moorland and upland grassland habitats through extensive grazing and deer control. This will help retain floral diversity, particularly of bilberry, bell heather, bird's-foot trefoil, clover and ragwort, until late summer / early autumn.

The bilberry bumblee bee is thought to nest only on areas with dense cover made of ericaceous shrubs. Specifically targeted muirburn may be useful for encouraging growth of bilberry and bell heather.

Key point

- you should maintain and enhance species-rich moorland and upland grassland habitats through extensive grazing and / or deer control

Further information

- the ecology of the bumblebee *Bombus monitcola* in the Scottish Highlands, 2002, PTES / RSPB
- Highland Bumblebees: Distribution, Ecology and Conservation. 2006. M. Macdonald and G. Nisbet. ISBN 0 9552211 0 2
- The UK Bees, Wasps and Ants Recording Society (BWARS) information sheet

Marsh fritillary

The marsh fritillary is a butterfly that lives on damp grassland and moorland. Its range in Scotland is restricted and centred on Argyll and neighbouring islands. It is mainly reliant on traditional agriculture through light cattle grazing, ideally by traditional breeds.

The aim is to create a patchwork of short and tall vegetation, five to 25 centimetres in height, with areas of abundant devil's-bit scabious (the caterpillar's sole food plant) and a supply of nectar sources.

Sheep selectively feed on scabious and can severely reduce or even eliminate it from the sward. The main threats to this species are habitat loss and inappropriate land management. Uncontrolled burning, drainage, and cessation of grazing can also be detrimental.

Key point

- maintain light cattle grazing, ideally by traditional breeds

- encourage a patchwork of short and tall vegetation, five to 25 centimetres, with areas of devil's-bit scabious and nectar sources

Further information

- Species Action Framework Handbook, Scottish Natural Heritage
- Butterfly Conservation Scotland leaflet

Mountain ringlet

The mountain ringlet is a butterfly of mountain grasslands restricted to northern Perthshire, northern Argyll, and the south-west Highlands, mainly between 350 and 1000 metres.

It is often found in damper areas around sedge-dominated flushes, although it is also found in drier areas.

The main foodplant of the caterpillar is mat-grass (*Nardus stricta*). It requires the maintenance of herb-rich *Nardus* grassland through prolonged, extensive sheep grazing.

Adults nectar mainly on wild thyme, tormentil, and meadow buttercup.

Key point

- maintain herb-rich *Nardus* grassland through prolonged, extensive sheep grazing

Further information

- UK Butterflies
- Butterfly Conservation
- Butterfly Conservation, SW Scotland branch

Narrow-bordered bee hawk-moth

The narrow-bordered bee hawk-moth is a day-flying moth found on moorland, grassland and in open woodland or woodland rides / track sides where the sole caterpillar foodplant – devil's-bit scabious – grows. It is most commonly found in Highland and Argyll. The adult moth nectars on a variety of flowers, preferring louseworts, bugle and bird's-foot trefoil.

Habitat management often requires a degree of light grazing, preferably by traditional cattle and / or ponies, which is essential to maintain flower-rich areas and devil's-bit scabious in an open sward of variable height (eight to 25 centimetres). Sheep can selectively feed on scabious flowers reducing or even eliminating it from the habitat.

Uncontrolled burning, drainage, and cessation of grazing can also be detrimental.

Key points

- manage habitats with light grazing, preferably by traditional cattle and / or ponies
- aim to maintain flower-rich areas and devil's-bit scabious in an open sward of variable height (eight to 25 centimetres)

Further information

- Butterfly Conservation Scotland leaflet
- narrow-bordered bee-hawk moth

Northern brown argus

The northen brown argus is a butterfly of lightly-grazed to ungrazed, well-drained, flower-rich grasslands, coastal cliffs and sand dunes where common rock-rose – the sole caterpillar foodplant – grows. Occupied sites are usually sheltered, often by scrub, and have thin base-rich soils with patches of bare ground.

The northen brown argus occurs predominantly in the eastern half of the country from the Borders north to southern Sutherland, as well as Dumfries and Galloway.

Sites should be managed to maintain a species-rich sward of varied height, with abundant rock-rose. Seasonal or light all year grazing is preferable to maintain a species-rich sward; periodic scrub removal may be required.

Key point

- maintain a species-rich sward of varied height, with abundant rock-rose, by seasonal or light all-year grazing

Further information

- Butterfly Conservation
- UK Butterflies

Pearl-bordered fritillary

The pearl-bordered fritillary is a butterfly mainly associated with the edges, or open spaces within, south-facing woodlands with a mosaic of light bracken and violets. Violets are the sole foodplant of the caterpillar, whilst the adults mainly nectar on bugle.

Colonies can be found in the glens of Perthshire, Grampian, Highland, Argyll and Moray. There are also small and isolated colonies near Dumfries.

Habitat should be managed to provide pockets of violets beneath light bracken cover, ideally in sunny, sheltered, south-facing locations. Light stock-grazing / trampling, or deer browsing, can be important to keep bracken in check. However, higher levels of sheep grazing can be detrimental, by reducing nectar supplies.

Ungrazed or under-grazed sites may benefit from cyclical scrub clearance, to retain or create open spaces, as well as bracken management to reduce its vigour and spread.

Key point

- habitat should be managed to provide pockets of violets beneath light bracken cover

Further information

- Species Action Framework Handbook, Scottish Natural Heritage
- Butterfly Conservation Scotland leaflet
- bracken for butterflies

Slender scotch burnet

The slender scotch burnet is a day-flying moth only known in the UK from Mull and some of its neighbouring islands where the species is endemic. It usually occupies species-rich grassland close to the coast, on sunny, south-facing undercliffs.

Habitat loss, fragmentation and inappropriate management are a threat to this species. The caterpillar's sole foodplant is bird's-foot trefoil, which is also used as a nectar plant along with other flowers including wild thyme.

Favoured habitats have short vegetation and pockets of bare ground, and should be managed as species-rich grassland with a spring / summer grazing break to maintain and enhance floristic diversity.

Light grazing by sheep and cattle is preferable – sheep to create the short sward and cattle to create small areas of bare ground through light poaching.

Key point

- manage as for species-rich grassland with a spring / summer grazing break
- light grazing by sheep and cattle is preferable

Further information

- Species Action Framework Handbook
- Butterfly Conservation Scotland leaflet

Transparent burnet

The transparent burnet is a day-flying moth and an endemic sub-species restricted to Scotland. The moth requires a warm micro-climate and favours steep, grassy, south or south-west facing slopes, particularly undercliffs on or near the coast, and occasionally inland on limestone / basalt. It occurs at scattered localities on the west coast from Skye to the Mull of Kintyre.

The sole caterpillar foodplant is wild thyme, which is also the preferred adult nectar plant. Favoured habitats have short vegetation and pockets of bare ground, and should be managed as species-rich grassland with a spring / summer grazing break to maintain and enhance floristic diversity.

Light grazing by sheep and cattle is preferable – sheep to create the short sward and cattle to create small areas of bare ground through light poaching.

Key points

- manage as for species-rich grassland with a spring / summer grazing break
- light grazing by sheep and cattle is preferable

Further information

- Butterfly Conservation Scotland leaflet
- transparent burnet moth

Violet oil-beetle

Because oil-beetle larvae are parasitic on ground-nesting solitary bees, they depend on the requirements of their hosts: food (pollen and nectar) throughout the season, suitable sites for hibernation, and suitable sites for nesting.

For nesting, patches of bare, exposed soil are particularly important (but also hedgerows, tussocks on the margin of fields, dead wood cavities, voles and mice burrows, etc).

Agricultural intensification and changes in land use are believed to be causes of decline of bee habitats, especially wildflower-rich grassland and heath.

Adult beetles also require sunny, dry areas of flowering plants, where they can feed on pollen.

Key point

- aim to encourage or maintain flower-rich areas and sources of pollen

11. Habitats

Heaths of European importance are widespread habitats in Scotland.

Both **European dry heaths** (dry heaths) and **Northern Atlantic wet heaths with *Erica tetralix*** (wet heathland with cross-leaved heath) can form lowland heath as well as upland heath, depending on location. For guidance on the management of dry heath and wet heath refer to the Moorland Management supporting guidance. For lowland heath, coastal heath and special interest heath (including serpentine heath) refer to the Heath Management supporting guidance.

Blanket bog is also widespread, and specific information is provided on the Moorland Management supporting guidance page.

The upland grassland **Species-rich *Nardus* grassland on siliceous substrates in mountain areas** (Species-rich *Nardus* grassland on acid soils in upland areas) will benefit from grazing as described in the upland grasslands section of the Moorland Management supporting guidance.

Alpine and boreal heaths (Alpine and subalpine heaths), **Siliceous alpine and boreal grasslands** (Montane acid grasslands), and **Alpine and subalpine calcareous grasslands** (Alpine calcareous grasslands) are fragile habitats found at higher altitudes and in exposed situations. They tend to form short wind-clipped mats dominated by dwarf-shrubs, mosses, sedges or herbs, and are often rich in lichens. They can have much bare soil or rock, and soils are vulnerable to erosion. These habitats should never be burnt and should only be lightly grazed.

Limestone pavement is a rare habitat in Scotland. For limestone pavement, and other bare rock habitats, reduce grazing and avoid burning to lower the risk of erosion.

Petrifying springs with tufa are also known as lime-rich springs. For this habitat and other upland flushes and fens avoid drainage, burning, and inappropriate grazing and trampling. For all these habitats refer to the blanket bog section of the Moorland Management supporting guidance.

Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels are tall-herb communities. Advice is available in the is available in the Tall-herb Vegetation Management supporting guidance.

For montane willow scrub (**Sub-Arctic *Salix* spp. scrub)** and for juniper **(*Juniperus communis* formations on heaths or calcareous grasslands)** refer to the Managing Scrub of Conservation Value supporting guidance.