

Conservation Grazing for Semi-Natural Habitats

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Summary

- **Appropriate grazing is essential for many habitats of conservation interest in Scotland**
- **A grazing management plan must have clear objectives**
- **Guideline stocking rates for many semi-natural habitats provide a starting point for grazing management**
- **The choice of livestock will depend on practical considerations as well as the grazing behaviour of different species. The effects of wild herbivores must also be taken into account**
- **Seasonal grazing may be necessary for practical reasons or to protect specific features (e.g. ground-nesting birds, wild flowers or tree regeneration), but in many cases moderate grazing for most of the year is ideal**
- **Livestock welfare is an important consideration when grazing semi-natural habitats**
- **Monitoring the effects of grazing is essential to inform the future development of grazing management**

Introduction

Grazing, whether by wild herbivores or domestic livestock, is an important process in almost all of our natural and semi-natural habitats and is particularly critical in maintaining semi-natural grasslands, wetlands and heathlands of conservation interest. In the latter part of the 20th Century, rising numbers of deer and domestic livestock, led to increasing concern about over-grazing of many semi-natural habitats. This is still a problem in many areas, but declining livestock numbers in recent years and farm specialisation means that under-grazing is just as much of concern nowadays. Appropriate grazing levels are essential to maintain and restore our habitats of conservation interest and the biodiversity that they support. This technical note provides guidance on developing grazing plans for a range of habitats in Scotland.

Setting the Aims of a Grazing Plan

It is important that a grazing plan sets out clearly what it is aiming to achieve. In many cases it will be to maintain the habitat in good condition to benefit a wide range of species, avoiding over-

grazing or under-grazing. In other cases it will be to manage the habitat for a particular plant or animal species of conservation interest that has specific requirements. Changes in grazing regimes may be desired to encourage the conversion of one habitat to another (e.g. woodland regeneration) or to prevent such conversion (e.g. preventing scrub encroachment on grassland and heath habitats).

A site survey should be carried out to help determine the aims of grazing management. The survey should record the extent of different habitats on the site, using a standard methodology such as Phase 1 or NVC, the existing or previous management regimes and the current condition of the vegetation. This information should be included in the grazing plan. Assessment of site condition may involve attributes such as indicator species (positive and negative), sward height, amount of litter (dead plant material) and browsing pressure on trees and shrubs. This may be a very simple assessment or could use more detailed formal surveys such as the SNH best practice guidance or the JNCC Common Standards Monitoring. If the site to be managed has a statutory



conservation designation (e.g. SSSI) there may be monitoring information available from SNH, who will have to be consulted in any case if a change in grazing is planned.

Setting an Overall Stocking Rate

The appropriate overall stocking rate for a site is dependent on the aims of management. To maintain good site condition, a balance must be achieved between the annual production of dry matter in the vegetation and the utilisation of this production by grazing herbivores. If the utilisation is too low, there will be a build-up of taller plants and dead plant material, while if it is too high there will be a loss of structural diversity in the vegetation. Both situations usually result in a loss of biodiversity.

Appropriate stocking rates for different habitat types are provided in this note, but it is important to appreciate that these can vary significantly depending on soil fertility and annual variation in weather. As a result, the guideline figures should be used as a starting point and adjusted if necessary, depending on more detailed knowledge of the site, or following a period of monitoring. Species-specific management or restoration of sites that are in very poor condition (e.g. under-grazed or over-grazed) may require a stocking rate that is higher or lower than these guidelines.

Overall stocking rates are usually expressed as Livestock Units per hectare per year (LU/ha/yr) for agricultural livestock, where one livestock unit is taken to be one cow with calf and other animals can be expressed as a proportion of this (Table 1). Wild herbivores should also be taken into account when setting stocking rates, although their numbers can be difficult to assess. Rabbits may be significant grazers in grassland habitats, while deer are important grazers in many upland and woodland habitats. Although deer can be expressed as livestock units, it is more common to assess their density in terms of deer/100ha (1km²).

Table 1: Different types of domestic and wild herbivore and their grazing pressure expressed as Livestock Units. These are guideline figures and can vary between different breeds of the same species.

Livestock type	Livestock Units (LU)
Cow and suckling calf	1.0
Other Cattle >24 months	1.0
Other Cattle 6-24 months	0.6
Ewe (incl. lamb)	0.15
Goat	0.15
Red Deer	0.3
Roe Deer	0.08
Sika/Fallow Deer	0.15
Mountain Hare	0.02
Rabbit	0.01

Choosing the Livestock

In most situations the choice will be between cattle and sheep for grazing and the choice will often be determined by purely practical considerations, such as the availability of stock and the existing farming system at the site. However, there are differences in the way that cattle and sheep graze vegetation and this must be considered carefully, particularly on more sensitive sites of conservation importance.



Cattle are generally less selective feeders, rely on bulk intake of forage and do not graze vegetation below 5-6cm. They are best suited to more fertile sites with large quantities of tall and coarse vegetation such as rushes and tall grasses. Due to their weight, they are more likely to damage the sward by trampling, which may be useful to create seed germination niches and to break up invasive vegetation such as bracken, but makes them unsuitable for more fragile sites on thin or peaty soils. They are also more likely to cause localised nutrient enrichment through dunging.

Sheep are more selective grazers than cattle and can graze swards down to 3cm, generally avoiding tall and coarse vegetation, although they will browse heather in the winter. They are best suited to sites with a relatively short sward, and are unlikely to be able to effectively graze habitats with tall, coarse vegetation such as rushes. They are more likely than cattle to remove the flowering heads of plants if these are particularly nutritious, but are well suited to fragile sites that are nutrient-sensitive or vulnerable to trampling and erosion.

Deer and goats have a greater propensity for browsing woody shrubs and trees than cattle or sheep and therefore in habitats with this type of vegetation such as heather moorland, woodland and scrub, their impacts can be greater than an equivalent stocking rate of other livestock.

There is often a preference for using hardy native breeds for conservation grazing as they tend to be better able to utilise poor-quality semi-natural vegetation than more productive breeds, and cause less trampling damage due to their generally smaller size compared with imported continental breeds.



Setting the Season and Duration of Grazing

It may be impossible, or undesirable, to graze some areas of semi-natural vegetation year-round. This may be for practical animal husbandry reasons such as the requirement to bring sheep into better fields for tupping and lambing, or due to the site being too small to practically achieve the appropriate stocking rate over the whole year. Many sites may not be able to support the nutritional requirements of more demanding livestock such as fattening cattle, if these are the only grazing animals available, and it may therefore be necessary to restrict grazing to a short period, or rotate animals through the semi-natural habitat. However, where spring-calving cows are used, there is often a requirement to reduce their weight over the winter before calving; concentrating their use of semi-natural vegetation into the autumn and early winter may be a desirable way of helping to achieve this. Many habitats are unable to meet the requirements of any livestock in late winter (January-March) without supplementary feeding, which can be damaging to semi-natural habitats. Removing livestock during this period may be the best option provided that sufficient grazing has taken place earlier.

There are also conservation reasons for seasonal grazing as certain habitats and species have sensitive periods when it may be desirable to reduce or remove grazing pressure:

- Flower-rich habitats are vulnerable to grazing in the summer, particularly by sheep which can selectively remove flower-heads.
- Tree and shrub regeneration and heather are vulnerable to browsing damage in the winter when more palatable food is in short supply.
- Wetland habitats can be particularly vulnerable to trampling and erosion during the wetter winter months.
- Ground-nesting birds are vulnerable to egg trampling (and even predation) by livestock between April and early June.

Where seasonal grazing is undertaken on a site, the stocking rate during the grazing period(s) will have to be increased above the overall annual stocking rate to achieve the same grazing pressure. For example, a site will require an actual stocking rate that is double the annual stocking rate if it only grazed for six months, or four times the annual stocking rate if it is only grazed for three months of the year. For very short grazing periods the high stocking rate required to achieve the overall annual stocking rate may create a risk of physical damage to the habitat such as soil erosion and nutrient enrichment, so in most cases it is preferable to keep the grazing period as long as possible.

Recommendations For Specific Habitats

Grassland

Grasslands tend to be more productive and require higher stocking rates than most other semi-natural habitats, but appropriate stocking rates can range from 0.2-1.0 LU/ha/yr depending on the grazing quality of the grassland (Table 2), which is influenced by the species present, climate and the underlying fertility of the soil. Upland grasslands dominated by *Nardus stricta* or *Molinia caerulea* are likely to fall within the poor quality grazing category. More palatable acid and calcareous grasslands dominated by Sheep's Fescue and Common Bent (e.g. NVC communities U4 and CG10), are likely to fall within the moderate quality range, although those at higher altitudes or on thin and fragile soils might fall within the poor quality category. Good quality unimproved grasslands are likely to include the MG3

and MG5 NVC communities where Red Fescue dominates, but may also include some of the better U4 and CG10 grasslands. Semi-improved grasslands typically have a significant amount of perennial ryegrass in the sward, indicating previous agricultural improvement or enrichment and can support higher stocking rates. Where semi-improved or improved grassland receive fertiliser inputs they may support annual stocking rates of up to 2.0LU/ha.

Table 2: Guideline stocking rates for semi-natural grasslands.

Quality of Grassland	Typical dominant grasses	Examples of NVC communities included	Indicative annual stocking rate (LU/ha)
Poor	Molinia/Nardus	U5, M25	0.25 (0.2-0.4)
Moderate	Sheep's Fescue/Common Bent	U4, CG10	0.50 (0.4-0.6)
Good	Red Fescue/Crested Dogstail	MG3, MG5	0.7 (0.6-0.8)
Semi-improved	Ryegrass/Crested Dogstail	MG6	0.8-1.0

For large areas of upland grassland with relatively low species-richness, grazing throughout the summer is ideal. Where grassland is rich in wild flowers, grazing should be kept at a low level or excluded from late April/early May through to early/mid-August, which may also benefit ground nesting birds. Late summer and autumn grazing is probably the best management option for these types of habitat and provided sites are dry and without fragile soils, quite high stocking rates may be possible for short periods, although a longer period (2-3 months) of moderate grazing is preferable. The vegetation is unlikely to have much nutritional value from December onwards and the aim should be to have achieved the year's grazing objectives by this time. However, some light sheep grazing may be possible during the late winter. Winter and spring grazing may also be desirable where grassland is threatened by scrub encroachment: browsing of shrubs such as gorse (particularly in the spring when fresh growth is most palatable) can reduce the rate of encroachment.

Some wild flower meadows, particularly newly created ones, may be best managed by cutting for hay in July/August. In these cases, aftermath grazing in the autumn and sheep grazing over the winter is likely to be the best option, but the overall stocking rate will need to take into account that probably at least half of the annual vegetation production is removed during the hay cut.

Wetland

Wetland habitats can include relatively productive areas of lowland rush pasture but also much more nutrient poor fens with a low cover of sedges, as well as swamps with sedges and reeds emerging from standing water. Grazing of swamps is rarely going to be practical or necessary but the drier fens and rush pastures require grazing to maintain their conservation value and prevent succession to scrub. The more fertile and grassy rush pasture is, the higher stocking rate it is likely to require. Grazing of wetland involves particular animal welfare issues that must be considered when planning grazing. These include the risk of animals becoming stuck or drowning on very wet sites and the risk of flooding during grazing.

Table 3: Guideline stocking rates for wetland habitats

	Examples of NVC communities included	Indicative annual stocking rate (LU/ha)
Nutrient poor fen	M4-M10	0.10 (0.05-0.25)
Rush pasture	M23	0.40 (0.25-0.40)

Where ground nesting wading birds are present, high stocking rates (>c.0.3LU/ha) should be avoided during the breeding season (April-June). Grazing during the late autumn and winter is also not advisable due to the risk of poaching to the vegetation. Concentrating grazing over as long a period as possible in the late summer/early autumn is therefore often the best option for wetland sites. Having very high levels of stocking for short periods runs the risk of damage to the sward and soil.

Heath and Bog

Heath and bog habitats often occur within extensive upland grazing areas. Blanket and raised bogs occur on areas of deep peat and are both relatively unproductive and vulnerable to damage from trampling of the fragile vegetation surface and subsequent erosion. Consequently, appropriate stocking rates are very low and in areas with bog pools, eroding peat or a high proportion of sphagnum moss, grazing by livestock may not be appropriate at all. Dry heath on mineral soils typically support the highest stocking rates, but where a previous lack of grazing or burning has left very tall and rank heather, only very low stocking rates may be possible unless a burning or grazing regime can establish a more varied vegetation structure including younger, more nutritious heather growth. When considering appropriate stocking rates for very large mountainous areas, it may be appropriate to ignore the area of land above the natural tree line (c.600m in the east and 400-500m in the west) and inaccessible areas including cliffs as such areas are unlikely to contribute significant grazing value.

Table 4: Guideline stocking rates for upland habitats

	Examples of NVC communities included	Indicative annual stocking rate (LU/ha)
Blanket and Raised Bog	M17, M18, M19	0.02 (0.00-0.05)
Wet Heath	M15, M16	0.08 (0.05-0.10)
Dry Heath	H9, H10, H12, H16	0.12 (0.10-0.20)
Bracken	U20	0.00 – 0.10

A long period of summer grazing or year-round grazing is likely to be the best option for these types of habitats. Grazing pressure should not be increased above the overall annual recommended stocking rate during the winter as that is when browsing on heather is most frequent and excessive browsing can result in heather loss.

Where red deer are the primary grazing animal in upland areas, grazing levels are generally expressed as deer per km² and are typically low if converted into LU/ha. This is partly due to the fact that large upland areas include significant areas of fragile and low-quality grazing such as blanket bog and alpine vegetation above the tree-line, and partly due to the habit of deer of concentrating in favoured areas (particularly in winter) and their greater propensity for browsing of heather and other shrubs, compared with sheep. Anything greater than 20 red deer/km² (equivalent to approximately 0.06 LU/ha) would normally be considered a very high density with potential for negative impacts

on vegetation. Around 5-10 deer/km² is likely to result in low to moderate impacts across most large upland areas, but some areas may sustainably support higher densities than this. In recent years there is an increasing emphasis on using vegetation monitoring as well as considering deer densities to manage upland deer populations (www.bestpracticeguides.org.uk).

Scrub and Woodland

Grazing of woodland and scrub can have beneficial impacts on ground layer vegetation and can encourage tree regeneration by disturbing the ground to create seed germination sites. However, if the grazing level is too high, particularly in the winter, then tree and shrub regeneration is likely to be damaged by browsing. For upland woodlands, a stocking rate of around 0.05LU/ha is likely to be suitable, but winter grazing should be avoided if regeneration is desired. On more fertile woodland sites (e.g. Ash and Alder woodland), up to 0.1LU/ha may be possible. Where deer are the primary grazers and browsers, it is usually recommended that the winter density is maintained below 4 red deer/km² in upland forests if tree regeneration is desired (equivalent to approximately 0.012LU/ha). On more fertile lowland forests, where the smaller roe deer is usually the main species, densities of up to 25 roe deer/km² (equivalent to approximately 0.02LU/ha) may be compatible with tree regeneration.

Where a pulse of new regeneration is desired on a site where moss and other ground vegetation is thought to be preventing seeds from reaching the soil, it may be better to have higher stocking rates for a short period to disturb the ground and create a suitable seedbed, before removing or significantly reducing grazing pressure and allowing the regeneration to occur.

Habitat Mosaics

On many sites, there may be a mosaic of different habitats present (e.g. woodland, wetland and grassland). If the aim of management is to maintain the balance of habitats in the mosaic then the initial stocking rate should be determined by the proportion of the site occupied by each habitat multiplied by the guideline stocking rate for that habitat. If management is aimed at one component of the mosaic, then an appropriate stocking rate for that component should be used. Monitoring is particularly important in habitat mosaics as grazing animals may not graze each component habitat at the appropriate rate, leading to localised over- or under-grazing. This is most likely when habitats with widely differing stocking levels are present in the mosaic (e.g. semi-improved grassland and nutrient poor fen). As a result, more careful stock management may be required or fencing to separate habitats. Where large upland mosaics including woodland are being managed, it is important to remember that herbivores (livestock or deer) may move into the shelter of the woodland in winter, resulting in locally high grazing and browsing pressure on one of the more sensitive parts of the mosaic, even if the overall stocking rate is low.

Livestock Welfare and Supplementary Feeding

It is essential that high standards of animal health and welfare are maintained under a grazing management plan. Physical dangers (deep ditches, quaking bogs), fencing, access for management and monitoring, food and drinking water are all factors that must be considered.

The nutritional value of the vegetation is a particular concern as many semi-natural habitats are unable to provide sufficient energy to maintain the condition of certain types of livestock, particularly

the more demanding types such as growing cattle and sheep. Supplementary feeding can be used to offset the nutritional limitations of the vegetation, but this has disadvantages: it can reduce the amount of grazing of the vegetation; it can cause nutrient enrichment and sward and soil damage around feeding sites as well as localised over- and under-grazing. Ideally, conservation grazing management should try to avoid the need for supplementary feeding by choosing livestock whose nutritional requirements closely match the nutritional value of the vegetation and by avoiding grazing during December-March when the nutritional value of most vegetation is at its lowest. Where this is not possible, the need for supplementary feed can be minimised by rotating groups of livestock through the site for short periods so that they do not lose condition. Otherwise, the minimum necessary supplementary feed should be used, which meets but does not exceed the requirement of the livestock. Mineral blocks with a low-moderate phosphorus content are likely to have the least negative impacts. Energy/protein concentrate blocks are the next best option, while bulky complete feeds such as hay and silage should be avoided as far as possible.

On large sites, the use of supplementary mineral and concentrate blocks can be beneficial to encourage livestock to range more evenly across the whole area. These can be moved around the site to avoid localised impacts of feeding, although on some sites sacrificial feeding areas may be preferable. In all cases, supplementary feeding sites should be located in dry areas more than 10 metres from any watercourse, in parts of the site with least conservation interest if possible and avoiding any sites of archaeological or historic interest.

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Monitoring

Given the number of variables that can affect the outcomes of a grazing management plan, site monitoring is essential to ensure that the aims of management are being achieved. If the aims are not being achieved, then changes to the management regime will be required. There is a wide range of monitoring methods available, from simple measures of sward height to quadrat surveys measuring the frequency and condition of key indicator plants or features such as leaf litter or tree regeneration. If the management is aimed at providing ideal conditions for other species, such as ground-nesting birds or a specific rare plant, then it may be more effective to monitor these directly. In upland habitats (particularly those grazed by deer), SNH Best Practice Guidance on habitat impact assessment provides a standard methodology for habitat monitoring.

Further information is available from:

Grazing Animals Project www.grazinganimalsproject.org.uk
SNH Best Practice Guidance-habitat impact assessment www.bestpracticeguides.org.uk

SNH Guidance note: The effects of supplementary feeding on species-rich grasslands www.snh.gov.uk
Woodland Grazing Toolbox www.scotland.forestry.gov.uk/woodland-grazing-toolbox