

Commissioned Report No.

An assessment and evaluation of herbivore impacts on designated habitats in the Breadalbane Hills

(ROAME No ….)

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AN ASSESSMENT AND EVALUATION OF HERBIVORE IMPACTS ON DESIGNATED HABITATS IN THE BREADALBANE HILLS.



Commissioned Report No. (ROAME No …..)

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**Background**

Site Condition Monitoring (SCM, JNCC 2008) assessments of some of the Sites of Special Scientific Interest (SSSIs), within the Breadalbane hill range, indicated that a number of the upland features were in unfavourable condition and potentially ‘at risk’ from herbivore impacts. The following sites were identified in 2007 by the agencies (SNH, DCS, SGRPID and FCS) as ones where Joint Agency Working could help to deliver sustainable deer/herbivore management: Ben Lawers, Ben Heasgarnich, Meall na Samhna, Meall Ghaordie and Carn Gorm/Meall Garbh, all of whom entered into a section 7 agreement in 2010 to deliver the required targets.

A grazing and trampling impact survey was carried out in August/September 2007 to gather information in relation to the nature and distribution of herbivore impacts on a representative range of the designated interests. This was repeated during the summer (June to August) 2011 and then again in 2014 to provide up to date information on impacts and to show changes in impact levels since the original survey. This report covers the results of the 2014 survey and includes an assessment of the 2014 results and an analysis of changes since 2007.

**Summary**

The five sites identified were grazed predominantly by sheep and deer except for two areas by Loch na Lairige from which grazing had been excluded. Four broad habitat types were assessed, smoothgrassland, flush, wind-clipped communities and ‘restricted habitats’, the latter category including tall-herb ledge and sub-Arctic *Salix* scrub. A total of 314 quarter km squares (250m2) were surveyed across the five sites; the sample squares representing approximately 20% by area of each site.

For each habitat type, the relevant assessment of current impacts was made as per MacDonald *et al.* 1998 (see Sec 2. Methods). An assessment of long-term impact and trends was made using the standard trend indicators data were compared with the results from 2007 and 2011.

In 2007, it was noted that there had been long-term herbivore impacts throughout the sites. Across many of the lower slopes, e.g. of Ben Lawers and Ben Heasgarnich, heather was relatively sparse and *Nardus stricta* grasslands were abundant. Recent management on Meall na Samhna, Ben Heasgarnich and North Ben Lawers had included reductions in the numbers of sheep run on the hills and some off-wintering of herds, and there were indications of a decreasing impact in these areas. Where sheep stocking levels were still relatively high (>1 ewe/ha) and/or sheep were not off-wintered, such as across south Ben Lawers and North Chesthill, impacts were still Moderate or High. Moderate–Low deer impacts were also noted from across the five sites with some local higher impacts such as on the Tarmachan Ridge and at Inverinian.

The results of the 2011 survey indicated that grazing impacts had decreased across most of the five sites. This was particularly evident on Ben Heasgarnich and Meall na Samhna, but a general pattern of decreasing impacts was recorded across all the SSSIs. Moderate, High and Increasing impacts were recorded from some locations on Ben Lawers and Carn Gorm/Meall Garbh.

The main findings of the 2014 survey were of fairly minor changes and many of the results were broadly the same as those from the 2011 survey. In general the pattern of changes was still a decreasing one, with most assessment squares either showing the same impact level as 2011 or a slightly lower one.

Moderate and High-Moderate impacts were still recorded in some locations on Ben Lawers, including grazing impacts largely attributable to sheep on wind-clipped vegetation across Ben Ghlas and along the main ridge, and grazing and trampling on flush vegetation to the south of Ben Lawers and along the glen east of Meall a Choire Leith and Meall Corraniach. Some Moderate deer impacts were noted from the Tarmachan ridge top and to the far north-east of the SSSI.

On Meall na Samhna, impacts were predominantly Low and Moderate-Low for all habitats although there were still Moderate trampling impacts recorded on flush habitat to the south-west. Another concern is the depth of litter build-up within species-rich *Nardus stricta* grassland that may result in a less herb-rich sward over time.

On Ben Heasgarnich, grazing impacts were mostly Low or Moderate-Low, with very occasional Moderate impacts, mostly in the eastern part of the site. Trampling impacts were slightly higher than grazing, especially trampling in flushes which had increased to near 2007 levels. Impacts on restricted habitats had decreased most, with most grazing impacts recorded as Low and trampling as Moderate-Low, with some Moderate grazing impacts restricted to the most accessible stands.

Likewise on Meall Ghaordie, the trend for most habitats assessed indicated a decrease in herbivore impacts though there were a few sites where grazing impacts were still notable on wind-clipped vegetation along the ridge and this was reflected in the dung frequency across the site.

On Carn Gorm-Meall Garbh, herbivore impacts on wind-clipped and smooth grassland habitats had also decreased since 2011 although there are still a few Moderate and High grazing impacts on wind-clipped vegetation along the ridge to the north-east of the site, with corresponding high dung frequency around this north-eastern margin.

Overall, impact levels have maintained a decreasing trend, though this is less marked than between 2007 and 2011. There are still locally higher impacts on some habitats, for example on wind-clipped vegetation on high ridges on Meall na Samhna, Meall Ghaordie, Carn Gorm/Meall Garbh and Ben Lawers and on flush habitats to the east of Meall Corranaich on Ben Lawers.

Grazing levels on these sites are still high enough to restrict tall herb and montane willow vegetation to poorly accessible cliff slopes, but they are too low in places, especially on Ben Heasgarnich and Meall na Samhna, to maintain a floristically and structurally diverse calcareous grassland.

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**CONTENTS**

Page

Summary 2

Acknowledgements 3

Contents 4

**1. Introduction 7**

1.1 Background 7

1.2 Vegetation summary 7

1.3 Designations 8

1.4 Geology 8

1.5 Management 8

1.6 Logistics 8

**2. Methods 9**

**3. Habitat descriptions and indicators 11**

3.1 Wind-clipped communities 11

3.2 Species-rich grassland 12

3.3 Flushes 13

3.4 Restricted habitats: Tall herb ledges 14

3.5 Restricted habitats: Dwarf willow scrub 15

**3.6 Results for each SSSI 16**

3.6.1 Ben Lawers 16

3.6.2 Ben Heasgarnich 21

3.6.3 Meall na Samhna 25

3.6.4 Meall Ghaordie 29

3.6.5 Carn Gorm and Meall Garbh 31

**4. Discussion 35**

4.1 Ben Lawers 35

4.2 Ben Heasgarnich 37

4.3 Meall na Samhna 37

4.4 Meall Ghaordie 38

4.5 Carn Gorm 39

**5. Conclusions 40**

**6. References 42**

**APPENDICES**

1. Impact summary tables 43

2. Index of common species names 59

3. Maps 61

*Ben Lawers*

Map 1. Location plan

Map 2 - grazing impacts on wind-clipped vegetation

Map 3 - trampling impacts on wind-clipped vegetation

Map 4 - grazing impacts on smooth grassland

Map 5 - trampling impacts on smooth grassland

Map 6 - herbivore impacts as indicated by litter depth on smooth grassland

Map 7 - grazing impacts on flush communities

Map 8 - trampling impacts on flush communities

Map 9 - grazing impacts on tall-herb ledges

Map 10 - grazing impacts on sub-arctic *Salix* scrub

Map 11 - trampling impacts on sub-arctic *Salix* scrub

Map 12 - dung frequency

*Ben Heasgarnich*

Map 1. Location plan

Map 2 - grazing impacts on wind-clipped vegetation

Map 3 - trampling impacts on wind-clipped vegetation

Map 4 - grazing impacts on smooth grassland

Map 5 - trampling impacts on smooth grassland

Map 6 - herbivore impacts as indicated by litter depth on smooth grassland

Map 7 - grazing impacts on flush communities

Map 8 - trampling impacts on flush communities

Map 9 - grazing impacts on tall-herb ledges

Map 10 - grazing impacts on sub-arctic *Salix* scrub

Map 11 - trampling impacts on sub-arctic *Salix* scrub

Map 12 - dung frequency

*Meall na Samhna*

Map 1. Location plan

Map 2 - grazing impacts on wind-clipped vegetation

Map 3 - trampling impacts on wind-clipped vegetation

Map 4 - grazing impacts on smooth grassland

Map 5 - trampling impacts on smooth grassland

Map 6 - herbivore impacts as indicated by litter depth on smooth grassland

Map 7 - grazing impacts on flush communities

Map 8 - trampling impacts on flush communities

Map 9 - grazing impacts on tall-herb ledges

Map 10 - dung frequency

*Meall Ghaordie*

Map 1. Location plan

Map 2 - grazing impacts on wind-clipped vegetation

Map 3 - trampling impacts on wind-clipped vegetation

Map 4 - dung frequency on wind-clipped communities

Map 5 - grazing impacts on montane willow scrub

Map 6 - trampling impacts on montane willowscrub

Map 7 – grazing impacts on tall-herb vegetation

Map 8 – impact trends on tall-herb vegetation

*Carn Gorm and Meall Garbh*

Map 1. Location plan

Map 2 - grazing impacts on wind-clipped vegetation

Map 3 - trampling impacts on wind-clipped vegetation

Map 4 - grazing impacts on smooth grassland

Map 5 - trampling impacts on smooth grassland

Map 6 – grazing impacts on flush and montane willow

Map 7 – dung frequency

The full mapped data-set covers all impact groups for all features surveyed within each SSSI. These and the full tables for the impact assessment results are available on demand from SNH.

**1. INTRODUCTION**

* 1. **Background**

Individually Scottish Natural Heritage (SNH), Forestry Commission Scotland (FCS) and the Scottish Government Rural Payments and Inspections Directorate (SGRPID) have different grant giving and regulatory powers which they use to promote and ensure sustainable management of grazing animals. Recognising that there are many circumstances where, used together, these powers can deliver more effective solutions, the agencies have signed up to Strategic Principles for the use of incentives and regulation in dealing with adverse impacts to the natural heritage.

<http://www.scotland.gov.uk/Resource/Doc/931/0021957.pdf>

Joint Working is concerned with tackling adverse grazing and trampling impacts attributed to wild deer either on their own, or in combination with other herbivores. Joint Working involves the agencies working with local interests and identifying local solutions.

The Site Condition Monitoring (SCM) assessments of the group of Sites of Special Scientific Interest (SSSI) within Breadalbane, including Ben Lawers, Ben Heasgarnich, Meall na Samhna, Meall Ghaordie and Carn Gorm and Meall Gharbh, indicated that many of their designated upland features were in unfavourable condition and potentially ‘at risk’ from herbivore impacts. On this basis, the group of sites were identified by the agencies as ones where Joint Agency Working could help to deliver sustainable deer/ herbivore management and a section 7 agreement was entered by the owners and graziers in 2010 to deliver this objective.

<http://www.scotland.gov.uk/Topics/Rural/JointAction/programme#top>

A grazing and trampling impact survey was carried out in August/September 2007 to gather information in relation to the nature and distribution of herbivore impacts on a representative range of the designated interests. This was repeated during summer (June to August) 2011 and again in 2014, to provide up to date information on impacts and to show changes in impact levels since the original survey. This report covers the results of the 2014 survey and includes an assessment of the 2014 results and an analysis of changes between 2007, 2011 and 2014.

* 1. **Vegetation summary**

The Breadalbane hills lie between Loch Tay and Glen Lyon. The range includes a series of generally steep-sided, high mountains with many peaks over 900m including the second highest peak in Scotland.

The distinctive vegetation includes a range of typical montane and sub-montane upland types, their extent and location defined by both geomorphology and past/current management. The slopes are dominated by areas of dry heath, wet heath and grassland, with blanket bog present on the flat tops and in basins with frequent short-sedge flushes.

The high altitude summits and ridges are generally dominated by alpine heath, moss heath and calcareous grasslands, the latter generally located on the bands of limestone or where surface flushing crosses them. The basic rocks also define the locations for the distinctive tall-herb ledge vegetation of the Breadalbane range and likely sites for the pockets of dwarf willows. Springs and flushes rising high in the hills support populations of alpine bryophytes, herbs and sedges.

**1.3 Designations**

The Breadalbane hills include a group of upland sites designated as SSSI for their upland features and assemblages. A smaller area of each of Ben Lawers, Ben Heasgarnich and Meall na Samhna are also designated as SAC under the European Habitats Directive for their range of upland Natura habitats including species-rich *Nardus* grasslands on siliceous substrates in montane areas, alpine and boreal heath, calcareous rocky slopes with chasmophytic vegetation and Sub-arctic *Salix* spp. scrub. The UK government has an obligation to avoid deterioration of the qualifying Natura features and to comply with the conservation objectives for the site as outlined below, i.e. to ensure there are no negative changes to the:

* + - extent of the habitat on the site
    - distribution of the habitat within the site
    - structure and function of the habitat
    - processes supporting the habitat
    - distribution of typical species of the habitat
    - viability of typical species as components of the habitat
    - and that there is no significant disturbance of typical species of the habitat

**1.4 Geology**

The bedrock of the Breadalbane hills is predominantly Slate/Phyllite and quartzose mica-schists with frequent granite intrusions. There are also several significant bands of limestone running through this range that give these hills some of their distinctive calcicolous vegetation.

**1.5 Management**

Breadalbane has been managed for hill sheep farming for many decades. There is some stalking on all the hills surveyed, mainly of red deer. In the five years previous to the 2007 survey, sheep numbers were reduced on the hill from many estates and there was also an increase in off-wintering of sheep. Since 2007 there have been a few further reductions, but sheep numbers on most estates have remained relatively stable.

By the Ben Lawers car park and also to the east of the Lochan na Lairige reservoir, some areas were fenced a few decades ago to exclude stock as a conservation measure. There are a few deer present now despite recent electric fencing of this area, but the changes in the vegetation are still evident.

Large parts of the lower slopes in Glen Lochay have been fenced and are being planted with tree saplings. This work was still in progress during the 2014 survey with diggers carrying out site preparation whenever the weather permitted. This has affected parts of both Ben Heasgarnich SSSI and Meall na Samhna SSSI where planting had already been completed. As a consequence the area available for sheep grazing on the lower slopes of these hills has been reduced.

The Breadalbane Hills are a popular area for recreation. Walkers are frequent, especially along the ridge from the reservoir (Lochan na Lairige) to Ben Lawers, and to the summits of the munros: Carn Gorm, Meall na Samhna and Ben Heasgarnich.

Due to the large number of separate owners and tenants across the survey area, data was collected relating to the designated interests across each SSSI, rather than by ownership units.

**1.6 Logistics**

The survey was carried out between the 21st June and 22nd August 2014. The surveyors were Nikki Dayton, Tim Rafferty, Ruth Maier and Colin Wells. Access was by foot from the road, or by 4x4 along tracks where suitable.

**2. METHODS**

**Habitat Impact Assessment**

Grazing and trampling impact information was collected for the following broad groups of features throughout the Breadalbane hills: wind-clipped summit heath, flushes, smooth grassland and restricted habitats. These were selected as representative of the range of designated interests. The habitat groups correspond to the assessment categories listed in the field guide to upland impact assessment (MacDonald *et al.* 1998). These groups relate to the habitat definitions according to the following table:

Table 1: Summary of habitats surveyed within the survey area.

|  |  |  |
| --- | --- | --- |
| Habitat Group | Natura habitats included | NVC types covered |
| Wind-clipped Summit Heath | * alpine and boreal heaths * siliceous alpine and boreal grasslands | H13-H17, U10 |
| Smooth Grassland | * species-rich *Nardus stricta* grassland on siliceous substrates in mountain areas * alpine/sub-alpine calcareous grasslands | CG10, CG11, CG12, CG14, U5c |
| Flush | * alkaline fens | M10-12, M30-38 |
| Restricted Habitats including:  Tall herb  Sub-arctic *Salix* scrub | * tall-herb ledges * Sub-arctic *Salix* spp scrub | U15-U19, W20 |

In 2007, SNH provided randomly generated 250x250m survey squares for each of the features to be monitored, spread across the site. Up to five assessment quadrats were made from each of a total of 314 squares spread across the five sites. In 2011, each assessment quadrat was revisited, located as closely as possible to the original grid reference and then again in 2014.

Each quadrat was relocated within the squares using a hand-held GPS with minimum 5m accuracy. Each 2x2m plot was marked with a measured rope quadrat, aligned north from the selected grid reference. For linear habitats, an elongated quadrat shape was sometimes used, e.g. 1x4m, using the same area as the other quadrats, but allowing for the shape of the feature.

For tall-herb and willow quadrats on rock outcrops, quadrats were sometimes hard to relocate as accurately due to inaccessibility, difficulties in crossing terrain and lower GPS accuracy from working close to steep rock and overhangs. They were also generally not possible to mark with a quadrat.

As far as possible, two photos were taken of each assessment quadrat, one from above the quadrat and one from a point approx 2.5 paces south of the quadrat, unless ground or weather conditions prevented this. In each case the location and direction of the photos was noted.

For each habitat type, the relevant assessment of current impacts was made as per MacDonald *et al.* 1998 (see Appendix 4) by using the range of indicators in the field guide and classing each as High (H), Medium (M) or Low (L) impact or using intermediate classes, High-Moderate (HM), Moderate-Low (ML) where appropriate. For trends, the term ‘chronic’ is used in MacDonald *et al.* 1998 to refer to long-term impacts. The assessment of long-term impact was then complemented by an assessment of whether impacts have increased, decreased or are stable relative to these historic impacts, wherever possible.

The indicators for each habitat type were grouped according to whether they represented impacts from grazing, trampling, dung, litter or trends and an overall assessment for each impact type made for each habitat. Grazing impact indicators included evidence of off-take, bitten leaves/shoots and weeding of cushions and trampling indicators included hoof-prints, poaching and bare-peat.

To combine the results for each quadrat, High impact results were scored 3, High-Moderate impacts 2.5, Moderate impacts 2, Moderate-Low impacts 1.5 and Low impacts 1. The combined scores for individual indicators were then averaged to give an overall score for each impact group within the quadrat, which was reclassified as follows:

0-1.249 Low

1.25-1.749 Moderate-Low

1.75-2.249 Moderate

2.25-2.749 High-Moderate

2.75-3 High

This was done in the same way as for 2007 and 2011 to make a comparison with that data as requested in the SoR for this site.

In addition, a number of quantitative measurements were collected including, for example, vegetation height, percentage of the ground that was poached and the percentage of leaves that had been grazed. This provided additional detail and will be particularly useful in future comparisons, providing additional detail to the trend indicators.

An overall trend for each square was obtained by averaging the trend indicators in the same way. The overall trend may be expected to differ from the assessments made for current impacts (grazing and trampling together or trampling separately) as, even if there is no difference between current and chronic trends, the trend indicators have tended to concentrate on attributes influenced by principally grazing impacts. As this assessment was often based on only one or two indicators, it was possible to do most of these by simple averages.

The results from the individual plots were then averaged to produce an overall impact assessment for each ¼ km square, for grazing, trampling impacts and for impact trends.

In addition, a comparison was made between the data from 2007, 2011 and 2014, and an assessment made of the degree of change over the six years of this programme.

In the 2007 survey some errors were made in the processing of smooth grassland data with some indicators wrongly assigned to trampling rather than grazing impacts and vice versa. The assessments done in 2011 were calculated on the original 2007 indicator assignment in order to make a comparison, but the results were also recalculated in 2011 using the correct assignment of indicators and this assignment was used to assess the 2014 results - this is discussed further in results section 3.7.

Summary tables of all the overall assessments for grazing, trampling, dunging, litter accumulation, trend indicators, amended smooth grassland indicators and changes between the two surveys are given in Appendix 1.

All vascular species nomenclature is *per* Stace, (1997) and NVC classifications according to Rodwell (1990-2001).

**3. HABITAT DESCRIPTIONS AND INDICATORS**

**3.1 Wind-clipped communities**

3.1.1 Habitat Description

Wind-clipped communities included alpine heaths and moss-heaths where wind-clipping was evident. Samples were not taken in boreal heath where there was no sign of wind-clipping.

Alpine heaths were present in many high altitude locations where there was a degree of exposure, often on the shoulders of the summits where they graded from existing areas of dry heath. These were typically dominated by *Calluna vulgaris* (ling) or *Vaccinium myrtillus* (blaeberry) with lichens such as *Cladonia arbuscula* (H13)and/or *Racomitrium lanuginosum* (moss) (H14).

Moss-heaths (U10) were more common, especially across exposed summits and ridges. This community was dominated by mixtures of *Carex bigelowii* (stiff sedge) and *Racomitrium lanuginosum* (moss) often with some fine-leaved grasses, *Alchemilla alpina* (alpine ladies-mantle), *Vaccinium myrtillus* (blaeberry) and other dwarf-shrubs such as *Vaccinium vitis-idaea* (cowberry), *Empetrum nigrum sbsp. nigrum* (crowberry) and *Salix herbacea* (a dwarf willow).

3.1.2 Indicators

Of the indicators used for trampling and grazing, all were largely relevant with at least one of the diagnostic species present for most indicators in most quadrats. For example, signs of grazing on leaves or fine-leaved grasses were generally assessed on *Carex bigelowii* (stiff sedge) and *Festuca ovina* (sheep’s fescue). Grazing on broad-leaved grasses was assessed on *Anthoxanthum odoratum* (sweet-vernal grass) and *Agrostis canina* (velvet bent) and signs of grazing on unpalatable herbs were assessed on *Alchemilla alpina* (alpine ladies-mantle) and, where present *Silene acaulis* (moss campion). Browsing on shrubs, *Calluna vulgaris* (ling)and *Vaccinium myrtillus* (blaeberry) was also a reliable indicator.

Trampling was measured by the presence of disturbed bare ground with prints away from exposed areas and observed impacts were generally due to the presence of deer and sheep tracks. Dung abundance was noted and, where possible sheep, deer and hare dung were assessed separately, though the first two were sometimes hard to tell apart.

Current trends were assessed based on the cover and presence of fine and broad-leaved palatable grasses. These gave a good indication of long-term impacts and sometimes of more recent changes in impact levels. Longer term changes were illustrated by the comparison between 2007 and 2011 results.

The assessment of herbivore type was made using a range of indicators. The abundance of dung and tracks produced by different species were noted and signs of browsing by small herbivores such as voles were assessed by looking at the angle of browsing on dwarf-shrubs. The actual presence of animals on the ground was also noted as far as was possible, and other signs such as wool or scrapes, to get an indication of which were responsible for the impacts observed.

**3.2 Smooth Grasslands**

3.2.1 Habitat description.

Smooth grasslands were found scattered through all five SSSIs and were required to be assessed on all but Meall Ghaordie. They were generally located on the steeper, grassy slopes of the hills and around the summit heaths, sometimes as large patches a few hundred metres across, but often as tiny pockets 2x2m, associated with areas of outcropping rock, knolls or banks.

The main communities found were the calcareous grasslands CG10 *Festuca ovina-Agrostis capillaris-Thymus polytrichus spp. brittanicus (T.praecox)* grassland, CG11 *Festuca ovina-Agrostis capillaris-Alchemilla alpina* and CG12 *Festuca ovina-Alchemilla alpina-Silene acaulis* grasslands. Of these, the CG11 was the most common. CG10 swards were occasional lower on the hillsides and in the valleys, especially where sheep-grazed. CG11 grasslands were ubiquitous across the slopes and summits. CG12 grasslands were relatively frequent at high altitudes, i.e. above 800m. Within *Nardus stricta* (mat grass) grasslands, occasional areas of local richness in which species such as *Thymus polytrichus spp. brittanicus* (thyme)*, Carex panicea* (carnation sedge)became locally frequent (U5c) were also included.

Some of the areas previously described as calcareous grassland in 2007, had characteristics of heath vegetation with *Calluna vulgaris* and *Vaccinium myrtillus* tending towards 25% cover of the plots (see photo – Ben Lawers plot 7.2a). Both these species are typical of the grassland communities previously identified but their presence at such high abundance marks a shift towards European Dry Heath vegetation, a different Annex 1 habitat, probably as a result of lower grazing pressure. Elsewhere, *Nardus stricta* was becoming more vigorous, especially on Ben Heasgarnich and Meall na Samhna, the sward tending towards U5.



3.2.2 Indicators

A measure was taken of the average sward height of each quadrat (cm) and an assessment made of sward height and texture such that short vegetation mostly <3m was rated a High impact, 3-6cm a Moderate impact and >6cm a Low impact unless more than 25% of the sward was less than 6cm suggesting a Moderate impact.

Other indications of grazing included the presence of uprooted tillers, the depth of litter, and signs of grazing on a range of indicator species of variable palatability, e.g. less palatable herbs such as *Alchemilla alpina* (alpine ladies-mantle)*, Thymus polytrichus spp. brittanicus* (wild thyme)and *Juncus squarrosus* (heath rush) was separated from signs of grazing on palatable legume species such as *Trifolium repens* (white clover)*.* Grazing on *Dryas octopetala* (mountain avens) was mostly inapplicable as this species was only present in a couple of quadrats throughout the five sites.

Small, cushion forming species were uncommon in CG10 and CG11 grasslands, but were frequent in CG12 swards at higher altitudes with species such as *Saxifraga hypnoides* (mossy saxifrage)*,* *Minuartia sedoides* (cyphel)and *Silene acaulis* (moss campion) present. Signs of weeding of cushions of these species provided a useful indication of grazing impacts on higher altitude samples – see photo.



The depth of mosses was an indicator of the degree of disturbance to the sward, with High impact sites having a greater cover of mosses, >50%; the mosses expanding in the open cover created by grazing and trampling. Trampling damage was noted by the presence of disturbed bare ground, not including wind-scoured earth, bare rock or mole hills.

Another indicator for trampling in smooth grasslands was breakage and uprooting of shoots of *Silene acaulis, Minuartia sedoides, Huperzia selago, Saxifraga hypnoides* and *Selaginella selaginoides* but as these species were only present in high altitude alpine & sub-alpine grassland samples this indicator was only rarely applicable.

The presence of trees was generally not applicable as any trees tended to be down in steep-sided gorges and valleys and unlikely to disperse seed effectively uphill.

There are five trend indicators for smooth grassland but most were largely inapplicable. The most useful assessment was made by comparing the height of the sward (as an indicator of longer term impacts) to that indicated by current grazing on leaves. I.e. If the impact indicator for sward height suggests a High Impact but the impact indicated by current grazing on leaves suggests a Moderate or Low impact, the overall trend would be of a Decreasing impact (D). This method required averaging indicators for current grazing on leaves in the field, and had to be checked through as a desk exercise afterwards to ensure that the averages were accurate.

The state of tall-herbs was generally not an applicable indicator as these species were scarce. The cover of small, rosette forming herbs was a useful indicator of long-term impacts. The presence of weedy species was not applicable in most cases.

**3.3 Flushes**

3.3.1 Habitat Description

Flushes were generally frequent on the slopes, especially along burnsides and across areas of degraded wet-heath and grassland. On the summits the ground was often dry with flushes limited to the breaks of slope and beneath outcropping rocks. On the flanks and upper slopes of the hills, most of the flushes were of the short-sedge type dominated by species such as *Carex viridula ssp. oedocarpa* (common yellow sedge)and *Carex panicea* (carnation sedge). On lower slopes, the *Carex dioica-Pinguicula vulgaris* flush (M10) was the most frequent, generally with abundant brown mosses including *D. revolvens* (moss), *Scorpidium scorpioides* (moss)and *Campyllium stellatum* (moss) as well as *Juncus bulbosus* (bulbous rush)*, Triglochin palustris* (marsh arrowgrass) and *Pinguicula vulgaris* (common butterwort)*.*

On higher ground, roughly above 600m though there was considerable cross-over, the M11 flush became more common in open, stony conditions. This flush was dominated by *Carex viridula ssp. oedocarpa* (common yellow-sedge) with other sedges and frequent *Saxifraga aizoides* (yellow saxifrage)*. Saxifraga stellaris* (starry saxifrage) was also frequent but the brown mosses were sparse. Less frequent but occasional around the summits were M12 *Carex saxatilis* flushes.

All these sedge flushes were typically linear, 0.5-2m wide and varied from small isolated pockets to extensive networks that webbed the hillside.

‘Spring-head’ type flushes, dominated by bryophytes such as *Philonotis fontana* (moss)*, Cratoneuron commutatum* (moss)*, Anthelia julacea* (liverwort)and *Aneura pinguis* (liverwort)(M31, M32, M37, M38) were less common. They occurred at the head of some flushes, especially in areas of rock outcropping or along rocky gorges. These flushes were all quite small, often less than the 2x2m quadrat and tended to merge almost immediately into the short sedge flush type as above.

3.3.2 Indicators

For flush communities there were several indicators for trampling impacts. Trampling indicators focussed on disruption to the peat and to moss mats and on the percentage of ground affected by poaching. Grazing indicators included vegetation height, percentage grazing on grass and sedge leaves and the proportion of sedgeflower heads that have been bitten off. These were reliable indicators in the less disturbed flushes but where there had been long-term impacts, for example to the south of Ben Lawers, sedges had been largely replaced by unpalatable species such as *Juncus squarrosus* (heath rush) and rank grasses. As these had been left ungrazed they not only skewed the results for ‘vegetation height’ but protected shorter, more palatable species. ‘Sedge flower heads bitten off’ was also difficult to assess as many of the sedges were not in flower.

The other indicators required the presence of certain species, *Juncus* spp. (rush), *Erica tetralix* (cross-leaved heath), *Cardamine* spp (group including cuckoo flower), *Crepis* spp. (hawkbeards) and *Armeria maritima* (thrift)*,* which were absent from all but a very few plots.

Trends were measured by the relative abundance of rushes *Juncus* spp. (rush) and grassland species and this was generally reliable to measure. However, in most cases this reflected longer-term impacts rather than current directional trends. The other trend indicator, height of bushes, was not applicable as woody shrubs were absent from all samples. Longer term changes were illustrated by comparison with 2007 results.

**3.4 Restricted habitats – tall-herb ledges**

3.4.1 Habitat Description

Restricted habitats

Tall herb ledges were present in all five sites though rare on Meall Ghaordie and Carn Gorm, throughout areas of outcropping rock, generally close to the summits and high ridges.

The tall herb ledges assessed were most often of the *Alchemilla glabra-Saxifraga aizoides* banks (U15) or of the *Luzula sylvatica-Geum rivale* (U17) community. In general these were located on steep, near vertical slopes that were inaccessible to large herbivores. Typical species included *Alchemilla glabra* (ladies-mantle)*, Alchemilla alpina* (alpine ladies-mantle)*, Saxifraga aizoides* (yellow saxifrage), *Sedum rosea* (roseroot) and grasses. Taller herbs such as *Geum rivale* (water avens) and *Angelica sylvestris* (wild angelica) were less common, typically only found on larger stands with at least some *Luzula sylvatica,* or within those areas from which grazing had been excluded*.* Ferns including *Athyrium filix-femina* (lady fern) and *Blechnum spicant* (hard fern) were occasional.



3.4.2 Indicators

The main indicators of grazing on tall-herb vegetation were vegetation height and signs of grazing on a number of plant groups. Grazing on palatable tall herbs such as *Geum rivale* (water avens)*, Angelica sylvestris* (wild angelica)*, Luzula sylvatica* (greater wood-rush)and *Alchemilla* spp (ladies-mantles) was a useful indicator where these tall herbs were present, but in most stands the main species was *Alchemilla alpina* (alpine ladies-mantle) and this is relatively unpalatable compared to the others. Browsing on dwarf-shrubs was a reliable indicator where present, but most stands did not support dwarf-shrubs. Ferns were present in most quadrats, but only in the least accessible areas and therefore showed no signs of grazing.

Trend indicators assessed the conspicuousness of tall herbs compared to grassland species or flowering of tall-herbs; both useful indicators if those tall-herbs were present. The other trend indicator was the presence of seedlings/saplings of small tree species, but these were rarely present and most plots were at a considerable distance from any sources of seed. This meant that, for the kinds of tall-herb ledges within the Breadalbane hills, current trend indicators were largely applicable. Longer term trends were illustrated by comparison with 2007 data.

**3.5 Restricted Habitats – sub-Arctic willow scrub**

3.5.1 Habitat Description

Sub-Arctic willow scrub quadrats were scattered sparsely throughout the high altitude areas of all the sites surveyed, especially in the rocky outcrops below the summits of Ben Lawers, Ben Heasgarnich and Meall na Samhna. As far as possible, where these coincided with squares selected for restricted habitats, willow assessments were made, and wherever else willows could be located within restricted habitat plots. However, willows were scarce and rarely occurred in groups of more than a few bushes. Some opportunistic quadrats were surveyed where necessary and some inaccessible plots were surveyed remotely using binoculars.

Dwarf willows surveyed included *Salix lapponum, Salix myrsinites* and *Salix phylicifolia*. .

3.5.2 Indicators



Browsing in this type of habitat was measured by damage on the shrubs (see photo) such as bark-stripping and the presence and condition of seedlings and saplings. Grazing on field-layer species was also measured. The degree of grazing or browsing on dwarf-shrubs and tall-herb vegetation was assessed using the various indicators for those habitats. Disturbance to litter and the presence of dung and tracks gave an indication of the number and type of herbivores involved.

Current trends were measured by looking at the form and extent of the willow bushes, particularly at any dense branching or contortion of the branches compared with other evidence suggesting high or low grazing impacts. Longer term trends were illustrated by comparison with 2007 data.

**3.6 RESULTS FOR EACH SSSI**

**3.6.1 Ben Lawers (see Ben Lawers Maps 2a-7)**

The assessments made within Ben Lawers SSSI included wind-clipped communities, smooth grassland (including alpine and sub-alpine grasslands and species-rich *Nardus* grassland in mountain areas, flushes (including alkaline fen, alpine fen and spring, rill and flush communities) and restricted communities; including both tall herb ledges and montane willow scrub. In total 144 assessments were made at Ben Lawers, three more than in 2011 and four more than in 2007, mainly due to additional stands of tall herb having been found whilst carrying out the SCM assessment alongside. Each assessment ‘score’ represents the average of up to 5 quadrat samples taken from within a 1/4km2 square. For each habitat, an assessment of current grazing and trampling impacts was made, and an assessment of ‘current trends’ based on the indicators used in the field. In addition, overall changes between 2007 & 2011 and from 2011 to 2014 were summarised, based on the difference in results for grazing and trampling between these three years. These are shown on the impact maps by concentric squares, the outer representing the impact levels in 2007, the middle one 2011 and the central square, 2014.

*3.6.1.1 Wind-clipped Communities*

The assessments for wind-clipped vegetation on Ben Lawers were based on a total of 24 assessment squares, as for 2007 and 2011, spread along the Tarmachan ridge, along the main ridge from Ben Ghlas, via Ben Lawers to Meal Griegh and to the north of Meall Coranaich to Meall a Choire Leith. The vegetation assessed was predominantly U10 *Carex bigelowii-Racomitrium lanuginosum* moss heath with occasional stands of H19/20 *Vaccinium myrtillus* heath and H13 *Cladonia arbuscula* heath. In some locations the U10 moss heath was noted as being transitional to U7 *Nardus stricta* grassland.

Grazing - see Ben Lawers map 2

**Table 3.6.1.1.1 The change in grazing impacts to wind-clipped communities on Ben Lawers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Lawers 2007 | 0 | 8 | 46 | 42 | 4 | 100 |
| Ben Lawers 2011 | 4 | 46 | 46 | 4 | 0 | 100 |
| Ben Lawers 2014 | 12.5 | 50 | 25 | 12.5 | 0 | 100 |

Of the 24 assessments made, 50% had Moderate-Low impacts and 13% Low, slightly more plots falling into the lower impact classes than in 2011 (L+LM 50%) although this was not a significant change. However, this was still a considerably lower impact than in 2007 when just 8% were Moderate-Low, 46% of samples showed a Moderate impact and 42% were High-Moderate.

In 2007, the High-Moderate impacts were mostly recorded around Ben Ghlas and south of Ben Lawers and were largely attributed to sheep grazing. A few High impacts were also recorded from the north-east and from the Tarmachan ridge in the west, that were likely to be due to deer as sheep were not kept in those areas.

Grazing impacts to wind-clipped communities reduced significantly between 2007 and 2011 and less markedly between 2011 and 2014. In all those areas previously highlighted as having higher impacts, levels are now predominantly Moderate-Low. However, the few Moderate and High-Moderate impacts recorded in 2014 were still in these areas: i.e. South Ben Lawers, west of the Tarmachan ridge and to the north-east, along the Bealach Craig a Bhannaich.

The pattern of grazing has been one of decreasing impact levels on wind-clipped habitats but, although still tending towards lower impact levels, the change has been much less evident between 2011 and 2014 than previously. Also, the Moderate and High-Moderate level impacts recorded are still occurring in the same areas.

Trampling - see Ben Lawers map 3

**Table 3.6.1.1.2 The change in trampling impacts to wind-clipped communities on Ben Lawers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Lawers 2007 | 42 | 46 | 13 | 0 | 0 | 100 |
| Ben Lawers 2011 | 71 | 17 | 13 | 0 | 0 | 100 |
| Ben Lawers 2014 | 92 | 4 | 0 | 0 | 0 | 100 |

Trampling assessments have continued to be predominantly Low since 2011, following the change towards lower impacts observed between 2007 and 2011. The current situation is that trampling impacts on wind-clipped communities within Ben Lawers are entirely Low (92%) or Moderate-Low (8%) throughout the Ben Lawers range.

Trends

**Table 3.6.1.1.3 The change in chronic impacts and trends to wind-clipped communities on Ben Lawers**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| Ben Lawers 2007 | 21 | 4 | 4 | 4 | 46 | 21 | 100 |
| Ben Lawers 2011 | 50 | 4 | 8 | 0 | 29 | 4 | 100 |
| Ben Lawers 2014 | 54 | 0 | 8 | 0 | 29 | 4 | 100 |

In 2007, the majority of the squares assessed within Ben Lawers SSSI indicated high long-term grazing impacts with 75% assessed as Chronic High, including 5 squares with an increasing impact trend, especially on Meall Garbh and Meall nan Tarmachan. In 2011, only 41% of samples indicated a Chronic High impact and there was no change to this assessment in 2014. The remainder of the assessment squares indicated Chronic Low impacts and the only change observed was a single change from a Chronic Low, increasing impact to Chronic Low, no change. This ties in with the observed impact changes that suggest both grazing and trampling impacts fell between 2007-2011 and have remained at these lower levels up to the 2014 survey with possibly a slight additional decrease in impact levels.

Dung

Sheep dung on wind-clipped habitats on Ben Lawers was at high frequency in 14/24 squares, Moderate in 5 and Low in 5 and deer dung was at high frequency in 12, Moderate in 7 and Low in 5. This is very similar to the levels recorded in the previous surveys

*3.6.1.2 Smooth Grassland*

15 smooth grassland assessments were made at Ben Lawers, compared to 17 in 2011 and 15 in 2007. The decrease was due to grasslands having become overgrown by heath and one having been recorded to the south of the site boundary in 2011.

Grazing Impacts - see Ben Lawers map 4

**Table 3.6.1.2.1 The change in grazing impacts to smooth grassland on Ben Lawers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Lawers 2007 | 7 | 47 | 40 | 7 | 0 | 100 |
| Ben Lawers 2011 | 12 | 65 | 24 | 0 | 0 | 100 |
| 2011 amended | 24 | 59 | 18 | 0 | 0 | 100 |
| Ben Lawers 2014 | 20 | 73 | 7 | 0 | 0 | 100 |

There has been a general shift in grazing impacts on smooth grassland towards lower impact levels. In 2007, 40% of squares indicated a Moderate impact and 7% High-Moderate, mainly scattered to the south of Ben Lawers ridge and at Meall Garbh. The only square noted as showing High-Moderate impact in 2007 is now Moderate-Low. All but one of those squares assessed in 2007 as indicating a Moderate impact level are also now Moderate-Low. A single assessment to the south of Lochan nan Cat has remained at a Moderate impact level. Otherwise, 93% of all squares assessed in 2014 indicated a Moderate to Low or Low impact. This seems to have been a gradual change over the seven years of this survey with the results for 2011 falling between the 2007 and 2014 levels.

Trampling Impacts - see Ben Lawers map 5

**Table 3.6.1.2.2 The change in trampling impacts to smooth grassland on Ben Lawers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Lawers 2007 | 0 | 67 | 33 | 0 | 0 | 100 |
| Ben Lawers 2011 | 6 | 71 | 18 | 0 | 6 | 100 |
| 2011 amended | 0 | 71 | 24 | 6 | 0 | 100 |
| Ben Lawers 2014 | 13 | 73 | 13 | 0 | 0 | 100 |

Following a slight decrease in trampling impacts on smooth grassland between 2007 and 2011 there has been very little change in the 2014 survey. A single square along the Allt Gleann da Eig to the north-west has fluctuated from Moderate-Low to High and back to Low over the survey but this is likely to be due to its location in a flushed and boggy area near the river making it susceptible to short-term trampling impacts. Two samples still recorded as showing a Moderate trampling impact are on the top of the Tarmachan ridge near the footpath and on the sharp-ridge between Coire Thaochaidh and Coire nam Bhuidheag to the north-east - a natural desire line and vantage point location for both humans and herbivores.

Trends

**Table 3.6.1.2.3 The change in chronic impacts and trends to smooth grassland on Ben Lawers**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| Ben Lawers 2007 | 33 | 13 | 0 | 13 | 27 | 13 | 100 |
| Ben Lawers 2011 | 53 | 12 | 24 | 0 | 12 | 0 | 100 |
| Ben Lawers 2014 | 60 | 7 | 7 | 0 | 13 | 13 | 100 |

The trend indicators also show a generally decreasing impact to smooth grassland over the duration of the surveys. In 2007, 53% of samples indicated a Chronic High impact, of which a quarter were increasing, whereas in 2011 36% of samples indicated a Chronic High impact and 2/3 of those (24% of all samples) showed a decreasing impact trend. In 2014, 33% of samples indicated a chronic high impact although two squares still indicated an increasing impact. 67% of all squares assessed in 2014 now suggest a long-term Low impact with only one of those assessments suggesting an increasing impact.

Dung

**Table 3.6.1.2.4 The change in dung frequency on smooth grassland on Ben Lawers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Dung* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Lawers 2007 | 33 | 27 | 13 | 7 | 20 | 100 |
| Ben Lawers 2011 | 18 | 12 | 29 | 18 | 24 | 100 |
| Ben Lawers 2014 | 33 | 13 | 33 | 13 | 7 | 100 |

The dung frequency assessments have shown very little change since 2007 except a slight shift towards Moderate frequency and away from High and High-Moderate frequencies. In 2007 20% of squares showed a High dung frequency and 24% in 2011 but this had dropped to 7% in 2014 whereas the percentage of squares indicating a Moderate dung frequency had increased from 13-33%. Other changes are slight.

Litter - see Ben Lawers map 6

**Table 3.6.1.2.5 The change in impacts as shown by litter depth in smooth grassland on Ben Lawers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Litter* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Lawers 2007 | 20 | 0 | 60 | 0 | 20 | 100 |
| Ben Lawers 2011 | 6 | 24 | 41 | 18 | 12 | 100 |
| Ben Lawers 2014 | 7 | 7 | 33 | 0 | 53 | 100 |

Changes in the accumulation of litter were rather inconclusive. The 2014 results have fewer Moderate assessments but have more of both High and Low impact assessments across the site than previous years. Although there has been an increase in the number of squares showing very little litter build-up (assessed as meaning a High impact *sensu* MacDonald *et al* 1998), there are other factors that may affect results. Some of these plots are located on steep slopes e.g. around Meall Garbh where litter might be less likely to accumulate or on high, exposed locations (to the north-east, on Meall Corranaich and the Tarmachan) where litter would be more prone to wind. However, the higher altitude squares noted above are also located in areas that have been shown to have higher herbivore impacts on wind-clipped and grassland habitats. The increased number of high impact results may therefore be indicative of longer term impacts, but may also be partly due to slow growth and wind-erosion of dead material in these exposed areas.

*3.6.1.3 Flush communities*

The communities assessed were base-rich flushes and springs, mainly of the M10 *Carex dioica* and *M11 Carex viridula ssp. oedocarpa –Saxifraga aizoides* types, but also including some springs dominated by *Philonotis fontana, Cratoneuron commutatum* and *Anthelia julacea:* M31, M32. A total of 79 squares were assessed for flush communities, in 2007, 2011 and 2014.

Grazing - see Ben Lawers map 7

**Table 3.6.1.3.1 The change in grazing impacts to flushes on Ben Lawers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Lawers 2007 | 22 | 59 | 15 | 3 | 0 | 100 |
| Ben Lawers 2011 | 9 | 72 | 14 | 5 | 0 | 100 |
| Ben Lawers 2014 | 31 | 59 | 9 | 1 | 0 | 100 |

The majority of the grazing impacts on flush vegetation were Moderate-Low in 2007, 2011 and 2014, with a 15% Moderate impacts recorded and 3% High-Moderate in 2007 and 14% Moderate and 5% High Moderate in 2011. In 2014 there were more squares assessed as indicating a Low grazing impact (30%) and Moderate-Low (57%), and fewer at higher impacts, e.g. only one assessment at High-Moderate and none High. This shows a general slight shift across the habitat towards lower impact levels.

The few Moderate and the single High-Moderate impact assessments recorded in 2014 were almost all located around Meall Corranaich. One was to the south of Craig an Fhitich, across the southern slopes and one to the north of An Stuc. Moderate and High-Moderate grazing impacts were previously recorded on the Tarmachan ridge but these are all now Low or Moderate-Low.

Trampling - see Ben Lawers map 8

**Table 3.6.1.3.2 The change in grazing impacts to flushes on Ben Lawers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Lawers 2007 | 8 | 47 | 37 | 8 | 1 | 100 |
| Ben Lawers 2011 | 15 | 54 | 25 | 4 | 1 | 100 |
| Ben Lawers 2014 | 11 | 58 | 25 | 3 | 0 | 100 |

Trampling impacts recorded from flushes on Ben Lawers were very similar to previous years with almost no change in the percentages of assessments recorded (see table above). As before, most of the Moderate and High-Moderate impacts were recorded from the eastern slopes of Meall Corranaich and to the east of Meall a Choire Leith, along the Allt a Chobhair glen, and across Coire Thaochaich to the north-east of the SSSI and at a three locations to the south of Ben Lawers.

*3.6.1.4 Restricted Communities*

The assessments for restricted communities included 14 tall herb squares as for 2007 and 2011 and 9 willow squares as an extra willow group was found as part of the SCM survey. The tall herb ledge communities assessed were mainly U15 *Alchemilla alpina-Saxifraga aizoides* banks and U17 *Luzula sylvatica-Geum rivale* with some W20*.* Access was difficult to many stands of these habitats and damp rocky ledges were not always safe to ascend. Some remote assessments of ledges were therefore necessary.

Grazing

**Table 3.6.1.4.1 The change in grazing impacts to restricted communities on Ben Lawers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing - tall herb* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Lawers 2007 | 43 | 43 | 7 | 7 | 0 | 100 |
| Ben Lawers 2011 | 64 | 7 | 21 | 7 | 0 | 100 |
| Ben Lawers 2014 | 43 | 50 | 7 | 0 | 0 | 100 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing - sub-Arctic willow* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Lawers 2007 | 25 | 63 | 13 | 0 | 0 | 100 |
| Ben Lawers 2011 | 25 | 63 | 13 | 0 | 0 | 100 |
| Ben Lawers 2014 | 12.5 | 75 | 12.5 | 0 | 0 | 100 |

Of the 14 assessments made for tall herb ledges, 43% indicated a Low and 50% a Moderate-Low grazing impact, giving a total of 93% of squares in these classes. This can be compared to 86% (L & LM) in 2007 and 71% (L & LM) in 2011, i.e. a very slight change. Many of the squares are within the exclosed area or on inaccessible ledges so they would not be expected to change. There was likewise almost no change in the level of grazing on montane willow scrub, although one square still indicates a Moderate grazing impact. Many of these squares are inaccessible to herbivores.

Trampling

**Table 3.6.1.4.2 The change in trampling impacts to restricted communities on Ben Lawers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Lawers 2007 | 63 | 25 | 13 | 0 | 0 | 100 |
| Ben Lawers 2011 | 0 | 88 | 13 | 0 | 0 | 100 |
| Ben Lawers 2014 | 0 | 78 | 11 | 0 | 0 | 100 |

No assessments were made for trampling on tall-herb vegetation, but 78% of all willow samples indicated a Moderate-Low trampling impact, which is very similar to both 2007 and 2011 when 88% of trampling assessments on dwarf willow vegetation were recorded as Low or Moderate-Low impact. A moderate trampling impact was recorded for one sample on the edge of the SSSI, north of the Tarmachan ridge.

Trends

**Table 3.6.1.4.3 The change in chronic impacts and trends to restricted communities on Ben Lawers**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends - tall herb* | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| Ben Lawers 2007 | 21 | 0 | 14 | 0 | 64 | 0 | 100 |
| Ben Lawers 2011 | 64 | 7 | 21 | 0 | 7 | 0 | 100 |
| Ben Lawers 2014 | 64 | 0 | 7 | 0 | 7 | 0 | 100 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends - sun-Arctic willow scrub* | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| Ben Lawers 2007 | 63 | 0 | 0 | 0 | 38 | 0 | 100 |
| Ben Lawers 2011 | 50 | 13 | 13 | 0 | 25 | 0 | 100 |
| Ben Lawers 2014 | 22 | 11 | 11 | 0 | 0 | 22 | 100 |

Of the tall-herb assessments, there was a significant drop in the number of assessments indicating a chronic high trend between 2007 and 2011, from 78% to 30%. Most of the high, long-term impacts were found over the Tarmachan ridge, around Meall Corranaich and below Creag an Fhitich. In 2014 there were still 28% of samples in this class suggesting a continuing slight decrease in impacts. Most samples (64%) indicated a Chronic Low, impact in both 2011 and 2014.

For the willow habitat, 38% of squares were recorded in both 2007 and 2011 as showing a Chronic High impact and this has dropped slightly to 33% in 2014. There is otherwise very little change in the trend class of montane willow assessments.

*3.6.1.5 Herbivore information*

Sheep

The management of herbivores within Ben Lawers SSSI is split between six different land ownership units, and to a number of farmers with historic grazing rights within the NTS land to the south of Ben Lawers. There have also been changes to grazing subsidies during the Section 7 agreement, entered into by all owners and graziers during 2010 to deliver agreed management objectives.

Sheep numbers have been reduced generally across the site since 2007, partly through the NTS acquiring control of some grazing rights between 2007 and 2011, e.g. on the Tarmachan, and partly through voluntary reductions on some of the private estates. Stocking levels are still highest to the south-east of the SSSI within NTS controlled land.

The sheep tend to congregate on preferred habitat such as smooth grassland and at preferred locations such as ridges and other vantage points. Sheep grazing is patchy across the SSSI despite the lack of fences, with locally higher grazing observed around Meall Corranaich, Beinn Ghlas and Creag an Fhitich where there is preferred habitat.

Impacts appear to have decreased strongly on some habitats between 2007 and 2011 but not to have changed appreciably between 2011 and 2014 except for a slight continued decrease, particularly on those areas where sheep numbers have been reduced. Higher impacts previously noted from Meall an Tarmachan and to the north-east also appear to be decreasing since sheep have been removed.

Deer

Red deer signs are frequent across the site and culls are undertaken on most of the ground. Deer dung was still frequent on the ridges and in the corries but grazing and trampling impacts were generally decreasing across the SSSI.

Other herbivores

Few hares were noted except near Ben Lawers, to the north-west. Field voles were very frequent this year following a mild winter, and burrows and small patches of closely cropped grasses were evident in most samples. In the exclosures, voles are the dominant herbivore although a few deer signs were noted inside the fence..

**3.6.2 Ben Heasgarnich (see Ben Heasgarnich maps 2a-7)**

The assessments made within Ben Heasgarnich SSSI/SAC included smooth grassland (including alpine and sub-alpine grasslands and species-rich *Nardus* grassland in mountain areas, flushes (including alkaline fen, alpine fen and spring, rill and flush communities) and restricted communities; including both tall herb ledges and montane willow scrub. Ben Heasgarnich is the westernmost of the five SSSIs surveyed. In total 64 squares were assessed, each assessment representing an average of 1 to 5 quadrat samples taken from within 1/4km2 squares, at random locations as per Ben Lawers and mapped in the same way.

Wind-clipped heaths were not assessed as they are not designated interests on this site.

*3.6.2.1 Smooth Grassland*

Grazing

**Table 3.6.2.1.1 The change in grazing impacts to smooth grassland on Ben Heasgarnich**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Heasgarnich 2007 | 14 | 73 | 14 | 0 | 0 | 100 |
| Ben Heasgarnich 2011 | 43 | 52 | 5 | 0 | 0 | 100 |
| 2011 amended | 48 | 43 | 10 | 0 | 0 | 100 |
| Ben Heasgarnich 2014 | 48 | 48 | 4 | 0 | 0 | 100 |

In total 21 assessments were made for smooth grassland, with samples largely drawn from the main ridge and the steep calcareous slopes to the north. One of the squares previously surveyed in 2007 (Square 24) comprised wind-clipped communities which had been wrongly identified as smooth grassland in the first survey. This has been discarded from the second and third survey results.

Between 2007 and 2011 there was an evident decrease in impacts with 73% Moderate to Low and 14% Moderate in 2007 and only 14% Low, to a fairly equal split in 2011 with 48% Low and 43% Moderate to Low.

Grazing levels in 2014 were similar to those found in 2011, with 48% of plots with Low impacts and 48% with Moderate-Low impacts. A single plot had Moderate grazing impacts (5%), reduced from 2011 when 2 plots had Moderate impacts (10%).

The Moderate impact plot was in Coire Ban Mor. This was one of four plots where grazing impacts were found to increase slightly, though all other increases were from Low to Moderate-Low. Increased grazing on *Deschampsia cespitosa* in some of the plots is at least partly responsible for these increases. In 2011 High grazing impacts on *D. cespitosa* were found in 2 samples in 2011 but at 9 in 2014.

Impacts showed more of a marked decrease between 2007 and 2011, whereas between 2011 and 2014 impacts were generally about the same, with no significant change.

Trampling

**Table 3.6.2.1.2 The change in trampling impacts to smooth grassland on Ben Heasgarnich**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Heasgarnich 2007 | 0 | 64 | 32 | 5 | 0 | 100 |
| Ben Heasgarnich 2011 | 0 | 71 | 29 | 0 | 0 | 100 |
| 2011 amended | 5 | 76 | 19 | 0 | 0 | 100 |
| Ben Heasgarnich 2014 | 14 | 62 | 19 | 5 | 0 | 100 |

Trampling impacts continued to show a slight overall decrease, with the percentage of squares in the Low impact class rising from )% in 2007, to 5% in 2011 and to 14% in 2014. Correspondingly, Moderate impact squares fell from 32% in 2007 and then stayed the same at 19% in 2011 and 2014. In both 2007 and 2014 High-Moderate impacts were recorded for one square, in 2014; this was in Coire Ban Beag which was recorded as showing a higher level of bare ground than previously.

Impacts decreased in 29% of plots but also increased in 24% due to the presence of disturbed bare ground, which was recorded as High at 15 sample points in 2014 as opposed to 9 in 2011. Four of the squares indicating a decreasing trampling impact were in the northern part of the site, the remaining 2 were close to the main ridge in the central part.

Overall, this suggests a decrease in trampling impacts on smooth grassland within Ben Heasgarnich between 2007 and 2011, and that impacts have barely changed over the last three years.

Trends

**Table 3.6.2.1.3 The change in chronic impacts to smooth grassland on Ben Heasgarnich**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %CH/D | %CH | %CH/I | TOTAL |
| Ben Heasgarnich 2007 | 14 | 50 | 32 | 5 | 100 |
| Ben Heasgarnich 2011 | 33 | 67 | 0 | 0 | 100 |
| Ben Heasgarnich 2014 | 38 | 33 | 29 | 0 | 100 |

Trends varied little between 2007, 2011 and 2014, but there was a slight increase in the percentage of squares with Chronic Low impacts from 14% in 2007 to 33% in 2011 and 38% in 2014. This corresponded to a decrease in the number of squares showing a Chronic High impact, from a total of 87% in 2007 (with 5% showing an increasing impact trend), to 62% in 2014 and with none increasing. This supports the grazing and trampling impact data that suggest a general decrease in impacts between 2007 and 2011 with no significant change except a possible slight further decrease between 2011 and 2014.

Dung

**Table 3.6.2.1.4 The change in dung frequency on smooth grassland on Ben Heasgarnich**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Dung* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Heasgarnich 2007 | 27 | 18 | 18 | 14 | 23 | 100 |
| Ben Heasgarnich 2011 | 29 | 29 | 10 | 5 | 29 | 100 |
| Ben Heasgarnich 2014 | 38 | 38 | 19 | 0 | 5 | 100 |

The frequency of dung in samples has continued to decrease, with 38% in each of the Low and Moderate-Low impact classes, a total of 76% in 2014. In 2007 a total of only 45% of squares had dung frequencies in the two lower classes and 23% still indicating a High dung frequency and in 2011 there were 29% of squares in Low and Moderate to Low and 29% still in High. Only 5% of squares still had High dung levels in 2014, no squares had High-Moderate dung levels and 19% had Moderate ones. This supports the findings of the impacts surveys of a generally decreasing level of herbivore activity.

Litter

**Table 3.6.2.1.5 The change in impacts as shown by litter depth in smooth grassland on Ben Heasgarnich**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Litter* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Heasgarnich 2007 | 9 | 0 | 50 | 0 | 41 | 100 |
| Ben Heasgarnich 2011 | 29 | 0 | 62 | 0 | 10 | 100 |
| Ben Heasgarnich 2014 | 19 | 10 | 57 | 5 | 10 | 100 |

Litter levels were similar to 2011 with most squares indicating a Moderate impact (57%) compared to 62% in the Moderate impact class in 2011. High impact plots stayed the same at 10%. However, between 2007 and 2011 there had been a more marked change, i.e. from 41% of squares showing a High impact and only 9& a Low impact. This also supports the finding of a more marked change between 2007 and 2011 with little further decrease in impacts during the last three years.

*3.6.2.2 Flushes*

In total, 26 squares were assessed for flush habitats within Ben Heasgarnich SSSI. In general flushes assessed were of the M10 *Carex dioica-Pinguicula vulgaris* or M11 *Carex viridula ssp. oedocarpa –Saxifraga aizoides* types but there were also quite frequent springheads including *Anthelia julacea-Sphagnum auriculatum* M31, *Philonotis fontana-Saxifraga stellaris* M32, *Cratoneuron commutatum-Festuca rubra* M37 or *Cratoneuron commutatum-Carex nigra* M38 forming all or part of samples. Flush samples were spread mainly across the central third of the SSSI, to either side of the ridge.

Grazing

**Table 3.6.2.2.1 The change in grazing impacts to flushes on Ben Heasgarnich**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Heasgarnich 2007 | 11 | 89 | 7 | 0 | 0 | 100 |
| Ben Heasgarnich 2011 | 0 | 73 | 23 | 4 | 0 | 100 |
| Ben Heasgarnich 2014 | 46 | 54 | 0 | 0 | 0 | 100 |

Flush grazing impacts have clearly decreased since 2011 with 54% of plots in the Moderate-Low and 46% in the Low impact class. Unlike in 2011, there were no plots in the Moderate or High-Moderate impact classes. Half of the plots showed clear decreases in grazing, the other half remained unchanged. No plots showed increases in grazing levels. The 2011 data indicated a slight increase from 2007 levels with 27% of squares in the Moderate and High-Moderate classes compared to 89% Moderate-Low in 2007. However the 2014 impact scores are the lowest of the three years' surveys.

The grazing impact score is mostly derived from the vegetation height target with only 5 samples in 4 different squares showing any sign of current grazing. In 2011 current grazing signs were recorded at 33 samples in 11 squares.

The plots on the slopes above the Allt Fionne a Ghlinne showed the lowest grazing levels, a marked change from 2011 when this area had the highest scores.

Trampling

**Table 3.6.2.2.2 The change in trampling impacts to flushes on Ben Heasgarnich**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Heasgarnich 2007 | 0 | 61 | 36 | 4 | 0 | 100 |
| Ben Heasgarnich 2011 | 38 | 42 | 8 | 12 | 0 | 100 |
| Ben Heasgarnich 2014 | 15 | 35 | 46 | 4 | 0 | 100 |

Trampling in flushes has increased slightly since 2011. While there were only 4% of squares in the High-Moderate class in 2014 as opposed to 12% in 2011, the percentage of squares with Moderate impacts has gone up from 12% to 46%, similar to 2007 levels (36% Moderate). The number of squares indicating Moderate-Low impactshave decreased from 42% to 35% and Low impacts from 35% to 15%. This is also similar to 2007 levels, albeit with some squares remaining in the Low impact class when there were none in 2007.

All the squares in Coire Ban Mor east of the summit of Ben Heasgarnich had Moderate trampling impacts and they have all increased since 2011. The single High-Moderate impact (4%) noted in 2014 is also located in this area. 5 of the remaining Moderate impacts were noted on the southern side of the main ridge whereas there were only 2 in 2011. There has, however, been a general decrease in trampling impacts north of the main ridge. Only 1 square north of the ridge had Moderate trampling impacts in 2014 as opposed to 4 in 2011.

Trends

**Table 3.6.2.2.3 The change in chronic impacts and trends to flushes on Ben Heasgarnich**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %D | %C | %I | %CH | TOTAL |
| Ben Heasgarnich 2007 | 0 | 36 | 36 | 0 | 18 | 100 |
| Ben Heasgarnich 2011 | 12 | 81 | 8 | 8 | 19 | 100 |
| Ben Heasgarnich 2014 | 0 | 58 | 42 | 0 | 0 | 100 |

In 2014, trend indicators continued to show a decreasing trend, with 58% indicating a decreasing impact and 42% with stable trends. No plots had Chronic High or Increasing trends, largely due to the decrease in grazing, as the trend target is linked to grazing levels. In 2007 and 2011 18 and 19% of plots respectively showed a chronic high impact and in 2011, 8% indicated an increasing grazing trend.

*3.6.2.3* *Restricted Habitats*

Restricted habitats were assessed within a total of twelve squares. Tall-herb ledges were assessed in all twelve squares and some dwarf-willow samples were assessed within two of the same squares. One of the extra opportunistic points from 2011 in one of the existing squares was also assessed. The habitat assessed was predominantly U17 *Luzula sylvatica-Geum rivale* with some U15 *Alchemilla glabra-Saxifraga aizoides* banks.

Grazing – tall herb

**Table 3.6.2.3.1 The change in grazing impacts to tall herb vegetation on Ben Heasgarnich**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Heasgarnich 2007 | 50 | 25 | 25 | 0 | 0 | 100 |
| Ben Heasgarnich 2011 | 8 | 25 | 50 | 0 | 17 | 100 |
| Ben Heasgarnich 2014 | 83 | 0 | 17 | 0 | 0 | 100 |

Grazing impacts were lower than in 2007 and 2011 with 83% of squares indicating Low impacts and only 17% with Moderate impacts. In 2007 25% of all squares indicated Moderate impacts and in 2011 50% were assessed as Moderate and 17% as High. No High impacts were recorded in 2014.

The plots with the Moderate impacts were the same in 2014 as in 2007. They included 3 very accessible plots, 2 in Coire Sheasgarnich and one plot on Frith a’ Choirean at the top of Coire Cheathaich. The plots in Coire Sheasgarnich were the only ones which recorded High grazing impacts in 2011.

The square on Frith a’ Choirean has very little true tall herb vegetation and largely consists of grassy *Alchemilla alpina* (CG11a) on boulders on the side of the ridge. It is likely that tall herbs are suppressed here by Chronic grazing levels targeting tall herbs, even though the surrounding grassland is only lightly grazed. The other areas where the Moderate impacts were recorded in 2014 coincided with areas where a high density of grazing sheep and abundant sheep dung were observed.

A fourth plot with Moderate impacts was located on the Leacall nan Sguabach, on the east face of Cam Chreag. The surrounding vegetation here consisted of calcareous grassland and accessible limestone cliff ledges with highly palatable species which is likely to attract herbivores from a large surrounding area.

Grazing – willow

**Table 3.6.2.3.2 The change in grazing impacts to sub\_arctic willow scrub on Ben Heasgarnich**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Heasgarnich 2007 | 67 | 33 | 0 | 0 | 0 | 100 |
| Ben Heasgarnich 2011 | 0 | 0 | 20 | 80 | 0 | 100 |
| Ben Heasgarnich 2014 | 100 | 0 | 0 | 0 | 0 | 100 |

All the grazing impacts recorded for willows were Low, an obvious decrease from 2011 when all were High-Moderate (80%) or Moderate (20%). This is similar to 2007 levels and it is puzzling, as herbivore numbers may not have changed much in the last three years. Sheep are still numerous close to the main willow locations and there is no easy explanation as to why grazing pressures were so much higher in 2011. It is possible that they were lower in 2014 due to poor winter accessibility resulting from the prolonged snow-lie in 2011. Grazing pressures on this feature are probably highest in early spring when other palatable vegetation is scarce and access may have been obstructed by late snow.

Trampling

**Table 3.6.2.3.3 The change in trampling impacts to sub\_arctic willow scrub on Ben Heasgarnich**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| Ben Heasgarnich 2007 | 0 | 100 | 0 | 0 | 0 | 100 |
| Ben Heasgarnich 2011 | 0 | 20 | 0 | 40 | 40 | 100 |
| Ben Heasgarnich 2014 | 0 | 100 | 0 | 0 | 0 | 100 |

Trampling levels in 2014 were Moderate-Low in all plots which is a decrease from 2011 and similar to the 2007 levels. Though there was very obvious tracking and soil slippage below the cliffs where willow stands were located, the actual sample plots showed few signs of disturbance.

Montane willows were also monitored separately for the vascular plant Site Condition Monitoring where trampling and browsing levels were mostly recorded as Low in a large number of locations scattered across the site.

Trends – tall herb

**Table 3.6.2.3.4 The change in chronic impacts and trends to tall-herb vegetation on Ben Heasgarnich**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %CM | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| Ben Heasgarnich 2007 | 8 | 0 | 8 | 0 | 83 | 0 | 100 |
| Ben Heasgarnich 2011 | 25 | 0 | 33 | 0 | 42 | 0 | 100 |
| Ben Heasgarnich 2014 | 21 | 14 | 0 | 0 | 7 | 0 | 100 |

Only 7% of squares still showed Chronic High impact trends in 2014 as opposed to 75% in 2011 (of which 33% of the total were assessed as showing a decreasing impact) and 91% in 2007. 14% of squares were assessed as showing Chronic Moderate impact trends in 2014 compared to none previously, all of which were in the eastern part of the site. 21% of squares indicated a Chronic Low impact in 2014 compared to 8% in 2007 and 25% in 2011, although no trends could be assigned to 50% of plots in 2014 due to ambiguity with the targets.

This shows a strong change in the evidence of long-term impacts, from most stands indicating a High Chronic impact to the majority now assessed as Chronic Moderate or Chronic Low.

Trends - willow

**Table 3.6.2.3.5 The change in chronic impacts and trends to sub\_arctic willow scrub on Ben Heasgarnich**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| Ben Heasgarnich 2007 | 33 | 0 | 33 | 0 | 33 | 0 | 100 |
| Ben Heasgarnich 2011 | 0 | 0 | 0 | 0 | 20 | 80 | 100 |
| Ben Heasgarnich 2014 | 100 | 0 | 0 | 0 | 0 | 0 | 100 |

All the willow plots indicated a Chronic Low and Decreasing impact trends. In 2007, 33% were recorded as indicating a Chronic Low impact, and 66% Chronic High, although half of these indicated a decreasing trend. However, in 2011,all the plots indicated Chronic High impacts and 80% of those showed an Increasing trend with high levels of browsing recorded. This appears to have been a short-term incidence of high grazing pressure, possibly due to the particularly cold winter conditions during winter 2010/11.

Herbivores

The site was grazed by sheep, with the highest numbers seen on the ridges and southern slopes. Far fewer sheep were seen on the north side where they were mainly present in Coire Sheasgarnich and around Meall Tionail, but absent from the lower slopes. A herd of cattle was grazing at Elrig on the lower northern slopes. No deer were seen during the survey but some dung was found.

**3.6.3 Meall na Samhna (see Meall na Samhna maps 1-10)**

Samples were taken from 51 250m2 squares within the Meall na Samhna SSSI/SAC, three more than in previous surveys. Flush and grassland points were taken largely from the western summits, Meall a Churain, Meall Eoghainn, Sgiath Chuil and Sgiath Chrom and on the southern flanks of Meall na Samhna. Wind-clipped vegetation was assessed from along the Meall na Samhna summit ridge and the higher of the western summits. Tall herb samples were taken from around the ridge and from points on the extensive crags to the north of the summit. Sub-Arctic *Salix* scrub was not required to be assessed at this site as part of the HIA features monitored although it is a feature of the SAC.

*3.6.3.1 Wind-clipped vegetation*

As for 2007 & 2011, seven squares were assessed for wind-clipped vegetation, five sited on the western summits and two along the ridge to the east of Meall na Samhna summit. Almost all sample plots were representative of the U10 *Carex bigelowii-Racomitrium lanuginosum* moss heath, although some were tending towards the grassland type U7 *Nardus stricta-Carex bigelowii* grass-heath and a few samples were H20 *Vaccinium myrtillus-Racomitrium lanuginosum* heath.

Grazing

**Table 3.6.3.1.1 The change in grazing impacts to wind-clipped vegetation on Meall na Samhna**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall na Samhna 2007 | 0 | 14 | 57 | 29 | 0 | 100 |
| Meall na Samhna 2011 | 29 | 57 | 14 | 0 | 0 | 100 |
| Meall na Samhna 2014 | 43 | 29 | 29 | 0 | 0 | 100 |

The assessment of grazing impacts on wind-clipped communities indicated a continuing decrease over the course of this monitoring programme. In 2007, 57% of samples were assessed as indicating a Moderate impact and 29% High-Moderate, whereas in 2011 57% of samples were assessed as showing a Moderate-Low impact and 29% Low, with only 14% Moderate and none in the higher categories. In 2014, 43% of assessment squares showed a Low grazing impact with 29% each in the Moderate-Low and Moderate impact classes.

In 2007, grazing by sheep on the high tops west of the summit appeared to be the main reason for the higher impacts observed. In 2011 and 2014 there was still strong evidence of sheep (animals, wool and dung) over the high ground west of the summit and this is still where the few Moderate and Moderate-Low grazing impacts were observed. However, overall, the impacts have decreased from previously high levels.

Trampling

**Table 3.6.3.1.2 The change in trampling impacts to wind-clipped vegetation on Meall na Samhna**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall na Samhna 2007 | 71 | 14 | 0 | 14 | 0 | 100 |
| Meall na Samhna 2011 | 71 | 29 | 0 | 0 | 0 | 100 |
| Meall na Samhna 2014 | 100 | 0 | 0 | 0 | 0 | 100 |

In previous years' surveys, trampling impacts to wind-clipped vegetation was Low or Moderate-Low, with all samples falling into these categories except for a single square with an overall High-Moderate impact assessed in 2007. This square was cited as having had high trampling impacts due to deer tracks running through this square, resulting in locally heavy poaching that had reduced to Moderate-Low impact in 2011. The trampling assessment for 2014 indicated that all squares now showed a Low trampling impact and that although square 9 to the west of the summit (where the deer track had been previously recorded) still indicated a Moderate grazing impact, the bare ground had healed and the trampling impact was Low.

Dung

The majority of assessments for dung were Low or Moderate-Low, with fewer Moderate frequency assessments than in 2011 and none in the higher frequency classes. This was, however, roughly similar to the assessments made in 2007 and cannot be taken to indicate a significant change.

Trends

**Table 3.6.3.1.3 The change in chronic impacts and trends on wind-clipped vegetation on Meall na Samhna**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| Meall na Samhna 2007 | 14 | 14 | 0 | 14 | 29 | 29 | 100 |
| Meall na Samhna 2011 | 86 | 0 | 14 | 0 | 0 | 0 | 100 |
| Meall na Samhna 2014 | 86 | 14 | 0 | 0 | 0 | 0 | 100 |

In 2007, 72% of the squares assessed indicated a Chronic High herbivore impact but in 2011, almost all the samples (86%) were assessed as showing a Low chronic impact and only one as showing a chronic High impact; and that one also indicating a decreasing trend. In 2007, most of the squares (72%) had been subject to a Chronic high grazing impact due to high covers of unpalatable grasses such as *Nardus stricta* and *Deschampsia flexuosa* and this was largely attributed to sheep*.* This supports the change observed in current grazing impacts between 2007 and 2011 (map 3d) that also indicates a strong decrease in grazing impacts on wind-clipped heath.

3.6.3.2 Smooth Grassland

Nine of ten smooth grassland squares assessed on Meall na Samhna SSSI were south of the ridge, with almost all of these on the western flanks of Sgiath Chuil and Sgiath Chrom. These were predominantly CG11 Festuca ovina-Agrostis capillaris-Alchemilla alpina grasslands, with stands of CG10 Festuca ovina-Agrostis capillaris-Thymus polytrichus spp. brittanicus on lower slopes. In some areas stands of Nardus stricta grassland (U5c Carex panicea sub-community) were assessed.

Grazing

**Table 3.6.3.2.1 The change in grazing impacts to smooth grassland on Meall na Samhna**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall na Samhna 2007 | 40 | 60 | 0 | 0 | 0 | 100 |
| Meall na Samhna 2011 | 60 | 30 | 10 | 0 | 0 | 100 |
| 2011 amended | 70 | 30 | 0 | 0 | 0 | 100 |
| Meall na Samhna 2014 | 60 | 40 | 0 | 0 | 0 | 100 |

In 2014, 60% of calcareous grassland squares showed a Low grazing impact with 40% Moderate-Low. This result was very similar to 2011 with 70% of plots indicating a Low and 30% a Moderate-Low impact. In one square, west of Meall a Churain, the impact increased from Low to Moderate-Low. This follows a slight decrease in impact level from 2007 to 2011. The Moderate-Low grazing impact levels were predominantly in the south of the site (Auchlyne) that is managed in part for sheep, but even here impacts are generally Low. The Site Condition Monitoring survey (Dayton, 2014) that was carried out at the same time gave similar results, with targets related to under-grazing not met.

Trampling

**Table 3.6.3.2.2 The change in trampling impacts to smooth grassland on Meall na Samhna**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall na Samhna 2007 | 50 | 30 | 20 | 0 | 0 | 100 |
| Meall na Samhna 2011 | 0 | 80 | 20 | 0 | 0 | 100 |
| 2011 amended | 0 | 20 | 80 | 0 | 0 | 100 |
| Meall na Samhna 2014 | 10 | 90 | 0 | 0 | 0 | 100 |

In 2014 all squares were assessed as Moderate-Low or Low for trampling impacts. In 2011, most squares were assessed as Moderate (80%) with 20% Moderate-Low, and in 2007 there was a spread of results between Low (50%) Moderate-Low (30%) and Moderate (20%) but there had been an error in the results that would have made trampling impacts seem slightly lower than they should have, whioch was corrected in 2011 (hence amended results). Therefore little change in trampling impacts has been evident during this monitoring exercise.

Trends

**Table 3.6.3.2.3 The change in chronic impacts and trends to smooth grassland on Meall na Samhna**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| Meall na Samhna 2007 | 70 | 0 | 0 | 0 | 30 | 0 | 100 |
| Meall na Samhna 2011 | 50 | 0 | 30 | 10 | 10 | 0 | 100 |
| Meall na Samhna 2014 | 51 | 0 | 0 | 0 | 90 | 0 | 100 |

Most squares (90%) now show a Chronic High impact compared to 50% in 2011 and 30% in 2007. This results from increased cover of mat herbs that may also reflect recently relaxed grazing, although in time a proliferation of rank grasses would be expected under Low grazing impacts. All Chronic High impact samples also show a stable or decreasing trend. Only one plot (1.3), in the north of the site at the base of crags where trampling was locally prominent, had 10% disturbed bare ground.

Dung

**Table 3.6.3.2.4 The change in dung frequency on smooth grassland on Meall na Samhna**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Dung* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall na Samhna 2007 | 40 | 40 | 20 | 0 | 0 | 100 |
| Meall na Samhna 2011 | 20 | 10 | 60 | 0 | 10 | 100 |
| Meall na Samhna 2014 | 30 | 50 | 20 | 0 | 0 | 100 |

Few assessments (20%) showed Moderate frequency with all others Moderate-Low or Low, marking a return to the low levels seen in 2007, compared to 60% Moderate and 10% High in 2011.

Litter

**Table 3.6.3.2.5 The change in impacts as shown by litter depth in smooth grassland on Meall na Samhna**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Litter* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall na Samhna 2007 | 60 | 0 | 30 | 0 | 10 | 100 |
| Meall na Samhna 2011 | 40 | 0 | 60 | 0 | 0 | 100 |
| Meall na Samhna 2014 | 50 | 0 | 50 | 0 | 0 | 100 |

Litter levels were largely unchanged with 50% of squares in the Low impact class and 50% Moderate, compared to 60% and 40% in 2011. In 2007, 30% of samples were recorded as Moderate and 10% High, but no samples had very thin litter in 2011 or 2014; litter is generally quite thick (3cm+) on most grassland plots. This supports the SCM target findings (Dayton, 2014) that under-grazing is a management issue for calcareous grassland on Meall na Samhna.

*3.6.3.3 Flush Communities*

Twenty four squares were assessed for impacts on flush communities as in 2011 and 2007. The vegetation surveyed was predominantly M10 *Carex dioica-Pinguicula vulgaris* and M11 *Carex viridula ssp. oedocarpa-Saxifraga aizoides* short-sedge flushes, sometimes within flushed wet heath (M15a), but some high spring-heads were also assessed including *Anthelia julacea-Sphagnum auriculatum* (M31) and *Philonotis fontana-Saxifraga stellaris* (M32). The flush assessment squares were almost all sited to the south, with only four to the north of the ridge.

Grazing

**Table 3.6.3.3.1 The change in grazing impacts to flushes on Meall na Samhna**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall na Samhna 2007 | 25 | 71 | 4 | 0 | 0 | 100 |
| Meall na Samhna 2011 | 17 | 75 | 8 | 0 | 0 | 100 |
| Meall na Samhna 2014 | 21 | 79 | 0 | 0 | 0 | 100 |

In 2014, all the squares were either Low impact (21%) or Moderate-Low impact (79%) with none higher. In previous years a few plots indicated a Moderate impact, to the south and east of Sgiath Chrom, but these are both now Moderate-Low. The average vegetation height has increased to 12.2cm compared to 8.5cm in 2011 and 10.3cm in 2007. Heights of between 5-15cm are recorded as Moderate impact, so this brings the overall impact for grazing down to Moderate-Low in most cases, whereas, since the main components of this habitat are short sedges and mosses, even under very low grazing impacts they are unlikely to be much taller.

Trampling

**Table 3.6.3.3.2 The change in trampling impacts to flushes on Meall na Samhna**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall na Samhna 2007 | 0 | 46 | 38 | 17 | 0 | 100 |
| Meall na Samhna 2011 | 0 | 67 | 29 | 4 | 0 | 100 |
| Meall na Samhna 2014 | 8 | 58 | 33 | 0 | 0 | 100 |

Trampling impacts are still mostly in the Moderate-Low class (58%), compared to 67% in 2011 and 46% in 2007. However, in previous years there have been samples in the High-Moderate class (17% in 2007 and 4% in 2011) and none Low. In 2014, although there are still about a third of plots indicating a Moderate impact, as in previous years there are no squares indicating a higher impact and 8% (two squares) indicating a Low trampling impact. This continues the general trend towards lower trampling impacts on flush habitat at this site.

The area with a persistent Moderate trampling imapct on flush vegetation is around the south and west of the site, mainly around the flanks of Sgiath Chuil and Sgiath Chrom and in the Coire Lobhaidh to the south of the main summit. This is also one of the main areas within which sheep are managed within this SSSI/SAC.

Trends

**Table 3.6.3.3.3 The change in chronic impacts and trends on flushes on Meall na Samhna**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %D | %C(NA) | %I | %CH | TOTAL |
| Meall na Samhna 2007 | 4 | 25 | 21 | 8 | 21 | 100 |
| Meall na Samhna 2011 | 0 | 42 | 50 | 0 | 8 | 100 |
| Meall na Samhna 2014 | 13 | 21 | 63 | 0 | 4 | 100 |

Trend results on flush samples were hard to assess since many plots showed no particular indication of trend. Of those where it was possible to make a judgement, there was a slight decrease in the number recorded as having a Chronic High impact and corresponding increase in the number indicating a Chronic Low impact (from 0 in 2011 to 13% or 3 squares in 2014).

*3.6.3.4 Restricted Habitats*

Only tall-herb vegetation was assessed under restricted habitats within Meall na Samhna, with seven squares visited although two were not fully surveyed as they did not support adequate stands of tall-herb vegetation, as noted in 2011 (see photos for squares 2 & 3). Of those surveyed, most were predominantly U15 and U17 habitats.

Grazing

**Table 3.6.3.4.1 The change in grazing impacts to tall herb communities on Meall na Samhna**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall na Samhna 2007 | 14 | 86 | 0 | 0 | 0 | 100 |
| Meall na Samhna 2011 | 29 | 14 | 29 | 29 | 0 | 100 |
| Meall na Samhna 2014 | 40 | 60 | 0 | 0 | 0 | 100 |

Grazing impacts on tall herb were all of Low or Moderate-Low impact levels and none showed the Moderate and High-Moderate impacts observed in 2011. In 2007 86% of samples showed a Moderate-Low impact, which is similar to 2014. Since the majority of the tall-herb vegetation on Meall na Samhna is largely inaccessible to herbivores except at the margins, grazing was only observed on tall herbs at three sample points. The other Moderate-Low impact assessments were largely due to vegetation height on 'dwarfed' herbs such as *Alchemilla alpina* that have been browsed in the past.

Trends

Of the trend indicators, 80% (4 squares) indicated a Chronic High impact, though mostly decreasing. This was largely due to the abundance of grasses in this community that were growing taller than the tall herbs. This, as with the grazing impacts noted above, may be attributable to prolonged dwarfing of tall herbs that may, under continued Low grazing pressures, grow taller.

*3.6.3.5 Herbivore information*

Sheep

Before the 2007 survey, there had been recent decreases in stock density from both north and south of the ridge. These have been maintained and this is reflected in the decrease in grazing and trampling impacts across the site between 2007 and 2011. The few Moderate impacts observed, mainly trampling impacts on flush habitat, were all located around the south and west of the site where sheep are still managed.

This also suggests that much of the recorded past impacts were attributable to sheep grazing and that the reduced stocking density of sheep has been a factor in the changein the type of chronic impacts observed, from Chronic High to Chronic Moderate or Low.

Deer

There is no evidence to suggest a significant change in deer numbers but there have been continued reductions in grazing and trampling impacts on all habitats at this SSSI/SAC.

Other herbivores

Mountain hare have not been noted during this survey although they were previously recorded on wind-clipped communities. Voles are still frequent especially in drier grassland areas across the southern slopes.

**3.6.4 Meall Ghaordie (see Meall Ghaordie maps 2a-6b)**

The notified features for Meall Ghaordie include tall herbs and montane and vascular plant assemblages. Known tall herb and sub-arctic *Salix* scrub locations were selected for survey and the widespread alpine heath and summit moss communities were assessed as indication of herbivore impacts on the plant assemblages.

Sixteen squares, which had been assessed in 2007 and 2011, were revisited across Meall Ghaordie. 4 of the opportunistically sampled willow plots from 2011 were also revisited.

*3.6.4.1 Wind-clipped vegetation*

In total 15 squares were assessed for wind-clipped vegetation. The heaths assessed were predominantly alpine and boreal heath NVC types: H13 *Calluna vulgaris-Cladonia arbuscula* heath and H19 *Vaccinium myrtillus* heath, but stands of H12 *Calluna vulgaris-Vaccinium myrtillus* heath and H18 *Vaccinium myrtillus-Deschampsia flexuosa* heath were assessed where these could be classed as ‘wind-clipped’. On the higher ridge and summits, some stands of *Carex bigelowii* moss heath and grassland (U7, U10) were also assessed.

Grazing

**Table 3.6.4.1.1 The change in grazing impacts to wind-clipped communities on Meall Ghaordie**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall Ghaordie 2007 | 13 | 20 | 33 | 20 | 13 | 100 |
| Meall Ghaordie 2011 | 20 | 60 | 20 | 0 | 0 | 100 |
| Meall Ghaordie 2014 | 53 | 27 | 7 | 13 | 0 | 100 |

The first cycle of HIA in 2007 indicated a spread of impact levels across the site, with 33% of squares assessed as showing a Moderate impact, 33% High and High-Moderate and the other 33% Low and Moderate-Low. There was a strong decrease in impact levels between 2007 and 2011 such that 60% of plots were then assessed as Moderate-Low with 20% Moderate, 20% Low and none in any of the higher categories.

Between 2011 and 2014 the change was less marked, though there was an increase in the number of squares indicating a Low grazing impact, from 20 to 53% and a drop in the number of squares indicating a Moderate or Moderate-Low impact, though two squares indicated a High-Moderate impact in 2014, both close to the main summit.

The higher grazing impacts were largely due to grazing on grasses, especially fine-leaved grasses, whereas higher grazing scores in 2011 were mostly due to browsing of dwarf shrubs. Average browsing on *Vaccinium myrtillus* decreased from 35% to 19% whereas grazing on fine-leaved grasses increased from 3% to 9%.

Some of this increase may be due changes in the growth of the grasses. In 2011 the survey was carried out a month earlier, during June, when grass growth may have been less advanced than later on in the summer. In addition, 2011 had a cold winter and late spring that would also have checked the growth of grass species, especially at higher altitudes.

Trampling

**Table 3.6.4.1.2 To show the change in trampling impacts to wind-clipped communities on Meall Ghaordie**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall Ghaordie 2007 | 33 | 40 | 20 | 0 | 7 | 100 |
| Meall Ghaordie 2011 | 33 | 53 | 7 | 0 | 7 | 100 |
| Meall Ghaordie 2014 | 60 | 33 | 0 | 7 | 0 | 100 |

Between 2007 and 2011 there was a slight shift towards lower trampling impacts, e.g. 20% of squares were assessed as indicating a Moderate impact, compared to 7% in 2011. In 2011, 53% of plots were in the Moderate-Low class and only 33% in the Low class, with single plots also in the Moderate and High classes.

In 2014, trampling impacts were found to have decreased further, with 60% of squares now in the Low impact class, 33% in Moderate-Low and 7%, (1 square) in the High-Moderate class.

The square which, in 2014 showed a High-Moderate impact, is located in Glas Choire and had High impacts during the preceding two surveys. Squares with Moderate-Low impact scores were in the western part of the site, and the slightly higher trampling levels in these plots were indicated by the presence of bare ground.

Dung

Dung levels have decreased since 2011, with 11 plots now with Low or Moderate-Low dung levels, up from only 2 in 2011. One plot still has High dung levels, and 2 others have High-Moderate ones, all in the vicinity of the main summit.

Most of the dung found is still from sheep but the number of waypoints with High levels of deer dung has increased from 7 to 14.

Trends

**Table 3.6.4.1.3 To show the change in chronic impacts and trends to wind-clipped communities on Meall Ghaordie**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %CL/I | %CM | %CH/DI | %CH | %CH/I | TOTAL |
| Meall Ghaordie 2007 | 27 | 20 | 0 | 7 | 27 | 20 | 100 |
| Meall Ghaordie 2011 | 40 | 0 | 40 | 7 | 13 | 0 | 100 |
| Meall Ghaordie 2014 | 73 | 0 | 0 | 0 | 27 | 0 | 100 |

In 2007, the trend indicators suggested that 54% of plots showed Chronic High impacts, including 20% of squares indicating a High and Increasing impact. By 2011 this had changed to only 20% of all samples assessed as indicating a Chronic High impact with none increasing and 40% Chronic Low, a quite considerable decrease in long-term impact signs.

The 2014 data shows that there has been a continued slight decrease in Chronic High impacts since the 2011 survey, with 82% of targets now returning a Chronic Low impact trend, up from 77% in 2011. Trend impacts have remained similar on the main summit but more Chronic High trends were recorded from the eastern part of the ridge in 2014 where the overall trend was Chronic Moderate. At the same time, trends in the western part of the site were mostly Chronic Low in 2014, down from predominately Chronic Moderate trends in 2011.

*3.6.4.2 Restricted habitats*

One square was reassessed for restricted habitats within Meall Ghaordie, on the north face of Creag Laoghain. Both tall herbs and montane willows were assessed in this square, both from U17 *Luzula sylvatica-Geum rivale* vegetation. In addition, four of the opportunistic willow plots from 2011 were revisited and assessed.

Grazing

**Table 3.6.4.2.1 The change in grazing impacts to tall-herb vegetation on Meall Ghaordie**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall Ghaordie 2007 | 0 | 100 | 0 | 0 | 0 | 100 |
| Meall Ghaordie 2011 | 0 | 0 | 100 | 0 | 0 | 100 |
| Meall Ghaordie 2014 | 0 | 100 | 0 | 0 | 0 | 100 |

**Table 3.6.4.2.2 The change in grazing impacts to sub-Arctic willow scrub on Meall Ghaordie**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall Ghaordie 2007 | 0 | 0 | 100 | 0 | 0 | 100 |
| Meall Ghaordie 2011 | 0 | 0 | 0 | 75 | 25 | 100 |
| Meall Ghaordie 2014 | 67 | 33 | 0 | 0 | 0 | 100 |

Grazing levels in the 2007 plot were Moderate-Low for tall herb vegetation and Moderate for the willow scrub. In 2011 however, this square and a further four squares assessed opportunistically, indicated generally high grazing impacts, all the tall-herb squares assessed indicated a moderate impact and the willow squares indicated High and High-Moderate impacts.

However in 2014, all the tall-herb and willow squares indicated Low and Moderate-Low impacts, a strong decrease in impact levels from previous years, particularly for the willow scrub .

There was little grazing observed on willows even in accessible locations during 2014. It is possible that willows were protected from grazing due to higher than usual snow levels during the preceding winter, though the data may also reflect a change in grazing patterns within the site.

Trampling

**Table 3.6.4.2.3 The change in trampling impacts to sub-Arctic willow scrub on Meall Ghaordie**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| Meall Ghaordie 2007 | 0 | 100 | 0 | 0 | 0 | 100 |
| Meall Ghaordie 2011 | 0 | 25 | 0 | 0 | 75 | 100 |
| Meall Ghaordie 2014 | 0 | 100 | 0 | 0 | 0 | 100 |

Trampling levels in the single restricted habitat square assessed in 2007 were Moderate-Low. In 2011, this square still indicated a Moderate-Low impact but the further three plots assessed all indicated a High trampling impact. In 2014, in the opportunistic willow plots from 2011 trampling has been reduced from High to Moderate-Low levels so that all squares now indicate this generally low level of grazing..

Trampling is very obvious below the cliffs where the sample plots are situated and in 2014 there were some small soil slips, possibly due to prolonged snow-lie and subsequent herbivore tracking. There was, however, little evidence of trampling within sample plots, probably because tall herb vegetation is largely restricted to poorly accessible locations already.

Trends and herbivores

**Table 3.6.4.2.4 The change in chronic impacts and trends to tall-herb vegetation on Meall Ghaordie**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %CL/I | %CM | %CH/D | %CH | %CM/D | TOTAL |
| Meall Ghaordie 2007 | 0 | 0 | 0 | 100 | 0 | 0 | 100 |
| Meall Ghaordie 2011 | 0 | 0 | 100 | 0 | 0 | 0 | 100 |
| Meall Ghaordie 2014 | 0 | 0 | 0 | 0 | 0 | 100 | 100 |

**Table 3.6.4.2.5 The change in chronic impacts and trends to sub-Arctic willow scrub on Meall Ghaordie**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %CL/I | %CM | %CH/D | %CH | %CH/I | TOTAL |
| Meall Ghaordie 2007 | 0 | 0 | 0 | 0 | 100 | 0 | 100 |
| Meall Ghaordie 2011 | 0 | 0 | 25 | 0 | 0 | 75 | 100 |
| Meall Ghaordie 2014 | 100 | 0 | 0 | 0 | 0 | 0 | 100 |

For the tall-herb vegetation, in 2007 all plots were assessed as indicating a Chronic High impact, whereas in 2011 and 2014 all plots indicated a Chronic Moderate impact, and in 2014 this impact was noted to be showing a decreasing trend. This shows an initial decrease in impacts followed by a continued slight decrease in impact trends to tall-herb vegetation.

Due to the low grazing levels recorded, all the willow squares in 2014 were Chronic Low, a change from 2011 when 75% of willow squares were Chronic High and Increasing, and the other 25% Chronic Moderate. This may be due to a change in grazing regime within the site. There were few sheep on the northern side of the hill above the new stock fence, with only a few present in Glas Choire and Coire Loaghain. Sheep numbers were higher on the southern slope, especially in the Cam Chreag grasslands.

Deer were seen in Glas Choire and in the upper parts of Coire Loaghain, in herds of up to 30 individuals.

**3.6.5 Carn Gorm and Meall Garbh (see Carn Gorm & Meall Garbh maps 1-7)**

In total 46 squares were assessed within the Carn Gorm and Meall Garbh SSSI. These comprised mainly wind-clipped vegetation and smooth grassland along with one square assessed for montane willow and one for flush vegetation.

*3.6.5.1 Wind-clipped vegetation*

In total 37 squares were assessed for wind-clipped vegetation, accounting for the majority of the assessments made at this site. Most of the vegetation assessed was of the *Carex bigelowii-Racomitrium lanuginosum* moss heath type (U10), but some were on alpine heath such as the *Calluna vulgaris-Cladonia arbuscula* heath H13, the *Calluna vulgaris-Racomitrium lanuginosum* heath H14 and the *Vaccinium myrtillus* heaths H19 and H20.

Grazing (see Carn Gorm/Meall Garbh map 2)

**Table 3.6.5.1.1 The change in grazing impacts to wind-clipped vegetation on Carn Gorm/Meall Garbh**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| CGMG 2007 | 0 | 23 | 26 | 37 | 14 | 100 |
| CGMG 2011 | 11 | 47 | 31 | 11 | 0 | 100 |
| CGMG 2014 | 47 | 30 | 14 | 6 | 3 | 100 |

Of the assessments made at this site, the most common class of grazing impact was Low, with around 47% of assessments in this class and 30% registering Low-Moderate impacts. 14% were Moderate, 6% Moderate-High and 3% High.

The results suggest a significant shift towards lower grazing pressures on wind-clipped vegetation within the SSSI over the duration of this monitoring exercise, with over three-quarters of the squares now encompassed within the Low or Low-Moderate grazing categories. In 2007 only 23% of assessments were classed as Moderate-Low and none Low, whereas in 2011 47% of assessments were Moderate-Low and 11% Low. In 2014 a total of 77% of all assessments were Moderate-Low or Low. Also, in 2007 77% of all assessments were Moderate or higher including 14% assessed as High, this had dropped to 42% in 2011 and 23% in 2014.

The Moderate, High-Moderate and High grazing impacts are predominantly to the north-east of the site, along the ridge, and to the north-west along the high ground between Carn Gorm and Meall Garbh. Although still maintaining a decreasing trend, these impacts, particularly those to the far north-east, are still at levels likely to lead to target failure at SCM.

Trampling (see Carn Gorm/Meall Garbh map 3)

**Table 3.6.5.1.2 The change in trampling impacts to wind-clipped vegetation on Carn Gorm/Meall Garbh**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| CGMG 2007 | 46 | 43 | 6 | 0 | 6 | 100 |
| CGMG 2011 | 33 | 31 | 22 | 14 | 0 | 100 |
| CGMG 2014 | 75 | 22 | 0 | 3 | 0 | 100 |

Impacts due to trampling were mostly minor with 75% of assessments showing a Low impact and 22% Moderate-Low while 3% registered High-Moderate trampling impacts. This represents a decline in trampling impacts from the last two assessments although there had been a slight increase between 2007 and 2011 from only 12% assessed as under a Moderate or higher impact in 2007 to 36% in 2011. In 2014 only one sample (3% of the total) was assessed at High-Moderate, all other squares were assessed as Moderate-Low (22%) or Low (75%). The one High-Moderate impact was also sited to the north-east of the site which has been noted for higher grazing impacts.

Dung (see Carn Gorm/Meall Garbh map 7)

15 Squares (42%) recorded High dung abundance, 8 (22%) Moderate, 1 (3%) Low-Moderate and 12 (33%) Low. There was a very definite distribution of dung across the site (see map 7) with the high dung frequencies predominantly recorded from the high ridges to the north-east and north-west.

Trends

**Table 3.6.5.1.3 The change in chronic impacts and trends to wind-clipped vegetation on Carn Gorm/Meall Garbh**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %CL/I | %CH/D | D | %CH | %CH/I | TOTAL |
| CGMG 2007 | 40 | 14 | 6 | 0 | 31 | 9 | 100 |
| CGMG 2011 | 64 | 3 | 8 | 0 | 17 | 8 | 100 |
| CGMG 2014 | 92 | 0 | 0 | 5 | 0 | 3 | 100 |

Of the squares sampled, most (92%) registered a Chronic Low impact trend and the remainder (5% and 3% respectively) showed Declining or Chronic High/Increasing trends.

In 2007 only 44% of all samples indicated a Chronic Low impact and, of those, about a third showed an increased impact. In 2011, this had increased to 67% with only one sample square indicating an increasing trend. By 2014 only one sample square still indicated a Chronic High impact.

This supports the results of the grazing and trampling assessments that the level of herbivore impacts on wind-clipped vegetation on Carn Gorm/Meall Garbh has decelined steadily over the seven yeasr of this study.

*3.6.5.2 Smooth Grassland*

Seven samples of smooth grassland were made within the site, all from the west end around Carn Gorm and Meall Garbh summits. Most assessments were of the *Festuca ovina-Agrostis capillaris*-*Alchemilla alpina* grassland CG11, though a couple were of the *Festuca ovina-Agrostis capillaris-Thymus polytrichus spp. brittanicus* community CG10 or of the *Festuca ovina-Alchemilla alpina-Silene acaulis* grassland CG12.

Grazing (see Carn Gorm/Meall Garbh map 4)

**Table 3.6.5.2.1 The change in grazing impacts to smooth grassland on Carn Gorm/Meall Garbh**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| CGMG 2007 | 0 | 86 | 14 | 0 | 0 | 100 |
| CGMG 2011 | 43 | 57 | 0 | 0 | 0 | 100 |
| 2011 amended | 57 | 43 | 0 | 0 | 0 | 100 |
| CGMG 2014 | 57 | 43 | 0 | 0 | 0 | 100 |

Of the samples assessed, 57% were subject to a Low impact from grazing and 43% to a Low-Moderate impact. This indicates a stable, low grazing pressure since the 2011 assessment. In 2007 86% of assessments were in the Moderate-Low class and 14% Moderate indicating that there has been a slight shift in the results for this habitat towards lower impacts.

Trampling (see Carn Gorm/Meall Garbh map 5)

**Table 3.6.5.2.2 The change in trampling impacts to smooth grassland on Carn Gorm/Meall Garbh**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| CGMG 2007 | 29 | 43 | 29 | 0 | 0 | 100 |
| CGMG 2011 | 0 | 86 | 0 | 14 | 0 | 100 |
| 2011 amended | 14 | 72 | 14 | 0 | 0 | 100 |
| CGMG 2014 | 0 | 100 | 0 | 0 | 0 | 100 |

Of the seven grassland squares assessed, 100% registered Low-Moderate trampling impacts and records a small, but continuing reduction in trampling impacts on this habitat on the site. In 2007 29% of squares were assessed as indicating Moderate impacts and 14% in 2011. By 2014, all squares are indicating Moderate-Low.

Dung (see Carn Gorm/Meall Garbh map 7)

**Table 3.6.5.2.3 The change in dung frequency on smooth grassland on Carn Gorm/Meall Garbh**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Dung* | %L | %LM | %M | %MH | %H | TOTAL |
| CGMG 2007 | 14 | 14 | 29 | 29 | 14 | 100 |
| CGMG 2011 | 14 | 14 | 14 | 14 | 43 | 100 |
| CGMG 2014 | 14 | 14 | 58 | 0 | 14 | 100 |

Of the seven samples taken, dung counts were spread quite evenly throughout the dung classes, though with a clear majority (58%) in the Moderate class. In most cases both sheep and deer were implicated.

Dung frequency on smooth grassland therefore show a marked shift from high to more moderate abundance since the last assessment.

Trends

**Table 3.6.5.2.4 The change in chronic impacts and trends to smooth grassland on Carn Gorm/Meall Garbh**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends* | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| CGMG 2007 | 43 | 14 | 0 | 0 | 43 | 0 | 100 |
| CGMG 2011 | 71 | 0 | 29 | 0 | 0 | 0 | 100 |
| CGMG 2014 | 86 | 0 | 0 | 0 | 14 | 0 | 100 |

Of the seven samples, 86% showed Chronic Low impact and 14% a Chronic-High impact, compared to 57% Low including over a third increasing in 2007 and 71% Chronic Low in 2011. This indicates a small shift towards the Chronic Low impact category since the start of the project.

Litter

**Table 3.6.5.2.5 The change in impacts as shown by litter depth on smooth grassland at Carn Gorm/Meall Garbh**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Litter* | %L | %LM | %M | %MH | %H | TOTAL |
| CGMG 2007 | 0 | 0 | 71 | 0 | 29 | 100 |
| CGMG 2011 | 0 | 0 | 100 | 0 | 0 | 100 |
| CGMG 2014 | 14 | 29 | 14 | 29 | 14 | 100 |

Values for depth of litter were broadly spread across all categories in 2014. In previous years, litter was less abundant. In 2007, 71% of squares had litter depths indicating a Moderate impact and 29% with almost no litter indicating a High impact. In 2011, all plots had a Moderate depth of litter and in 2014 43% of all samples had deeper litter indicating a Moderate-Low or Low impact. This, again, indicates a shift towards lower herbivore impacts, though the build up of litter within calcareous grassland can lead to the smothering of some of the small annuals associated with this grassland type.

*3.6.5.3 Flush vegetation* (see Carn Gorm/Meall Garbh map 6)

**Table 3.6.5.3.1 The change in grazing and trampling impacts to flush vegetation at Carn Gorm/Meall Garbh**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| CGMG 2007 | 0 | 100 | 0 | 0 | 0 | 100 |
| CGMG 2011 | 0 | 0 | 100 | 0 | 0 | 100 |
| CGMG 2014 | 0 | 100 | 0 | 0 | 0 | 100 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| CGMG 2007 | 0 | 100 | 0 | 0 | 0 | 100 |
| CGMG 2011 | 0 | 0 | 100 | 0 | 0 | 100 |
| CGMG 2014 | 100 | 0 | 0 | 0 | 0 | 100 |

Only one sample square was assessed for impacts on flush vegetation at this site, situated in the far east of the SSSI. Grazing impacts at this point were Low-Moderate and there had been a Decreasing trend impact over the whole period of the monitoring. This represents a shift to lower impacts than in 20007 and 2011.

Trampling impacts have fluctuated from Moderate-Low in 2007, to Moderate in 2011 indicating a slight increasing impact trend, and back down to Low in 2014.

*3.6.5.4 Restricted habitats* (see Carn Gorm/Meall Garbh map 6)

**Table 3.6.5.4.1 The change in grazing and trampling impacts to Arctic willow scrub at Carn Gorm/Meall Garbh**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Grazing* | %L | %LM | %M | %MH | %H | TOTAL |
| CGMG 2007 | 0 | 100 | 0 | 0 | 0 | 100 |
| CGMG 2011 | 0 | 0 | 0 | 100 | 0 | 100 |
| CGMG 2014 | 0 | 100 | 0 | 0 | 0 | 100 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Trampling* | %L | %LM | %M | %MH | %H | TOTAL |
| CGMG 2007 | 100 | 0 | 0 | 0 | 0 | 100 |
| CGMG 2011 | 0 | 0 | 0 | 0 | 100 | 100 |
| CGMG 2014 | 0 | 100 | 0 | 0 | 0 | 100 |

Only one square was assessed for sub-Arctic *Salix* scrub; just to the north-east of Carn Gorm, f. Grazing and trampling impacts were Low-Moderate for both impact types. The location assessed was accessible to herbivores. Trend indicators suggested that long-term trends are now Chronic Low whereas in 2007 and 2011, the trend indicators suggested a Chronic High nad (in 2011) an Increasing trend. The results suggest a reduction in herbivore impacts since the last assessment.

*3.6.5.6 Herbivores*

The main grazers within Carn Gorm are North Chesthill Estate who manage their ground for sheep and deer, and Innerhadden to the east, who manage primarily for sheep. The other landowners either do not have sheep (e.g. Scottish Woodlands), or have recently taken their sheep off. Scottish Woodland has an area to the south of the SSSI that forms an area of open ground adjacent to an ongoing woodland regeneration project.

Sheep

North Chesthill appears to have a relatively high stock of ewes and followers that are not off-wintered. The other estates have largely reduced stock density to quite low levels although the sheep tend to move freely between estates.

Deer

North Chesthill has a high population of deer during the summer, but a proportion tend to move off during the winter. Innerhadden also supports a strong population.

Other

Hares are scarce within the SSSI, except some small populations over 600m asl. Vole grazing was occasionally noticed in plots with burrows but the impact of this was negligible.

3.6.5.7 Recreation

Walking is very popular on these hills with the route up to Carn Gorm summit along the ridge path probably the most popular. Some concern had been voiced that visitor pressure was causing the deer to move around the hill more and to spend more time in the corries that would otherwise have been the case. However, most of the higher and increasing herbivore impacts, and higher dung abundances, are spread around the ridge line, relatively close to the path.

**4. DISCUSSION**

**4.1 Ben Lawers**

The Ben Lawers SAC/SSSI is grazed across most of its extent by sheep and deer, and management is dependent on various landownerships. South of the central ridge the land is predominantly under NTS ownership that is further sub-divided into a number of tenancies where grazing rights complicate management solutions. Sheep numbers have been reduced over part of this area but remain unchanged to the east, although since this survey was done the NTS have taken back 200 rights on West Ben Lawers and relet them on West Beinn Ghlas to balance distribution (JB *pers comm)*. To the north, sheep numbers have been reduced across most of the area, particularly to the north-east where the ground is managed primarilyin for deer.

Grazing and trampling impacts were predominantly in the Low and Moderate-Low classes for all habitats, except for wind-clipped vegetation where about 50% were in the Moderate class, as in 2011. Between 2007 and 2011, both the trends and the grazing/trampling impacts showed a current decreasing impact level for most habitats with an increase in squares indicating Chronic Low impacts.

The 2014 data were, on the whole, very similar to that from 2011 with little significant change. The most evident change was a shift in grazing and trampling impacts on wind-clipped vegetation from Moderate to Moderate-Low and Low impacts.

Across the site, the few higher impacts were also in fairly similar locations to 2011 with areas such as Beinn Ghlas and the Tarmachan ridge still showing some Moderate and High-Moderate grazing impacts, on wind-clipped communities in particular. A group of Moderate grazing and trampling impacts on flushes was also noted from the valley east of Meall Corranaich and Meall a Choire Leith.

Prognosis

Under the current level of impacts it would appear that most habitats are actually improving in condition. The increase in the number of squares indicating a Chronic Low impact shows that the structure of those vegetation communities is changing away from the issues caused by herbivory such as an overabundance of fine-leaved grasses in wind-clipped heath and poached ground in flushes. The main areas where there could still be a problem are the high altitude grasslands along the Tarmachan and Ben Lawers ridges, where the combination of palatable species, exposure and other benefits to herbivores such as vantage points, escape from biting insects in summer and shelter in high corries, combine to create hot-spots of herbivore impacts, e.g. on the west side of Beinn Ghlas. However, on the lower flanks, the steep slopes and build-up of unpalatable grasses and litter have lead to low levels of herbivory that are leading to 'undergrazing' of particularly smooth grassland in places, and this is likely to get more evident under current conditions.

The fenced areas of tall-herb ledge vegetation and willow to the west of Lochan na Lairige are flourishing under the current lack of herbivore impacts.

**4.2 Ben Heasgarnich**

Grazing impacts across Ben Heasgarnich continue to be Low or Moderate-Low. Grassland grazing levels have remained very similar to 2011 and grazing in flushes and restricted habitats has decreased. The decrease was most notable in tall herb and montane willow vegetation where levels have returned to 2007 levels and below. Montane willow especially was little grazed in 2014, and trampling levels in this feature were also Moderate-Low.

Trampling levels have increased slightly in grasslands and flushes and this corresponds with a slight decrease in the depth of leaf litter in grasslands. Small patches of bare ground were most widespread in grassland plots, especially in areas with obvious sheep grazing. The increase in trampling in flushes was more obvious, with most flushes in the south and east showing increases in trampling since 2011. 2014 trampling levels were in fact closer to 2007 levels, though still slightly lower.

Differences in sheep numbers between surveys may explain the change in trampling impacts in flushes. The survey was carried out a month later than in 2011 which may explain the larger number of sheep seen on the site. Much of the lower southern slope is now fenced and planted with tree saplings, but sheep still graze the unfenced areas, though it not known whether stocking densities have changed alongside this reduction in available open ground. Sheep are widespread on the upper slopes, especially along the ridges and in Coire Ban Mor to the East, where higher grazing and trampling impacts were recorded.

Sheep numbers north of the main ridge were very low, with scattered individuals on the slopes of Meall Tionaill. Few were seen on the steep slopes above the Allt Fionn a’Ghlinne where impacts have decreased most since 2011. The area around Elrig was grazed by a herd of cattle at the time of survey.

Despite the increases in trampling which suggest higher herbivore levels, grazing levels in grasslands remain too low for maintaining a good, structurally and floristically diverse sward in many areas. Highly calcareous grasslands such as the CG12 grasslands on the slopes of Creag Mhor and Sron nan Eun and on the ridge above Coire Sheasgarnich continue to receive moderate grazing pressure but elsewhere grasslands are often rank and species-poor.

Prognosis

The overall results for Ben Heasgarnich suggest continuing moderate and low impact levels across the site following a strong drop in impacts between 2007 and 2011 but with very little change noted between 2011 and 2014. There was a slight increase in bare-ground patches and a thinning of litter within smooth grassland plots indicating an increase in herbivory on exposed plots, though grassland plots of the less attractive flanks of the hills were generally under-grazed, making a balance hard to achieve. Impacts on flushes had decreased significantly between 2007 and 2011 but current trends suggest that poaching may have increased slightly in the last three years, although tall-herb vegetation has shown an improving trend. In general, impacts to all habitats are at acceptable levels and that a stable situation, tending towards more Chronic Low indications would be expected. However, the recent increases in trampling on grassland and flush habitats should continue to be monitored.

**4.3 Meall na Samhna**

Meall na Samhna SSSI/SAC includes the main summits of Beinn Bhreac, Meall na Samhna, Meall Eoghain and Sgiath Chuil and the slopes to either side of that ridge. It is divided roughly into management units north and south of the ridge. Sheep are grazed at low stocking density to the south and minimally to the north, and deer are present throughout, although the resident population is more numerous to the south (Auchlyn *pers comm.*).

Grazing impacts were generally Low and Moderate-Low for all habitats. This represented a continued slight decrease in impacts since 2011, following a more marked decrease in impact levels since 2007 on smooth grassland, wind-clipped vegetation and flushes. This was largely attributable to the decrease in sheep stocking levels on these habitats. Deer changes are less evident although they may have changed their territory and movements as a result of changes to sheep numbers.

Trampling impacts were also generally Low and Moderate-Low on most habitats, particularly on wind-clipped vegetation where sample points with significant disturbed bare ground in the past now indicate Low trampling levels. Some Moderate trampling impacts were noted on flush vegetation around the flanks of Sgiath Chrom and Sgiath Chuil. Flushes are sensitive to trampling as the small herbs and mosses within wet ground can be easily uprooted.

The Moderate and High-Moderate impacts observed on tall-herb vegetation within Meall na Samhna in 2011 were not noted again in 2014 when impacts were all Low and Moderate-Low.

The reduction in sheep stocking densities to the north and south of Meall na Samhna is a likely contributory factor to the decrease in impacts on grassland, flush and wind-clipped vegetation but there may be some other contributory factors. One is the lack of records for mountain hares which were quite frequent along the summit ridge in 2007. Changes to deer population size and movements may also be a factor.

As noted in 2011, a possible negative consequence of the decreasing grazing impact is under-grazing of species-rich *Nardus stricta* grassland as shown by the increasing depth of litter within grassland assessments. The proliferation of grasses and subsequent build-up of litter may restrict the growth of small, annual herbs and for more competitive grasses to proliferate, allowing the grasslands to tend towards ranker swards and heath.

Prognosis

Decreasing impacts were recorded for all habitats at this site, including a general shift from Chronic High to Chronic Low indicators that suggests an improvement in habitat condition as well as impact levels. The main concern at this site is the increase in signs of 'under-grazing' of smooth grassland habitat, especially around the flanks of the hills to the south.

**4.4 Meall Ghaordie**

Herbivore impacts at Meall Ghaordie have largely continued to decrease since 2011 with the exception of the immediate main summit area, where grazing has increased in wind-clipped vegetation plots. This was attributed to both deer and sheep. A small herd of up to 30 deer was seen on or near the ridge on all survey days. Few sheep were present on the upper northern slope and the sheep grazing pressure on the summit may be due to sheep from the Cam Chreag area crossing the ridge.

There was an obvious decrease in impacts on montane willow vegetation, with few current grazing impacts recorded in 2014. This may reflect changes in stock grazing patterns with most sheep now excluded from the northern corries and cliffs for much of the year. Grazing levels were higher in willow plots assessed for Site Condition monitoring in the Cam Chreag area, probably reflecting the higher number of sheep still present there.

There is a possibility that the low grazing levels on montane willow are a result of anomalous winter conditions with higher than normal snowfall levels and prolonged snow-lie covering willows and preventing access from herbivores during winter and early spring when food is scarce.

Prognosis

The 2014 results indicate that herbivore levels are now at an acceptable level for most of the site, with the exception of Meall Ghaordie summit plateau where impacts on wind-clipped vegetation have increased. This could result in an increase in unpalatable grasses within this habitat and erosion.

**4.5 Carn Gorm, Meall Garbh**

The main habitat assessed at Carn Gorm and Meall Garbh was wind-clipped communities, though some assessments were also made for grasslands, and a single square of each was assessed for flushes and willows.

At the 2011 assessment it was noted that grazing impacts had decreased for most habitats but that trampling impacts had increased across the north-east. In the 2014 survey, there had been little change although it was noted that there had been a general, slight decrease in impacts across all habitats with the assessment results for most squares staying the same or decreasing.

Impact levels were predominantly Low or Moderate-Low for all habitats although the map of grazing impacts on wind-clipped vegetation (map 2) indicates that the few Moderate and High impacts recorded are still clustered to the north-east of the site along the high ridges and between Carn Gorm and Meall Garbh. The north-east is also where higher trampling impacts on wind-clipped communities were recorded. This ridge was predominantly grazed by sheep.

Prognosis

Generally impacts have decreased at this site, especially for wind-clipped and grassland habitats, with a general shift from Chronic High to Chronic Low indications across most of the SSSI. There are still evident sheep impacts around the northern and eastern periphery of the site and this could cause increasing erosion or the proliferation of unpalatable grasses on wind-clipped vegetation. However, Moderate grazing impacts on smooth grassland are not likely to cause further degradation of this habitat.

**5. CONCLUSIONS**

The five sites studied have been grouped together due to similarities in habitats and management, all being part of the Breadalbane Hills range with similar geology and habitats. Past management has been predominantly sheep but deer management is increasing in importance on some estates. Some of the larger sheep estates have reduced sheep stocking densities, for example north Ben Heasgarnich, and west Ben Lawers.

The 2007 survey concluded that the density of sheep was a major factor dictating the levels of impact observed and, following the 2011 survey, decreases in impact were particularly noted where sheep stocking densities had been reduced.

The main result of the 2014 habitat impact assessment was again a decrease in impacts across the five sites with Low and Moderate-Low impacts dominant for all habitats. The decrease was less marked than in 2011, with many squares staying unchanged, but the general impression was of a slight decrease in impact levels.

Although decreases in impact were noted across all habitats, some areas still showed local clusters of moderate and high impacts. Of particular note were grazing impacts on the wind-clipped communities of the high ridges on Meall na Samhna (west), Ben Lawers (west) and Beinn Ghlas, the summit of Meall Ghaordie and the high ridge around the north and east of the Carn Gorm/Meall Garbh SSSI. Some Moderate and high trampling impacts were also noted from these areas though still less than in previous years.

Some Moderate trampling impacts were also noted from flush vegetation, predominantly along the glen to the east of Meall Corrannaich and Meal a Choire Leith, north of Ben Lawers and around the southern flanks of Meall na Samhna.

The areas highlighted above as still indicating Moderate and High impacts are all those where sheep are still managed at moderate stocking densities. It is not known whether they are off wintered.

Hare are relatively infrequent, except over 700m, on most sites. They are more numerous on Carn Gorm and this may be contributing to grazing impacts, although they appear to be less widespread and numerous in 2011 and 2014 than previously. Signs of hare impacts were not noted on Meall na Samhna and Ben Lawers although they were recorded in 2007.

Impacts on tall herb and dwarf willow vegetation were generally Low or Moderate-Low. The samples were, however, still only really present at less accessible locations and are only thriving in situations where herbivores have been excluded. It would appear that both willow and tall-herb habitats are limited by herbivores and would be considerably more extensive if grazing were excluded from other areas of flushed open rock.

Low grazing impacts on Meall na Samhna and Ben Heasgarnich indicate undergrazing on species-rich *Nardus stricta* grassland across the flanks of these hills as noted following the 2011 survey. This is reflected both in the height of the vegetation and in the build-up of litter in these sample squares. This is likely to result in a loss of species diversity in these grasslands since smaller herbs will be out-shaded and out-competed by taller, more vigorous herbs and grasses.

Overall, herbivore impacts are continuing to decrease across all habitats on all sites within the Breadalbane Hills. The trend indicators also suggest that for some habitats, the signs of long-term damage are fading and there is an increase in the number of samples indicating a long-term (chronic) Low impact. This implies an improving situation for general habitat condition. There are a few locations, mainly on high, exposed ground, where Moderate impacts are still evident and elsewhere the situation has remained more or less stable.

**6. REFERENCES**

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**APPENDIX 1 - Summary Tables of HIA results for each site, comparing 2007, 2011 and 2014 results.**

**1.1 Ben Lawers**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Smooth Grassland | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Grazing* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| Ben Lawers 2007 | 1 | 7 | 6 | 1 | 0 | 15 | 7 | 47 | 40 | 7 | 0 | 100 |  |  |
| Ben Lawers 2011 | 2 | 11 | 4 | 0 | 0 | 17 | 12 | 65 | 24 | 0 | 0 | 100 |  |  |
| Change | 1 | 4 | -2 | -1 | 0 | 2 | 5 | 18 | -16 | -7 | 0 |  |  |  |
| 2011 amended | 4 | 10 | 3 | 0 | 0 | 17 | 24 | 59 | 18 | 0 | 0 | 100 |  |  |
| Ben Lawers 2014 | 3 | 11 | 1 | 0 | 0 | 15 | 20 | 73 | 7 | 0 | 0 | 100 |  |  |
| Change 1114 | -1 | 1 | -2 | 0 | 0 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | I | I | D | D | S |  |  |  |
| *Trampling* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| Ben Lawers 2007 | 0 | 10 | 5 | 0 | 0 | 15 | 0 | 67 | 33 | 0 | 0 | 100 |  |  |
| Ben Lawers 2011 | 1 | 12 | 3 | 0 | 1 | 17 | 6 | 71 | 18 | 0 | 6 | 100 |  |  |
| Change | 1 | 2 | -2 | 0 | 1 | 2 |  |  |  |  |  |  |  |  |
| 2011 amended | 0 | 12 | 4 | 1 | 0 | 17 | 0 | 71 | 24 | 6 | 0 | 100 |  |  |
| Ben Lawers 2014 | 2 | 11 | 2 | 0 | 0 | 15 | 13 | 73 | 13 | 0 | 0 | 100 |  |  |
| Change 1114 | 2 | -1 | -2 | -1 | 0 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trends* | CL/D | CL/I | CH/D | CH/DI | CH | CMH/I | Total | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| Ben Lawers 2007 | 5 | 2 | 0 | 2 | 4 | 2 | 15 | 33 | 13 | 0 | 13 | 27 | 13 | 100 |
| Ben Lawers 2011 | 9 | 2 | 4 | 0 | 2 | 0 | 17 | 53 | 12 | 24 | 0 | 12 | 0 | 100 |
| Ben Lawers 2014 | 9 | 1 | 1 | 0 | 2 | 2 | 15 | 60 | 7 | 7 | 0 | 13 | 13 | 100 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Dung* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| Ben Lawers 2007 | 5 | 4 | 2 | 1 | 3 | 15 | 33 | 27 | 13 | 7 | 20 | 100 |  |  |
| Ben Lawers 2011 | 3 | 2 | 5 | 3 | 4 | 17 | 18 | 12 | 29 | 18 | 24 | 100 |  |  |
| Ben Lawers 2014 | 5 | 2 | 5 | 2 | 1 | 15 | 33 | 13 | 33 | 13 | 7 | 100 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Litter* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| Ben Lawers 2007 | 3 | 0 | 9 | 0 | 3 | 15 | 20 | 0 | 60 | 0 | 20 | 100 |  |  |
| Ben Lawers 2011 | 1 | 4 | 7 | 3 | 2 | 17 | 6 | 24 | 41 | 18 | 12 | 100 |  |  |
| Ben Lawers 2014 | 1 | 1 | 5 | 0 | 8 | 15 | 7 | 7 | 33 | 0 | 53 | 100 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Wind-clipped** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Grazing* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| Ben Lawers 2007 | 0 | 2 | 11 | 10 | 1 | 24 | 0 | 8 | 46 | 42 | 4 | 100 |  |  |
| Ben Lawers 2011 | 1 | 11 | 11 | 1 | 0 | 24 | 4 | 46 | 46 | 4 | 0 | 100 |  |  |
| Ben Lawers 2014 | 3 | 12 | 6 | 3 | 0 | 24 | 13 | 50 | 25 | 13 | 0 | 100 |  |  |
| Change0711 | 1 | 9 | 0 | -9 | -1 | 0 |  |  |  |  |  |  |  |  |
| Change1114 | 2 | 1 | -5 | 2 | 0 | 0 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trampling* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| Ben Lawers 2007 | 10 | 11 | 3 | 0 | 0 | 24 | 42 | 46 | 13 | 0 | 0 | 100 |  |  |
| Ben Lawers 2011 | 17 | 4 | 3 | 0 | 0 | 24 | 71 | 17 | 13 | 0 | 0 | 100 |  |  |
| Ben Lawers 2014 | 22 | 1 | 0 | 0 | 0 | 24 | 92 | 4 | 0 | 0 | 0 | 100 |  |  |
| Change0711 | 7 | -7 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| Change1114 | 5 | -3 | -3 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| *Trends* | CL (D) | CL/I | CH/D | CH/DI | CH | CH/I | Total | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| Ben Lawers 2007 | 5 | 1 | 1 | 1 | 11 | 5 | 24 | 21 | 4 | 4 | 4 | 46 | 21 | 100 |
| Ben Lawers 2011 | 12 | 1 | 2 | 0 | 7 | 1 | 24 | 50 | 4 | 8 | 0 | 29 | 4 | 100 |
| Ben Lawers 2014 | 13 | 0 | 2 | 0 | 7 | 1 | 24 | 54 | 0 | 8 | 0 | 29 | 4 | 100 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Flush** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Grazing* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| Ben Lawers 2007 | 17 | 47 | 12 | 2 | 0 | 79 | 22 | 59 | 15 | 3 | 0 | 100 |  |  |
| Ben Lawers 2011 | 7 | 57 | 11 | 4 | 0 | 79 | 9 | 72 | 14 | 5 | 0 | 100 |  |  |
| Ben Lawers 2014 | 24 | 45 | 7 | 1 | 0 | 79 | 30 | 57 | 9 | 1 | 0 | 100 |  |  |
| Change0711 | -10 | 10 | -1 | 2 | 0 | 0 |  |  |  |  |  |  |  |  |
| Change1114 | 17 | -12 | -4 | -3 | 0 | 0 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trampling* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| Ben Lawers 2007 | 6 | 37 | 29 | 6 | 1 | 79 | 8 | 47 | 37 | 8 | 1 | 100 |  |  |
| Ben Lawers 2011 | 12 | 43 | 20 | 3 | 1 | 79 | 15 | 54 | 25 | 4 | 1 | 100 |  |  |
| Ben Lawers 2014 | 9 | 46 | 20 | 2 | 0 | 79 | 11 | 58 | 25 | 3 | 0 | 100 |  |  |
| Change0711 | 6 | 6 | -9 | -3 | 0 | 0 |  |  |  |  |  |  |  |  |
| Change1114 | -3 | 3 | 0 | -1 | -1 | 0 |  |  |  |  |  |  |  |  |
| *Trends* | CL (D) | D | S/CM (NA) | I | CH | Total | %CL | %D | %C | %I | %CH | TOTAL |  |  |
| Ben Lawers 2007 | 8 | 19 | 37 | 5 | 10 | 79 | 10 | 24 | 47 | 6 | 13 | 100 |  |  |
| Ben Lawers 2011 | 7 | 58 | 10 | 7 | 21 | 79 | 9 | 73 | 13 | 9 | 27 | 100 |  |  |
| Ben Lawers 2014 | 4 | 15 | 3 | 0 | 20 | 79 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Tall Herb** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Grazing* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| Ben Lawers 2007 | 6 | 6 | 1 | 1 | 0 | 14 | 43 | 43 | 7 | 7 | 0 | 100 |  |  |
| Ben Lawers 2011 | 9 | 1 | 3 | 1 | 0 | 14 | 64 | 7 | 21 | 7 | 0 | 100 |  |  |
| Ben Lawers 2014 | 6 | 7 | 1 | 0 | 0 | 14 | 43 | 50 | 7 | 0 | 0 | 100 |  |  |
| Change 0711 | 3 | -5 | 2 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| Change 0114 | -3 | 6 | -2 | -1 | 0 | 0 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trends* | CL D | CL/I | CH/D | CH/DI | CH | CH/I | Total | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| Ben Lawers 2007 | 3 | 0 | 2 | 0 | 9 | 0 | 14 | 21 | 0 | 14 | 0 | 64 | 0 | 100 |
| Ben Lawers 2011 | 9 | 1 | 3 | 0 | 1 | 0 | 14 | 64 | 7 | 21 | 0 | 7 | 0 | 100 |
| Ben Lawers 2014 | 9 | 0 | 1 | 0 | 1 | 0 | 14 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Salix Scrub** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Grazing* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| Ben Lawers 2007 | 2 | 5 | 1 | 0 | 0 | 8 | 25 | 63 | 13 | 0 | 0 | 100 |  |  |
| Ben Lawers 2011 | 2 | 5 | 1 | 0 | 0 | 8 | 25 | 63 | 13 | 0 | 0 | 100 |  |  |
| Ben Lawers 2014 | 1 | 6 | 1 | 0 | 0 | 9 | 11 | 67 | 11 | 0 | 0 | 100 |  |  |
| Change 0711 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |
| Change 0114 | -1 | 1 | 0 | 0 | 0 | 1 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trampling* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| Ben Lawers 2007 | 5 | 2 | 1 | 0 | 0 | 8 | 63 | 25 | 13 | 0 | 0 | 100 |  |  |
| Ben Lawers 2011 | 0 | 7 | 1 | 0 | 0 | 8 | 0 | 88 | 13 | 0 | 0 | 100 |  |  |
| Ben Lawers 2014 | 0 | 7 | 1 | 0 | 0 | 9 | 0 | 78 | 11 | 0 | 0 | 100 |  |  |
| Change 0711 | -5 | 5 | 0 | 0 | 0 | 0 |  |  |  |  |  |  |  |  |
| Change 0114 | 0 | 0 | 0 | 0 | 0 | 1 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trends* | CL/D | CL/I | CH/D | CH/DI | CH | CH/I | Total | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| Ben Lawers 2007 | 5 | 0 | 0 | 0 | 3 | 0 | 8 | 63 | 0 | 0 | 0 | 38 | 0 | 100 |
| Ben Lawers 2011 | 4 | 1 | 1 | 0 | 2 | 0 | 8 | 50 | 13 | 13 | 0 | 25 | 0 | 100 |
| Ben Lawers 2014 | 2 | 1 | 1 | 0 | 0 | 2 | 9 | 22 | 11 | 11 | 0 | 0 | 22 | 100 |

**1.2 Ben Heasgarnich**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Smooth Grassland** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Grazing* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |  |  |
| Ben Heasgarnich 2007 | 3 | 16 | 3 | 0 | 0 | 22 | 14 | 73 | 14 | 0 | 0 | 100 |  |  |  |  |
| Ben Heasgarnich 2011 | 9 | 11 | 1 | 0 | 0 | 21 | 43 | 52 | 5 | 0 | 0 | 100 |  |  |  |  |
| Change | 6 | -5 | -2 | 0 | 0 | -1 | 29 | -20 | -9 | 0 | 0 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2011 amended | 10 | 9 | 2 | 0 | 0 | 21 | 48 | 43 | 10 | 0 | 0 | 100 |  |  |  |  |
| Ben Heasgarnich 2014 | 10 | 10 | 1 | 0 | 0 | 21 | 48 | 48 | 5 | 0 | 0 | 100 |  |  |  |  |
| Change | 0 | 1 | -1 | 0 | 0 | 0 | 0 | 5 | -5 | 0 | 0 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trampling* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |  |  |
| Ben Heasgarnich 2007 | 0 | 14 | 7 | 1 | 0 | 22 | 0 | 64 | 32 | 5 | 0 | 100 |  |  |  |  |
| Ben Heasgarnich 2011 | 0 | 15 | 6 | 0 | 0 | 21 | 0 | 71 | 29 | 0 | 0 | 100 |  |  |  |  |
| Change | 0 | 1 | -1 | -1 | 0 | -1 | 0 | 8 | -3 | -5 | 0 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2011 amended | 1 | 16 | 4 | 0 | 0 | 21 | 5 | 76 | 19 | 0 | 0 | 100 |  |  |  |  |
| Ben Heasgarnich 2014 | 3 | 13 | 4 | 1 | 0 | 21 | 14 | 62 | 19 | 5 | 0 | 100 |  |  |  |  |
| Change | 2 | -3 | 0 | 1 | 0 | 0 | 10 | -14 | 0 | 5 | 0 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trends* | CL D | CL/I | CH/D | CH/DI | CH | CL | CH/I | Total | %CL | %CL/I | %CH/D | %CH/DI | %CH | CL | %CH/I | TOTAL |
| Ben Heasgarnich 2007 | 3 | 0 | 11 | 0 | 7 | 0 | 1 | 22 | 14 | 0 | 50 | 0 | 32 | 0 | 5 | 100 |
| Ben Heasgarnich 2011 | 7 | 0 | 14 | 0 | 0 | 0 | 0 | 21 | 33 | 0 | 67 | 0 | 0 | 0 | 0 | 100 |
| Ben Heasgarnich 2014 | 5 | 0 | 7 | 0 | 6 | 3 | 0 | 21 | 24 | 0 | 33 | 0 | 29 | 14 | 0 | 100 |
| Change 07/11 | 4 | 0 | 3 | 0 | -7 | -1 | -1 |  | 20 | 0 | 17 | 0 | -32 | 0 | -5 |  |
| Change 11/14 | -2 | 0 | -7 | 0 | 6 | 3 | 0 |  | -10 | 0 | -33 | 0 | 29 | 14 | 0 |  |
|  |  |  |  |  |  |  |  | I | S | I | S | D | D |  |  |  |
| *Dung* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |  |  |
| Ben Heasgarnich 2007 | 6 | 4 | 4 | 3 | 5 | 22 | 27 | 18 | 18 | 14 | 23 | 100 |  |  |  |  |
| Ben Heasgarnich 2011 | 6 | 6 | 2 | 1 | 6 | 21 | 29 | 29 | 10 | 5 | 29 | 100 |  |  |  |  |
| Ben Heasgarnich 2014 | 8 | 8 | 4 | 0 | 1 | 21 | 38 | 38 | 19 | 0 | 5 | 100 |  |  |  |  |
| Change 07/11 | 0 | 2 | -2 | -2 | 1 |  | 1 | 10 | -9 | -9 | 6 |  |  |  |  |  |
| Change 11/14 | 2 | 2 | 2 | -1 | -5 |  | 10 | 10 | 10 | -5 | -24 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Litter* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |  |  |
| Ben Heasgarnich 2007 | 2 | 0 | 11 | 0 | 9 | 22 | 9 | 0 | 50 | 0 | 41 | 100 |  |  |  |  |
| Ben Heasgarnich 2011 | 6 | 0 | 13 | 0 | 2 | 21 | 29 | 0 | 62 | 0 | 10 | 100 |  |  |  |  |
| Ben Heasgarnich 2014 | 4 | 2 | 12 | 1 | 2 | 21 | 19 | 10 | 57 | 5 | 10 | 100 |  |  |  |  |
| Change 07/11 | 4 | 0 | 2 | 0 | -7 |  | 19 | 0 | 12 | 0 | -31 |  |  |  |  |  |
| Change 11/14 | -2 | 2 | -1 | 1 | 0 |  | -10 | 10 | -5 | 5 | 0 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Flush** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Grazing* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |  |  |
| Ben Heasgarnich 2007 | 3 | 25 | 2 | 0 | 0 | 28 | 11 | 89 | 7 | 0 | 0 | 100 |  |  |  |  |
| Ben Heasgarnich 2011 | 0 | 19 | 6 | 1 | 0 | 26 | 0 | 73 | 23 | 4 | 0 | 100 |  |  |  |  |
| Ben Heasgarnich 2014 | 12 | 14 | 0 | 0 | 0 | 26 | 46 | 54 | 0 | 0 | 0 | 100 |  |  |  |  |
| Change 07/11 | -3 | -6 | 4 | 1 | 0 | -2 | -11 | -16 | 16 | 4 | 0 |  |  |  |  |  |
| Change 11/14 | 12 | -5 | -6 | -1 | 0 |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trampling* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |  |  |
| Ben Heasgarnich 2007 | 0 | 17 | 10 | 1 | 0 | 28 | 0 | 61 | 36 | 4 | 0 | 100 |  |  |  |  |
| Ben Heasgarnich 2011 | 10 | 11 | 2 | 3 | 0 | 26 | 38 | 42 | 8 | 12 | 0 | 100 |  |  |  |  |
| Ben Heasgarnich 2014 | 4 | 9 | 12 | 1 | 0 | 26 | 15 | 35 | 46 | 4 | 0 | 100 |  |  |  |  |
| Change 07/11 | 10 | -6 | -8 | 2 | 0 |  | 38 | -18 | -28 | 8 | 0 |  |  |  |  |  |
| Change 11/14 | -6 | -2 | 10 | -2 | 0 |  | -23 | -8 | 38 | -8 | 0 |  |  |  |  |  |
|  |  |  |  |  |  |  | I | I | D | D | S |  |  |  |  |  |
| *Trends* | CL (D) | D | S/CM (NA) | I | CH | Total | %CL | %D | %C | %I | %CH | TOTAL |  |  |  |  |
| Ben Heasgarnich 2007 | 0 | 10 | 10 | 0 | 5 | 28 | 0 | 36 | 36 | 0 | 18 | 100 |  |  |  |  |
| Ben Heasgarnich 2011 | 3 | 21 | 2 | 2 | 5 | 26 | 12 | 81 | 8 | 8 | 19 | 100 |  |  |  |  |
| Ben Heasgarnich 2014 | 0 | 15 | 11 | 0 | 0 | 26 | 0 | 58 | 42 | 0 | 0 | 100 |  |  |  |  |
| Change 07/11 | 3 | 11 | -8 | 2 | 0 |  | 12 | 45 | -28 | 8 | 1 |  |  |  |  |  |
| Change 11/14 | -3 | -6 | 9 | -2 | -5 |  | -12 | -23 | 35 | -8 | -19 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Tall Herb** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| *Grazing* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |  |  |
| Ben Heasgarnich 2007 | 6 | 3 | 3 | 0 | 0 | 12 | 50 | 25 | 25 | 0 | 0 | 100 |  |  |  |  |
| Ben Heasgarnich 2011 | 1 | 3 | 6 | 0 | 2 | 12 | 8 | 25 | 50 | 0 | 17 | 100 |  |  |  |  |
| Ben Heasgarnich 2014 | 10 | 0 | 2 | 0 | 0 | 12 | 83 | 0 | 17 | 0 | 0 | 100 |  |  |  |  |
| Change 07/11 | -5 | 0 | 3 | 0 | 2 |  | -42 | 0 | 25 | 0 | 17 |  |  |  |  |  |
| Change 11/14 | 9 | -3 | -4 | 0 | -2 |  | 75 | -25 | -33 | 0 | -17 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trends* | CL (D) | CL/I | CH/D | CH/DI | CH | CH/I | CM/D | U | Total | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| Ben Heasgarnich 2007 | 1 | 0 | 1 | 0 | 10 | 0 | 0 | 0 | 12 | 8 | 0 | 8 | 0 | 83 | 0 | 100 |
| Ben Heasgarnich 2011 | 3 | 0 | 4 | 0 | 5 | 0 | 0 | 0 | 12 | 25 | 0 | 33 | 0 | 42 | 0 | 100 |
| Ben Heasgarnich 2014 | 3 | 0 | 0 | 0 | 1 | 0 | 2 | 6 | 12 | 25 | 0 | 0 | 0 | 8 | 0 | 100 |
| Change 07/11 | 2 | 0 | 3 | 0 | -5 | 0 | 0 | 0 |  | 17 | 0 | 25 | 0 | -42 | 0 |  |
| Change 11/14 | 0 | 0 | -4 | 0 | -4 | 0 | 2 | 6 |  | 0 | 0 | -33 | 0 | -33 | 0 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Salix Scrub** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Grazing* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |  |  |
| Ben Heasgarnich 2007 | 2 | 1 | 0 | 0 | 0 | 3 | 67 | 33 | 0 | 0 | 0 | 100 |  |  |  |  |
| Ben Heasgarnich 2011 | 0 | 0 | 1 | 4 | 0 | 5 | 0 | 0 | 20 | 80 | 0 | 100 |  |  |  |  |
| Ben Heasgarnich 2014 | 3 | 0 | 0 | 0 | 0 | 3 | 100 | 0 | 0 | 0 | 0 | 100 |  |  |  |  |
| Change 07/11 | -2 | -1 | 1 | 4 | 0 |  | -67 | -33 | 20 | 80 | 0 |  |  |  |  |  |
| Change 11/14 | 3 | 0 | -1 | -4 | 0 |  | 100 | 0 | -20 | -80 | 0 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trampling* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |  |  |
| Ben Heasgarnich 2007 | 0 | 3 | 0 | 0 | 0 | 3 | 0 | 100 | 0 | 0 | 0 | 100 |  |  |  |  |
| Ben Heasgarnich 2011 | 0 | 1 | 0 | 2 | 2 | 5 | 0 | 20 | 0 | 40 | 40 | 100 |  |  |  |  |
| Ben Heasgarnich 2014 | 0 | 3 | 0 | 0 | 0 | 3 | 0 | 100 | 0 | 0 | 0 | 100 |  |  |  |  |
| Change 07/11 | 0 | -2 | 0 | 2 | 2 |  | 0 | -80 | 0 | 40 | 40 |  |  |  |  |  |
| Change 11/14 | 0 | 2 | 0 | -2 | -2 |  | 0 | 80 | 0 | -40 | -40 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trends* | CL D | CL/I | CH/D | CH/DI | CH | CH/I | Total | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |  |  |
| Ben Heasgarnich 2007 | 1 | 0 | 1 | 0 | 1 | 0 | 3 | 33 | 0 | 33 | 0 | 33 | 0 | 100 |  |  |
| Ben Heasgarnich 2011 | 0 | 0 | 0 | 0 | 1 | 4 | 5 | 0 | 0 | 0 | 0 | 20 | 80 | 100 |  |  |
| Ben Heasgarnich 2014 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 100 | 0 | 0 | 0 | 0 | 0 | 100 |  |  |
| Change 07/11 | -1 | 0 | -1 | 0 | 0 | 4 |  | -33 | 0 | -33 | 0 | -13 | 80 |  |  |  |
| Change 11/14 | 3 | 0 | 0 | 0 | -1 | -4 |  | 100 | 0 | 0 | 0 | -20 | -80 |  |  |  |

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| **1.3 Meall na Samhna** | |  | |  | |  | |  | |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |
| **Smooth Grassland** |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
|  |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
| *Grazing* | L | | LM | | M | | MH | | H | | | Total | | %L | | %LM | | %M | | %MH | | %H | | TOTAL | |  | |  | | |
| Meall na Samhna 2007 | 4 | | 6 | | 0 | | 0 | | 0 | | | 10 | | 40 | | 60 | | 0 | | 0 | | 0 | | 100 | |  | |  | | |
| Meall na Samhna 2011 | 6 | | 3 | | 1 | | 0 | | 0 | | | 10 | | 60 | | 30 | | 10 | | 0 | | 0 | | 100 | |  | |  | | |
| *Change 0711* | *2* | | *-3* | | *1* | | *0* | | *0* | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
| 2011 amended | 7 | | 3 | | 0 | | 0 | | 0 | | | 10 | | 70 | | 30 | | 0 | | 0 | | 0 | | 100 | |  | |  | | |
| Meall na Samhna 2014 | 6 | | 4 | | 0 | | 0 | | 0 | | | 10 | | 60 | | 40 | | 0 | | 0 | | 0 | | 100 | |  | |  | | |
| *Change 1114* | *-1* | | *-1* | | *0* | | *0* | | *0* | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
|  |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
| *Trampling* | L | | LM | | M | | MH | | H | | | Total | | %L | | %LM | | %M | | %MH | | %H | | TOTAL | |  | |  | | |
| Meall na Samhna 2007 | 5 | | 3 | | 2 | | 0 | | 0 | | | 10 | | 50 | | 30 | | 20 | | 0 | | 0 | | 100 | |  | |  | | |
| Meall na Samhna 2011 | 0 | | 8 | | 2 | | 0 | | 0 | | | 10 | | 0 | | 80 | | 20 | | 0 | | 0 | | 100 | |  | |  | | |
| *Change 0711* | *-5* | | *5* | | *0* | | *0* | | *0* | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
|  |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
| 2011 amended | 0 | | 2 | | 8 | | 0 | | 0 | | | 10 | | 0 | | 20 | | 80 | | 0 | | 0 | | 100 | |  | |  | | |
| Meall na Samhna 2014 | 1 | | 9 | | 0 | | 0 | | 0 | | | 10 | | 10 | | 90 | | 0 | | 0 | | 0 | | 100 | |  | |  | | |
| *Change 1114* | *-1* | | *-1* | | *0* | | *0* | | *0* | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
|  |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
| *Trends* | CL (D) | | CL/I | | CH/D | | CH/DI | | CH | | | CH/I | | Total | | %CL | | %CL/I | | %CH/D | | %CH/DI | | %CH | | %CH/I | | TOTAL | | |
| Meall na Samhna 2007 | 7 | | 0 | | 0 | | 0 | | 3 | | | 0 | | 10 | | 70 | | 0 | | 0 | | 0 | | 30 | | 0 | | 100 | | |
| Meall na Samhna 2011 | 1 (4) | | 0 | | 3 | | 1 | | 1 | | | 0 | | 10 | | 50 | | 0 | | 30 | | 10 | | 10 | | 0 | | 100 | | |
| Meall na Samhna 2014 | 1 | | 0 | | 0 | | 0 | | 9 | | | 0 | | 10 | |  | |  | |  | |  | |  | |  | |  | | |
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| *Dung* | L | | LM | | M | | MH | | H | | | Total | | %L | | %LM | | %M | | %MH | | %H | | TOTAL | |  | |  | | |
| Meall na Samhna 2007 | 4 | | 4 | | 2 | | 0 | | 0 | | | 10 | | 40 | | 40 | | 20 | | 0 | | 0 | | 100 | |  | |  | | |
| Meall na Samhna 2011 | 2 | | 1 | | 6 | | 0 | | 1 | | | 10 | | 20 | | 10 | | 60 | | 0 | | 10 | | 100 | |  | |  | | |
| Meall na Samhna 2014 | 3 | | 5 | | 2 | | 0 | | 0 | | | 10 | |  | |  | |  | |  | |  | |  | |  | |  | | |
| *Change 0711* | *-2* | | *-3* | | *4* | | *0* | | *1* | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
| *Change 1114* | *1* | | *4* | | *-4* | | *0* | | *-1* | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
|  |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
| *Litter* | L | | LM | | M | | MH | | H | | | Total | | %L | | %LM | | %M | | %MH | | %H | | TOTAL | |  | |  | | |
| Meall na Samhna 2007 | 6 | | 0 | | 3 | | 0 | | 1 | | | 10 | | 60 | | 0 | | 30 | | 0 | | 10 | | 100 | |  | |  | | |
| Meall na Samhna 2011 | 4 | | 0 | | 6 | | 0 | | 0 | | | 10 | | 40 | | 0 | | 60 | | 0 | | 0 | | 100 | |  | |  | | |
| Meall na Samhna 2014 | 5 | | 0 | | 5 | | 0 | | 0 | | | 10 | |  | |  | |  | |  | |  | |  | |  | |  | | |
| *Change 0711* | *-2* | | *0* | | *3* | | *0* | | *-1* | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
| *Change 1114* | *1* | | *0* | | *-1* | | *0* | | *0* | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
|  |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
| **Wind-clipped** |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
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| *Grazing* | L | | LM | | M | | MH | | H | | | Total | | %L | | %LM | | %M | | %MH | | %H | | TOTAL | |  | |  | | |
| Meall na Samhna 2007 | 0 | | 1 | | 4 | | 2 | | 0 | | | 7 | | 0 | | 14 | | 57 | | 29 | | 0 | | 100 | |  | |  | | |
| Meall na Samhna 2011 | 2 | | 4 | | 1 | | 0 | | 0 | | | 7 | | 29 | | 57 | | 14 | | 0 | | 0 | | 100 | |  | |  | | |
| Meall na Samhna 2014 | 3 | | 2 | | 2 | | 0 | | 0 | | | 7 | | 43 | | 29 | | 29 | | 0 | | 0 | | 100 | |  | |  | | |
| *Change 0711* | 2 | | 3 | | -3 | | -2 | | 0 | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
| *Change 1114* | 1 | | -2 | | 1 | | 0 | | 0 | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
|  |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
| *Trampling* | L | | LM | | M | | MH | | H | | | Total | | %L | | %LM | | %M | | %MH | | %H | | TOTAL | |  | |  | | |
| Meall na Samhna 2007 | 5 | | 1 | | 0 | | 1 | | 0 | | | 7 | | 71 | | 14 | | 0 | | 14 | | 0 | | 100 | |  | |  | | |
| Meall na Samhna 2011 | 5 | | 2 | | 0 | | 0 | | 0 | | | 7 | | 71 | | 29 | | 0 | | 0 | | 0 | | 100 | |  | |  | | |
| Meall na Samhna 2014 | 7 | | 0 | | 0 | | 0 | | 0 | | | 7 | | 100 | | 0 | | 0 | | 0 | | 0 | | 100 | |  | |  | | |
| *Change 0711* | 0 | | 1 | | 0 | | -1 | | 0 | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
| *Change 1114* | 2 | | -2 | | 0 | | 0 | | 0 | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
|  |  | |  | |  | |  | |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |
| *Trends* | CL (D) | | CL/I | | CH/D | | CH/DI | | CH | | | CH/I | | Total | | %CL | | %CL/I | | %CH/D | | %CH/DI | | %CH | | %CH/I | | TOTAL | | |
| Meall na Samhna 2007 | 1 | | 1 | | 0 | | 1 | | 2 | | | 2 | | 7 | | 14 | | 14 | | 0 | | 14 | | 29 | | 29 | | 100 | | |
| Meall na Samhna 2011 | 6 | | 0 | | 1 | | 0 | | 0 | | | 0 | | 7 | | 86 | | 0 | | 14 | | 0 | | 0 | | 0 | | 100 | | |
| Meall na Samhna 2014 | 6 | | 1 | | 0 | | 0 | | 0 | | | 0 | | 7 | | 86 | | 14 | | 0 | | 0 | | 0 | | 0 | | 100 | | |
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| **Flush** | | |  | | |  | | |  | | |  | | |  | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |
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| *Grazing* | | | L | | | LM | | | M | | | MH | | | H | | | | Total | | | %L | | | %LM | | | %M | | | %MH | | | %H | | | TOTAL | | |  | | |  | | | |
| Meall na Samhna 2007 | | | 6 | | | 17 | | | 1 | | | 0 | | | 0 | | | | 24 | | | 25 | | | 71 | | | 4 | | | 0 | | | 0 | | | 100 | | |  | | |  | | | |
| Meall na Samhna 2011 | | | 4 | | | 18 | | | 2 | | | 0 | | | 0 | | | | 24 | | | 17 | | | 75 | | | 8 | | | 0 | | | 0 | | | 100 | | |  | | |  | | | |
| Meall na Samhna 2014 | | | 5 | | | 19 | | | 0 | | | 0 | | | 0 | | | | 24 | | | 21 | | | 79 | | | 0 | | | 0 | | | 0 | | | 100 | | |  | | |  | | | |
| *Change 0711* | | | *-2* | | | *1* | | | *1* | | | *0* | | | *0* | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |
| *Change 1114* | | | *1* | | | *1* | | | *-2* | | | *0* | | | *0* | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |
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| *Trampling* | | | L | | | LM | | | M | | | MH | | | H | | | | Total | | | %L | | | %LM | | | %M | | | %MH | | | %H | | | TOTAL | | |  | | |  | | | |
| Meall na Samhna 2007 | | | 0 | | | 11 | | | 9 | | | 4 | | | 0 | | | | 24 | | | 0 | | | 46 | | | 38 | | | 17 | | | 0 | | | 100 | | |  | | |  | | | |
| Meall na Samhna 2011 | | | 0 | | | 16 | | | 7 | | | 1 | | | 0 | | | | 24 | | | 0 | | | 67 | | | 29 | | | 4 | | | 0 | | | 100 | | |  | | |  | | | |
| Meall na Samhna 2014 | | | 2 | | | 14 | | | 8 | | | 0 | | | 0 | | | | 24 | | | 8 | | | 58 | | | 33 | | | 0 | | | 0 | | | 100 | | |  | | |  | | | |
| *Change 0711* | | | 0 | | | 5 | | | -2 | | | -3 | | | 0 | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |
| *Change 1114* | | |  | | |  | | |  | | |  | | |  | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |
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| *Trends* | | | CL (D) | | | D | | | S (NA) | | | I | | | CH | | | | Total | | | %CL | | | %D | | | %C(NA) | | | %I | | | %CH | | | TOTAL | | |  | | |  | | | |
| Meall na Samhna 2007 | | | 1 | | | 6 | | | 5 | | | 2 | | | 5 | | | | 24 | | | 4 | | | 25 | | | 21 | | | 8 | | | 21 | | | 100 | | |  | | |  | | | |
| Meall na Samhna 2011 | | | 0 | | | 10 | | | 12 | | | 0 | | | 2 | | | | 24 | | | 0 | | | 42 | | | 50 | | | 0 | | | 8 | | | 100 | | |  | | |  | | | |
| Meall na Samhna 2014 | | | 3 | | | 5 | | | 15 | | | 0 | | | 1 | | | | 24 | | | 13 | | | 21 | | | 63 | | | 0 | | | 4 | | | 100 | | |  | | |  | | | |
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| **Tall Herb** | | |  | | |  | | |  | | |  | | |  | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |
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| *Grazing* | | | L | | | LM | | | M | | | MH | | | H | | | | Total | | | %L | | | %LM | | | %M | | | %MH | | | %H | | | TOTAL | | |  | | |  | | | |
| Meall na Samhna 2007 | | | 1 | | | 6 | | | 0 | | | 0 | | | 0 | | | | 7 | | | 14 | | | 86 | | | 0 | | | 0 | | | 0 | | | 100 | | |  | | |  | | | |
| Meall na Samhna 2011 | | | 2 | | | 1 | | | 2 | | | 2 | | | 0 | | | | 7 | | | 29 | | | 14 | | | 29 | | | 29 | | | 0 | | | 100 | | |  | | |  | | | |
| Meall na Samhna 2014 | | | 2 | | | 3 | | | 0 | | | 0 | | | 0 | | | | 5 | | | 40 | | | 60 | | | 0 | | | 0 | | | 0 | | | 100 | | |  | | |  | | | |
| *Change 0711* | | | *1* | | | *-5* | | | *2* | | | *2* | | | *0* | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |
| *Change 1114* | | | *0* | | | *2* | | | *-2* | | | *-2* | | | *0* | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | | |
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| *Trends* | | | CL (D) | | | CL/I | | | CH/D | | | CH/DI | | | CH | | | | CH/I | | | Total | | | %CL | | | %CL/I | | | %CH/D | | | %CH/DI | | | %CH | | | %CH/I | | | TOTAL | | | |
| Meall na Samhna 2007 | | | 0 | | | 0 | | | 5 | | | 0 | | | 1 | | | | 0 | | | 7 | | | 0 | | | 0 | | | 71 | | | 0 | | | 14 | | | 0 | | | 100 | | | |
| Meall na Samhna 2011 | | | 5 | | | 0 | | | 1 | | | 0 | | | 0 | | | | 0 | | | 7 | | | 71 | | | 0 | | | 14 | | | 0 | | | 0 | | | 0 | | | 100 | | | |
| Meall na Samhna 2014 | | | 1 | | | 0 | | | 2 | | | 0 | | | 2 | | | | 0 | | | 5 | | | 20 | | | 0 | | | 40 | | | 0 | | | 40 | | | 0 | | | 100 | | | |
| **1.4 Meall Ghaordie** | |  | |  | | |  | | |  | | |  | | |  | |  | | |  | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |  | |
| **Wind-clipped** |  | | | |  | | |  | | |  | | |  | | |  | | |  | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |
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| *Grazing* | L | | | | LM | | | M | | | MH | | | H | | | Total | | | %L | | | | %LM | | | %M | | | %MH | | | %H | | | TOTAL | | |  | | |  | | |
| Meall Ghaordie 2007 | 2 | | | | 3 | | | 5 | | | 3 | | | 2 | | | 15 | | | 13 | | | | 20 | | | 33 | | | 20 | | | 13 | | | 100 | | |  | | |  | | |
| Meall Ghaordie 2011 | 3 | | | | 9 | | | 3 | | | 0 | | | 0 | | | 15 | | | 20 | | | | 60 | | | 20 | | | 0 | | | 0 | | | 100 | | |  | | |  | | |
| Meall Ghaordie 2014 | 8 | | | | 4 | | | 1 | | | 2 | | | 0 | | | 15 | | | 53 | | | | 27 | | | 7 | | | 13 | | | 0 | | | 100 | | |  | | |  | | |
| Change 07/11 | 1 | | | | 6 | | | -2 | | | -3 | | | -2 | | |  | | | 7 | | | | 40 | | | -13 | | | -20 | | | -13 | | |  | | |  | | |  | | |
| Change 11/14 | 5 | | | | -5 | | | -2 | | | 2 | | | 0 | | |  | | | 33 | | | | -33 | | | -13 | | | 13 | | | 0 | | |  | | |  | | |  | | |
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| *Trampling* | L | | | | LM | | | M | | | MH | | | H | | | Total | | | %L | | | | %LM | | | %M | | | %MH | | | %H | | | TOTAL | | |  | | |  | | |
| Meall Ghaordie 2007 | 5 | | | | 6 | | | 3 | | | 0 | | | 1 | | | 15 | | | 33 | | | | 40 | | | 20 | | | 0 | | | 7 | | | 100 | | |  | | |  | | |
| Meall Ghaordie 2011 | 5 | | | | 8 | | | 1 | | | 0 | | | 1 | | | 15 | | | 33 | | | | 53 | | | 7 | | | 0 | | | 7 | | | 100 | | |  | | |  | | |
| Meall Ghaordie 2014 | 9 | | | | 5 | | | 0 | | | 1 | | | 0 | | | 15 | | | 60 | | | | 33 | | | 0 | | | 7 | | | 0 | | | 100 | | |  | | |  | | |
| Change 07/11 | 0 | | | | 2 | | | -2 | | | 0 | | | 0 | | |  | | | 0 | | | | 13 | | | -13 | | | 0 | | | 0 | | |  | | |  | | |  | | |
| Change 11/14 | 4 | | | | -3 | | | -1 | | | 1 | | | -1 | | |  | | | 27 | | | | -20 | | | -7 | | | 7 | | | -7 | | |  | | |  | | |  | | |
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| *Trends* | CL (D) | | | | CL/I | | | CM | | | CH/DI | | | CH | | | CH/I | | | Total | | | | %CL | | | %CL/I | | | %CM | | | %CH/DI | | | %CH | | | %CH/I | | | TOTAL | | |
| Meall Ghaordie 2007 | 4 | | | | 3 | | | 0 | | | 1 | | | 4 | | | 3 | | | 15 | | | | 27 | | | 20 | | | 0 | | | 7 | | | 27 | | | 20 | | | 100 | | |
| Meall Ghaordie 2011 | 6 | | | | 0 | | | 6 | | | 1 | | | 2 | | | 0 | | | 15 | | | | 40 | | | 0 | | | 40 | | | 7 | | | 13 | | | 0 | | | 100 | | |
| Meall Ghaordie 2014 | 11 | | | | 0 | | | 0 | | | 0 | | | 4 | | | 0 | | | 15 | | | | 73 | | | 0 | | | 0 | | | 0 | | | 27 | | | 0 | | | 100 | | |
| Change 07/11 | 2 | | | | -3 | | | 6 | | | 0 | | | -2 | | | -3 | | |  | | | | 13 | | | -20 | | | 40 | | | 0 | | | -13 | | | -20 | | |  | | |
| Change 11/14 | 5 | | | | 0 | | | -6 | | | -1 | | | 2 | | | 0 | | |  | | | | 33 | | | 0 | | | -40 | | | -7 | | | 13 | | | 0 | | |  | | |
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| **Tall herb** |  | | | |  | | |  | | |  | | |  | | |  | | |  | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |
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| *Grazing* | L | | | | LM | | | M | | | MH | | | H | | | Total | | | %L | | | | %LM | | | %M | | | %MH | | | %H | | | TOTAL | | |  | | |  | | |
| Meall Ghaordie 2007 | 0 | | | | 1 | | | 0 | | | 0 | | | 0 | | | 1 | | | 0 | | | | 100 | | | 0 | | | 0 | | | 0 | | | 100 | | |  | | |  | | |
| Meall Ghaordie 2011 | 0 | | | | 0 | | | 1 | | | 0 | | | 0 | | | 1 | | | 0 | | | | 0 | | | 100 | | | 0 | | | 0 | | | 100 | | |  | | |  | | |
| Meall Ghaordie 2014 | 0 | | | | 1 | | | 0 | | | 0 | | | 0 | | | 1 | | | 0 | | | | 100 | | | 0 | | | 0 | | | 0 | | | 100 | | |  | | |  | | |
| Change 07/11 | 0 | | | | -1 | | | 1 | | | 0 | | | 0 | | |  | | | 0 | | | | -100 | | | 100 | | | 0 | | | 0 | | |  | | |  | | |  | | |
| Change 11/14 | 0 | | | | 1 | | | -1 | | | 0 | | | 0 | | |  | | | 0 | | | | 100 | | | -100 | | | 0 | | | 0 | | |  | | |  | | |  | | |
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| *Trends* | CL (D) | | | | CL/I | | | CM | | | CH/D | | | CH | | | CM/D | | | Total | | | | %CL | | | %CL/I | | | %CM | | | %CH/D | | | %CH | | | %CM/D | | | TOTAL | | |
| Meall Ghaordie 2007 | 0 | | | | 0 | | | 0 | | | 1 | | | 0 | | | 0 | | | 1 | | | | 0 | | | 0 | | | 0 | | | 100 | | | 0 | | | 0 | | | 100 | | |
| Meall Ghaordie 2011 | 0 | | | | 0 | | | 1 | | | 0 | | | 0 | | | 0 | | | 1 | | | | 0 | | | 0 | | | 100 | | | 0 | | | 0 | | | 0 | | | 100 | | |
| Meall Ghaordie 2014 | 0 | | | | 0 | | | 0 | | | 0 | | | 0 | | | 1 | | | 1 | | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 100 | | | 100 | | |
| Change 07/11 | 0 | | | | 0 | | | 1 | | | -1 | | | 0 | | | 0 | | |  | | | | 0 | | | 0 | | | 100 | | | -100 | | | 0 | | | 0 | | |  | | |
| Change 11/14 | 0 | | | | 0 | | | -1 | | | 0 | | | 0 | | | 1 | | |  | | | | 0 | | | 0 | | | -100 | | | 0 | | | 0 | | | 100 | | |  | | |
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| **Salix Scrub** |  | | | |  | | |  | | |  | | |  | | |  | | |  | | | |  | | |  | | |  | | |  | | |  | | |  | | |  | | |
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| *Grazing* | L | | | | LM | | | M | | | MH | | | H | | | Total | | | %L | | | | %LM | | | %M | | | %MH | | | %H | | | TOTAL | | |  | | |  | | |
| Meall Ghaordie 2007 | 0 | | | | 0 | | | 1 | | | 0 | | | 0 | | | 1 | | | 0 | | | | 0 | | | 100 | | | 0 | | | 0 | | | 100 | | |  | | |  | | |
| Meall Ghaordie 2011 | 0 | | | | 0 | | | 0 | | | 3 | | | 1 | | | 4 | | | 0 | | | | 0 | | | 0 | | | 75 | | | 25 | | | 100 | | |  | | |  | | |
| Meall Ghaordie 2014 | 2 | | | | 1 | | | 0 | | | 0 | | | 0 | | | 3 | | | 67 | | | | 33 | | | 0 | | | 0 | | | 0 | | | 100 | | |  | | |  | | |
| Change 07/11 | 0 | | | | 0 | | | -1 | | | 3 | | | 1 | | |  | | | 0 | | | | 0 | | | -100 | | | 75 | | | 25 | | |  | | |  | | |  | | |
| Change 11/14 | 2 | | | | 1 | | | 0 | | | -3 | | | -1 | | |  | | | 67 | | | | 33 | | | 0 | | | -75 | | | -25 | | |  | | |  | | |  | | |
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| *Trampling* | L | | | | LM | | | M | | | MH | | | H | | | Total | | | %L | | | | %LM | | | %M | | | %MH | | | %H | | | TOTAL | | |  | | |  | | |
| Meall Ghaordie 2007 | 0 | | | | 1 | | | 0 | | | 0 | | | 0 | | | 1 | | | 0 | | | | 100 | | | 0 | | | 0 | | | 0 | | | 100 | | |  | | |  | | |
| Meall Ghaordie 2011 | 0 | | | | 1 | | | 0 | | | 0 | | | 3 | | | 4 | | | 0 | | | | 25 | | | 0 | | | 0 | | | 75 | | | 100 | | |  | | |  | | |
| Meall Ghaordie 2014 | 0 | | | | 3 | | | 0 | | | 0 | | | 0 | | | 3 | | | 0 | | | | 100 | | | 0 | | | 0 | | | 0 | | | 100 | | |  | | |  | | |
| Change 07/11 | 0 | | | | 0 | | | 0 | | | 0 | | | 3 | | |  | | | 0 | | | | -75 | | | 0 | | | 0 | | | 75 | | |  | | |  | | |  | | |
| Change 11/14 | 0 | | | | 2 | | | 0 | | | 0 | | | -3 | | |  | | | 0 | | | | 75 | | | 0 | | | 0 | | | -75 | | |  | | |  | | |  | | |
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| *Trends* | CL (D) | | | | CL/I | | | CM | | | CH/D | | | CH | | | CH/I | | | Total | | | | %CL | | | %CL/I | | | %CM | | | %CH/D | | | %CH | | | %CH/I | | | TOTAL | | |
| Meall Ghaordie 2007 | 0 | | | | 0 | | | 0 | | | 0 | | | 1 | | | 0 | | | 1 | | | | 0 | | | 0 | | | 0 | | | 0 | | | 100 | | | 0 | | | 100 | | |
| Meall Ghaordie 2011 | 0 | | | | 0 | | | 1 | | | 0 | | | 0 | | | 3 | | | 4 | | | | 0 | | | 0 | | | 25 | | | 0 | | | 0 | | | 75 | | | 100 | | |
| Meall Ghaordie 2014 | 3 | | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 3 | | | | 100 | | | 0 | | | 0 | | | 0 | | | 0 | | | 0 | | | 100 | | |
| Change 07/11 | 0 | | | | 0 | | | 1 | | | 0 | | | -1 | | | 3 | | |  | | | | 0 | | | 0 | | | 25 | | | 0 | | | -100 | | | 75 | | |  | | |
| Change 11/14 | 3 | | | | 0 | | | -1 | | | 0 | | | 0 | | | -3 | | |  | | | | 100 | | | 0 | | | -25 | | | 0 | | | 0 | | | -75 | | |  | | |
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**1.5 Carn Gorm/Meall Garbh**

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| **Smooth Grassland** | |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| *Grazing* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| CGMG 2007 | 0 | 6 | 1 | 0 | 0 | 7 | 0 | 86 | 14 | 0 | 0 | 100 |  |  |
| CGMG 2011 | 3 | 4 | 0 | 0 | 0 | 7 | 43 | 57 | 0 | 0 | 0 | 100 |  |  |
| Change | 3 | -2 | -1 | 0 | 0 | 0 | 43 | -29 | -14 | 0 | 0 |  |  |  |
| 2011 amended | 4 | 3 | 0 | 0 | 0 | 7 | 57 | 43 | 0 | 0 | 0 | 100 |  |  |
| CGMG 2014 | 4 | 3 | 0 | 0 | 0 | 7 | 57 | 43 | 0 | 0 | 0 | 100 |  |  |
| Change | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 100 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trampling* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| CGMG 2007 | 2 | 3 | 2 | 0 | 0 | 7 | 29 | 43 | 29 | 0 | 0 | 100 |  |  |
| CGMG 2011 | 0 | 6 | 0 | 1 | 0 | 7 | 0 | 86 | 0 | 14 | 0 | 100 |  |  |
| Change | -2 | 3 | -2 | 1 | 0 | 0 | -29 | 43 | -29 | 14 | 0 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2011 amended | 1 | 5 | 1 | 0 | 0 | 7 | 14 | 72 | 14 | 0 | 0 | 100 |  |  |
| CGMG 2014 | 0 | 7 | 0 | 0 | 0 | 7 | 0 | 100 | 0 | 0 | 0 | 100 |  |  |
| Change | -1 | 2 | -1 | 0 | 0 | 7 | -14 | 29 | -14 | 0 | 0 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trends* | CL (D) | CL/I | CH/D | CH/DI | CH | CH/I | Total | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I | TOTAL |
| CGMG 2007 | 3 | 1 | 0 | 0 | 3 | 0 | 7 | 43 | 14 | 0 | 0 | 43 | 0 | 100 |
| CGMG 2011 | 5 | 0 | 2 | 0 | 0 | 0 | 7 | 71 | 0 | 29 | 0 | 0 | 0 | 100 |
| Change | 2 | -1 | 2 | 0 | -3 | 0 | 0 | 29 | -14 | 29 | 0 | -43 | 0 |  |
| CGMG 2014 | 6 | 0 | 0 | 0 | 1 | 0 | 0 | 86 | 0 | 0 | 0 | 14 |  |  |
| Change | 1 |  |  |  | 1 |  |  | 14 | 0 | -29 | 0 | 14 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Dung* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| CGMG 2007 | 1 | 1 | 2 | 2 | 1 | 7 | 14 | 14 | 29 | 29 | 14 | 100 |  |  |
| CGMG 2011 | 1 | 1 | 1 | 1 | 3 | 7 | 14 | 14 | 14 | 14 | 43 | 100 |  |  |
| Change | 0 | 0 | -1 | -1 | 2 | 0 | 0 | 0 | -14 | -14 | 29 |  |  |  |
| CGMG 2014 | 1 | 1 | 4 | 0 | 1 | 7 | 14 | 14 | 58 | 0 | 14 | 100 |  |  |
| Change | 0 | 0 | 3 | -1 | -2 | 0 | 0 | 0 | 43 | -14 | -28 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Litter* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| CGMG 2007 | 0 | 0 | 5 | 0 | 2 | 7 | 0 | 0 | 71 | 0 | 29 | 100 |  |  |
| CGMG 2011 | 0 | 0 | 7 | 0 | 0 | 7 | 0 | 0 | 100 | 0 | 0 | 100 |  |  |
| Change | 0 | 0 | 2 | 0 | -2 | 0 | 0 | 0 | 29 | 0 | -29 |  |  |  |
| CGMG 2014 | 1 | 2 | 1 | 2 | 1 | 7 | 14 | 29 | 14 | 29 | 14 | 100 |  |  |
| Change | 1 | 2 | -6 | 2 | 1 | 0 | 14 | 29 | -86 | 29 | 14 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Wind-clipped** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Grazing* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| CGMG 2007 | 0 | 8 | 9 | 13 | 5 | 35 | 0 | 23 | 26 | 37 | 14 | 100 |  |  |
| CGMG 2011 | 4 | 17 | 11 | 4 | 0 | 36 | 11 | 47 | 31 | 11 | 0 | 100 |  |  |
| Change | 4 | 9 | 2 | -9 | -5 | 1 | 11 | 24 | 5 | -26 | -14 |  |  |  |
| CGMG 2014 | 17 | 11 | 5 | 2 | 1 | 36 | 47 | 30 | 14 | 6 | 3 | 100 |  |  |
| Change | 13 | -6 | -6 | -2 | 1 |  | 36 | -17 | -17 | -5 | 3 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trampling* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| CGMG 2007 | 16 | 15 | 2 | 0 | 2 | 35 | 46 | 43 | 6 | 0 | 6 | 100 |  |  |
| CGMG 2011 | 12 | 11 | 8 | 5 | 0 | 36 | 33 | 31 | 22 | 14 | 0 | 100 |  |  |
| Change | -4 | -4 | 6 | 5 | -2 | 1 | -12 | -12 | 17 | 14 | -6 |  |  |  |
| CGMG 2014 | 27 | 8 | 0 | 1 | 0 | 36 | 75 | 22 | 0 | 3 | 0 | 100 |  |  |
| Change |  |  |  |  |  |  | 42 | -9 | -22 | -11 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trends* | CL (D) | CL/I | CH/D | D | CH | CH/I | Total | %CL | %CL/I | %CH/D | D | %CH | %CH/I | TOTAL |
| CGMG 2007 | 14 | 5 | 2 | 0 | 11 | 3 | 35 | 40 | 14 | 6 | 0 | 31 | 9 | 100 |
| CGMG 2011 | 23 | 1 | 3 |  | 6 | 3 | 36 | 64 | 3 | 8 | 0 | 17 | 8 | 100 |
| Change | 9 | -4 | 1 | 0 | -5 | 0 | 1 | 24 | -12 | 3 | 0 | -15 | 0 |  |
| CGMG 2014 | 33 | 0 | 0 | 2 | 0 | 1 | 36 | 92 | 0 | 0 | 5 | 0 | 3 |  |
| Change |  |  |  |  |  |  |  | 28 | -3 | -8 | 5 | -17 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Flush** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Grazing* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| CGMG 2007 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 100 | 0 | 0 | 0 | 100 |  |  |
| CGMG 2011 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 100 | 0 | 0 | 100 |  |  |
| Change | 0 | -1 | 1 | 0 | 0 | 0 | 0 | -100 | 100 | 0 | 0 |  |  |  |
| CGMG 2014 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 100 | 0 | 0 | 0 | 100 |  |  |
| Change | 0 | 1 | -1 | 0 | 0 |  |  | 100 | -100 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trampling* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| CGMG 2007 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 100 | 0 | 0 | 0 | 100 |  |  |
| CGMG 2011 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 100 | 0 | 0 | 100 |  |  |
| Change | 0 | -1 | 1 | 0 | 0 | 0 | 0 | -100 | 100 | 0 | 0 |  |  |  |
| CGMG 2014 | 1 | 0 | 0 | 0 | 0 | 1 | 100 | 0 | 0 | 0 | 0 | 100 |  |  |
| Change | 1 | 0 | -1 | 0 | 0 |  | 100 | 0 | -100 | 0 | 0 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trends* | CL (D) | D | CH/D | I | CH | Total | %CL | %D | %CH/D | %I | %CH | TOTAL |  |  |
| CGMG 2007 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 100 | 0 | 0 | 0 | 100 |  |  |
| CGMG 2011 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 100 | 0 | 0 | 100 |  |  |
| Change | 0 | -1 |  | 0 | 0 | 0 | 0 | -100 | 100 | 0 | 0 |  |  |  |
| CGMG 2014 | 0 | 1 | 0 | 0 | 0 |  | 0 | 100 | -100 | 0 | 0 | 100 |  |  |
| Change | 0 | 1 | -1 | 0 | 0 |  | 0 | 100 | -100 | 0 | 0 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Salix Scrub** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Grazing* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| CGMG 2007 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 100 | 0 | 0 | 0 | 100 |  |  |
| CGMG 2011 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 100 | 0 | 100 |  |  |
| Change | 0 | -1 | 0 | 1 | 0 | 0 | 0 | -100 | 0 | 100 | 0 |  |  |  |
| CGMG 2014 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 100 |  |  |
| Change | 0 | 1 | 0 | -1 | 0 | 0 | 0 | 100 | 0 | -100 | 0 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Trampling* | L | LM | M | MH | H | Total | %L | %LM | %M | %MH | %H | TOTAL |  |  |
| CGMG 2007 | 1 | 0 | 0 | 0 | 0 | 1 | 100 | 0 | 0 | 0 | 0 | 100 |  |  |
| CGMG 2011 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 100 | 100 |  |  |
| Change | -1 | 0 | 0 | 0 | 1 | 0 | -100 | 0 | 0 | 0 | 100 |  |  |  |
| CGMG 2014 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 100 |  |  |
| Change | 0 | 1 | 0 | 0 | -1 | 0 | 0 | 100 | 0 | 0 | -100 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Trends* | CL (D) | CL/I | CH/D | CH/DI | CH | CH/I | Total | %CL | %CL/I | %CH/D | %CH/DI | %CH | %CH/I |  |
| CGMG 2007 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 100 | 0 | 0 | 0 |  |
| CGMG 2011 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 100 |  |
| Change | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |  |
| CGMG 2014 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 | 0 |  |
| Change | 1 | 0 | 0 | 0 | 0 | -1 | 0 | 100 | 0 | 0 | 0 | 0 | -100 |  |

**APPENDIX 2. Index of common species names**

List of species mentioned in this report with their common names

|  |  |
| --- | --- |
| Scientific name | Common Name |
|  |  |
| *Agrostis capillaris* | Common bent |
| *Agrostis canina* | Velvet bent |
| *Agrostis vinealis* | Brown bent |
| *Alchemilla alpina* | Alpine ladies-mantle |
| *Alchemilla glabra* | Ladies-mantle |
| *Aneura pinguis* | Bryophyte |
| *Angelica sylvestris* | Wild angelica |
| *Anthelia julacea* | Bryophyte |
| *Anthoxanthum odoratum* | Sweet vernal-grass |
| *Armeria maritima* | Thrift |
| *Athyrium filix-femina* | Lady fern |
| *Blindia acuta* | Bryophyte |
| *Calluna vulgaris* | Ling |
| *Campyllium stellatum* | Bryophyte |
| *Cardamine pratensis* | Cuckooflower |
| *Carex bigelowii* | Stiff sedge |
| *Carex capillaris* | Hair sedge |
| *Carex dioica* | Dioecious sedge |
| *Carex nigra* | Common sedge |
| *Carex panicea* | Carnation sedge |
| *Carex rostrata* | Bottle sedge |
| *Carex viridula ssp. oedocarpa* | Common yellow sedge |
| *Cladonia arbuscula* | Lichen |
| *Cratoneuron commutatum* | Bryophyte |
| *Crepis spp* | Hawk’s-beard |
| *Deschampsia caespitosa* | Tufted hair-grass |
| *Deschampsia flexuosa* | Wavy hair-grass |
| *Dicranum fusescens* | Bryophyte |
| *Drepanocladus revolvens* | Bryophyte |
| *Drosera rotundifolia* | Round-leaved sundew |
| *Dryas octopetala* | Mountain avens |
| *Empetrum nigrum sbsp. nigrum* | Crowberry |
| *Erica tetralix* | Cross-leaved heath |
| *Festuca ovina* | Sheep's fescue |
| *Festuca rubra* | Red fescue |
| *Filipendula ulmaria* | Meadowsweet |
| *Galium saxatile* | Heath bedstraw |
| *Geum rivale* | Water avens |
| *Heracleum sphondyllium* | Hogweed |
| *Juncus bulbosus* | Bulbous rush |
| *Juncus squarrosus* | Heath rush |
| *Luzula sylvatica* | Greater woodrush |
| *Minuartia sedoides* | Cyphel |
| *Nardus stricta* | Mat grass |
| *Oxyria digyna* | Mountain sorrel |
| *Philonotis fontana* | Bryophyte |
| *Pinguicula vulgaris* | Common butterwort |
| *Polytrichum commune* | Bryophyte |
| *Racomitrium lanuginosum* | Bryophyte |
| *Salix arbuscula* | Mountain willow |
| *Salix herbacea* | Dwarf willow |
| *Salix lapponum* | Woolly willow |
| *Salix myrsinites* | Whortle-leaved willow |
| *Salix phyllicifolia* | Tea-leaved willow |
| *Salix repens* | Creeping willow |
| *Salix reticulata* | Net-leaved willow |
| *Saxifraga aizoides* | Yellow saxifrage |
| *Saxifraga hypnoides* | Mossy saxifrage |
| *Saxifraga oppositifolia* | Purple saxifrage |
| *Saxifraga stellaris* | Starry saxifrage |
| *Scorpidium scorpioides* | Bryophyte |
| *Sedum rosea* | Roseroot |
| *Silene acaulis* | Moss campion |
| *Sphagnum spp.* | Bryophyte |
| *Succisa pratensis* | Devil’s-bit scabious |
| *Thymus polytrichus spp. brittanicus* | Wild thyme |
| *Trichophorum cespitosum* | Deergrass |
| *Trifolium repens* | White clover |
| *Triglochin palustris* | Marsh arrowgrass |
| *Trollius europaeus* | Globeflower |
| *Vaccinium myrtillus* | Blaeberry |
| *Vaccinium uliginosum* | Northern Blaeberry |
| *Vaccinium vitis-idaea* | Cowberry |