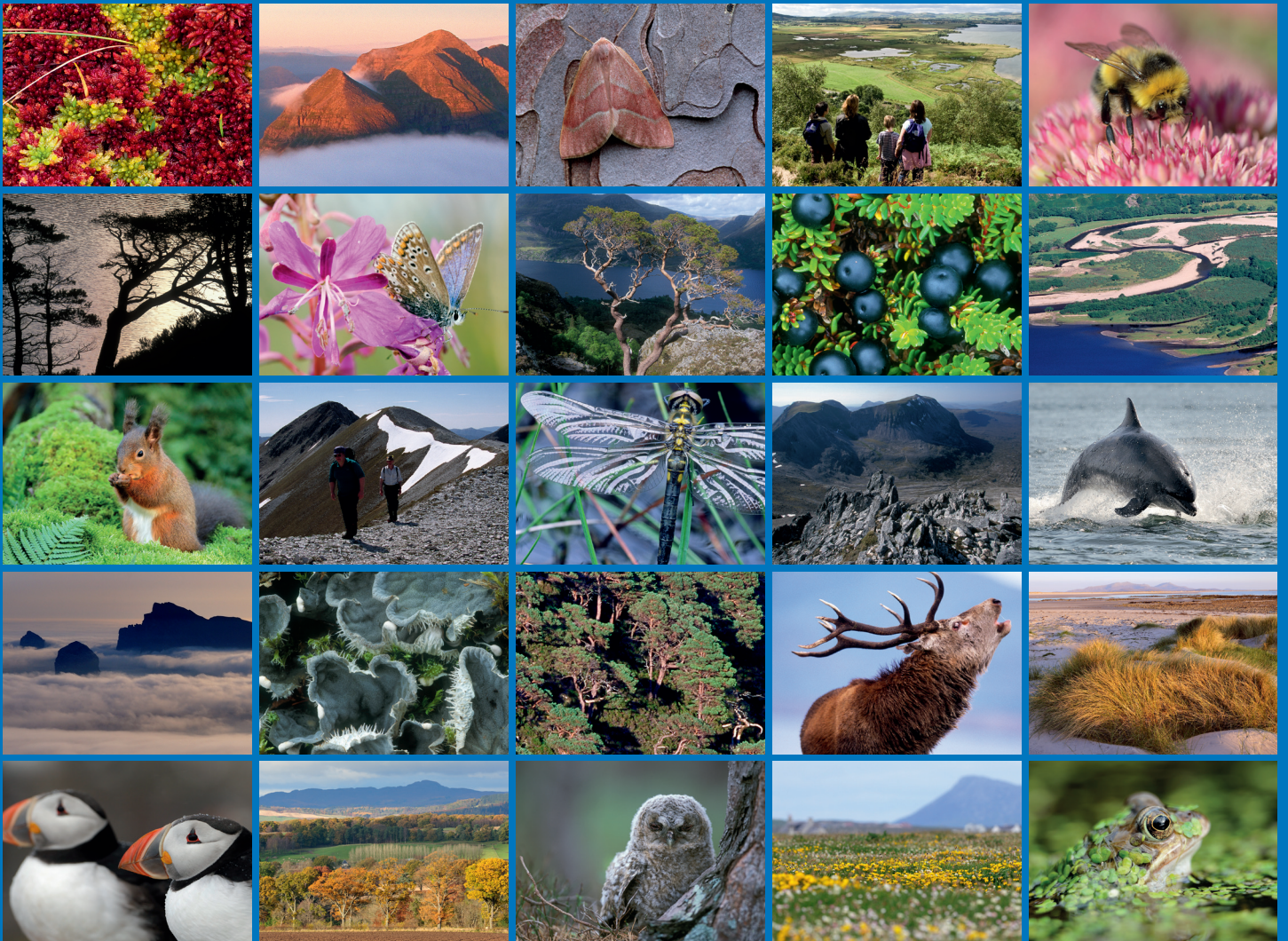


Site Condition Monitoring survey of upland notified features on designated sites – Caenlochan





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RESEARCH REPORT

Research Report No. 1034

**Site Condition Monitoring survey of upland
notified features on designated sites –
Caenlochan**

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Maier, R. 2018. Site Condition Monitoring survey of upland notified features on designated sites – Caenlochan. *Scottish Natural Heritage Research Report No. 1034*.

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SCM Reports

This report was commissioned by SNH as part of the Site Condition Monitoring (SCM) programme to assess the condition of special features (habitats, species populations or earth science interests) on protected areas in Scotland (Sites of Special Scientific Interest, Special Areas of Conservation, Special Protection Areas and Ramsar). Site Condition Monitoring is SNH's rolling programme to monitor the condition of special features on protected areas, their management and wider environmental factors which contribute to their condition.

The views expressed in the report are those of the contractor concerned and have been used by SNH staff to inform the condition assessment for the individual special features. Where the report recommends a particular condition for an individual feature, this is taken into account in the assessment process, but may not be the final condition assessment of the feature. Wider factors, which would not necessarily be known to the contractor at the time of the monitoring, are taken into consideration by SNH staff in making final condition assessments.



RESEARCH REPORT

Summary

Site Condition Monitoring survey of upland notified features on designated sites – Caenlochan

Research Report No. 1034

Project No: 013952

Contractor: Ruth Maier

Year of publication: 2018

Keywords

Site Condition Monitoring; Protected Area; Vascular Plants; Site of Special Scientific Interest; Condition; Grazing

Background

This report describes the results of the 3rd cycle of the Site Condition Monitoring of vascular plants at Caenlochan SSSI. The objective of the survey was to locate populations of specified target species within the SAC and report on location, population size, regeneration and environmental parameters.

Main findings

- 25 species were selected for monitoring and populations were located for 19 of these. 13 species were in favourable condition, 6 were in unfavourable condition. The remaining 6 populations were indeterminate due to lack of data from this or recent monitoring cycles.
- *Gentiana nivalis* and *Athyrium flexile* are considered to be in unfavourable condition because only a single very small population was found for each of these species.
- *Cystopteris montana* and *Euphrasia frigida* were in unfavourable condition because only a single, albeit large, population was found for each.
- *Woodsia ilvensis* and *Pyrola media* were in unfavourable condition despite the presence of 3 or more populations because all individual populations had fewer than 25 individuals.
- The indeterminate species were all based on old records and had not been found during the previous monitoring cycle. Two may have been erroneous records from the past, three are now considered to be extinct at this site. The remaining indeterminate species was *Salix arbuscula*, as all plants found during the survey appeared to be hybrids, rather than true *Salix arbuscula*.

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Acknowledgements

We would like to thank Sarah Smyth, Eleanor Stamp and Shona Smith from SNH for supplying background information and arranging access, and Mike Smedley from SNH for supplying additional reports and location information for populations in Corrie Fee and for sharing his results from the *Homogyne alpina* monitoring with us. Thanks also go to Robin Payne for supplying some information from the BSBI database and for help with field recording in Corrie Fee in August 2017. We would also like to thank owners and occupiers of Tulchan, Invercauld and Balmoral Estates for allowing access for this survey.

1. INTRODUCTION

This report describes the results of the 3rd cycle of the Site Condition Monitoring of vascular plants at Caenlochan SSSI for a selected number of target species. Some of the 3rd cycle SCM for the rare vascular plant species at Caenlochan had already been carried out in 2012 (Headley 2012) and no information was collected on any of these non-target species in 2017.

The 3rd cycle monitoring follows on from the 2nd cycle in 2008/09 (Loizou 2010) and the 1st cycle which was partly carried out by Viv Halcrow (Halcrow 2000) and partly by Theo Loizou. Annex forms were supplied for populations monitored in 2008 and 2009, and some population location photographs were supplied from the 2000 survey by Viv Halcrow.

The objective of the survey was to locate populations of specified target species within the SSSI and report on location, population size, regeneration and environmental parameters.

1.1 Background

Sites of Special Scientific Interest (SSSI) are designated on the basis of notified features of interest. These include habitats, species, or geological features. Site Condition Monitoring (SCM) is a six year programme of assessment of the state of all notified features of interest on designated sites. Reporting will be based on feature types and will be to common standards across the four UK country conservation agencies.

2. METHODS

25 species were selected for monitoring, with 35 species having been monitored in 2012. Grid references were supplied for most populations of most target species, together with other relevant information and past survey reports. From the 2000 survey, only old location photos were available but these were helpful for identifying old population locations for some of the target species. Most existing population locations were visited and new population locations were searched for in appropriate locations.

There was little overlap between the 2012 survey and the current one, as they were meant to cover different target species. Four species were searched for in both, and some of the new populations found during 2012 were checked in 2017. Though a report with 6 figure grid references was made available, location photographs were lacking and would have been helpful for the search.

Some of the target species in Corrie Fee are already closely monitored with regular site visits by Mike Smedley (SNH) and others. Most of the populations for these species were visited if en route to other locations, but information supplied by Mike Smedley was used for one species, *Homogyne alpina*. For the *Cicerbita alpina* population on Craig Rennet, monitoring photos from 2015 were repeated but the gully was not surveyed in detail to avoid disturbance.

For each population found, information was recorded using the recording forms supplied. Information about each population visited was entered into the Annex form, which was turned into a spreadsheet for ease of use in the field. A spreadsheet summarising the information about each population in all three cycles was also created. A summary status table for each species is given in the results section.

Each population was identified with a unique code (UID) taken from the recently completed spreadsheet summarising all vascular plant population data for all protected sites for the whole of Scotland (POPULATION-IDENTIFIER-NS-RDB-FINAL-1; referred to as UID

spreadsheet in report). This replaces any previous forms of id and helps identify and assign old records more easily.

The 2000 location photos were scanned and labelled with the UID codes.

New six figure grid references were recorded for small populations where only 4 or 5 figure grid references existed previously. Populations were either counted or estimated, depending on their size. Small populations with fewer than 50 individuals were usually counted precisely, larger ones were estimated. A '+' sign was appended to the total count if the likelihood of additional plants in the nearby area was high, or if the count had been quick and rough. The total extent of each population was also estimated. Extra information recorded was presence of regeneration, brief habitat description, any sign of damage or threats to populations and any other comments considered useful. If species or habitat information had been recorded during previous cycles it was not always re-recorded.

A species was considered to be in favourable condition if it met the targets set for each in the survey brief. The most common requirement was for two populations of at least 25 individuals to be present, though only a single population was required for species which had only ever been recorded in a single location. The minimum population size of 25 individuals was not required for some more mobile species usually only found in small populations.

2.1 Fieldwork

Fieldwork was carried out between 17th July and 12th August 2017 by Ruth Maier and Colin Wells.

The weather was variable during the survey, with low cloud and heavy rain hindering survey efforts on some days.

2.2 Nomenclature

Nomenclature in this report follows Stace (1999).

3. RESULTS

3.1 Key findings

Of the 25 species selected for monitoring, 13 were found to be in favourable condition, though five of these were only present as a single population and thus at a higher risk of localised extinction events. Six were in unfavourable condition for not meeting the minimum population size targets set and another six were indeterminate as no populations had been found within the site. The status for each species is listed in Table 1.

- Five of the indeterminate species had not been found during the previous monitoring cycle and only two had been found during the first cycle in 2000; both now considered a possible error.
- The final indeterminate species is *Salix arbuscula* which appears to be a hybrid in some, possibly all, populations in Corrie Fee.
- *Woodsia ilvensis* is considered to be unfavourable as no populations have the 25 individuals required for the minimum population size, though two populations have 30 or more fronds each. This species is monitored regularly by other surveyors.
- *Cystopteris montana* and *Euphrasia frigida* are in unfavourable condition because only a single population is present for each, though total numbers of plants within are similar to 2009 with little apparent change.

- *Athyrium flexile* is unfavourable because only a single population with three clumps was found.
- *Gentiana nivalis* is in unfavourable condition as only a single plant was found at one of the four locations where it was found in 2009. This is a cause for concern as annual species such as this require regular seed production for survival.
- *Pyrola media* was present in four small populations, none of which reached the required minimum size target. The potential decline in the largest population from 2009 is worrying, though it may be due to differences in search area.
- The remaining 13 species were all in favourable condition.

Table 1. Status for each target species. Cells highlighted in orange denote failure of individual species target.

Species	Number of populations	Population size	Decline	Regeneration	Status
<i>Athyrium distentifolium</i>	5	300+	no	yes	Favourable
<i>Athyrium flexile</i>	1		?	no	Baseline established
<i>Carex saxatilis</i>	1	3000+	no	yes	Favourable
<i>Carex x grahamii</i>	1	450+	no	yes (vegetative)	Favourable
<i>Cerastium cerastoides</i>	none				Indeterminate
<i>Cicerbita alpina</i>	2	500+	no	yes	Favourable
<i>Cystopteris montana</i>	1	50	no	?	Unfavourable
<i>Draba norvegica</i>	none				Indeterminate
<i>Euphrasia frigida</i>	1	150+	no	yes	Unfavourable
<i>Gentiana nivalis</i>	1	1	yes	yes	Unfavourable
<i>Gnaphalium norvegicum</i>	none				Indeterminate
<i>Homogyne alpina</i>	1	760	no		Favourable
<i>Juncus castaneus</i>	3	17	no	yes	Favourable
<i>Linnaea borealis</i>	3	310+	no	yes (vegetative)	Favourable
<i>Oxytropis campestris</i>	1	2000+	no	yes	Favourable
<i>Pyrola media</i>	4	42	yes?	yes	Unfavourable
<i>Pyrola rotundifolia</i>	1	30	no	yes	Favourable
<i>Sagina nivalis</i>	none				Indeterminate
<i>Sagina saginoides</i>	4	44	no	yes	Favourable
<i>Salix arbuscula</i>	none				Indeterminate
<i>Salix myrsinites</i>	3	67+	no	no	Favourable
<i>Saxifraga nivalis</i>	5	67	no	yes	Favourable
<i>Thlaspi caerulescens</i>	none				Indeterminate
<i>Woodsia alpina</i>	2	35	no	yes	Favourable
<i>Woodsia ilvensis</i>	3	164	no	yes	Unfavourable

3.2 Species accounts

3.2.1 *Athyrium distentifolium*

4 existing populations, monitored in 2000 and 2009. 10 populations recorded in 2012, some of which are likely to be the same as those listed in the UID spreadsheet.

In 2017, five populations, including three of the existing populations together with one from 2012 and a new one were monitored. The largest population was the one on the scree slopes and lower cliffs near the *Cicerbita alpina* ledge in Caenlochan Glen and this seems to have changed little in the last eight years. All other populations recorded were smaller with 5-30 clumps in each. The species appears to be widespread but local at this site.

The population in Corrie Sharroch was quite heavily grazed; elsewhere grazing levels were generally around 10%. The Corrie Sharroch population was also the only one with fertile fronds in all clumps, with the percentage of fertile fronds in other populations being around 10%.

No target was set for this species at the actual species included for monitoring was *Athyrium flexile* rather than *A. distentifolium*. With five populations, two of which with more than 25 clumps, the species is considered to be in favourable condition.

Favourable

3.2.2 *Athyrium flexile*

This subspecies has been recorded in Caenlochan Glen in 2009 and at the Dounalt, Glen Doll in 2012, but no detailed recording has been carried out. Only non-fertile clumps have ever been found.

In 2017, the subspecies was searched for in all areas where *Athyrium distentifolium* was present. No *A. flexile* was found in the eastern part of the site, but a few clumps of leaves with characteristics of *A. flexile* were found at NO17488 76293. They were non-fertile and could have been young atypical fronds of *A. distentifolium*. Plants with characteristics of *A. flexile* appear to be rare within the site, and the total population is likely to be small. While *A. distentifolium* is widespread within the site and in favourable condition, *A. flexile* appears to be much more restricted. As this is likely to be a new species for the vascular plant assemblage, these survey results should establish the baseline for this species, and as a taxon on its own is in unfavourable condition.

Unfavourable

3.2.3 *Carex saxatilis*

No populations listed in the UID spreadsheet, though one has been monitored in Garbh Choire SSSI in 2001 and in 2009. The 2010 report also lists three old records not relocated or searched for in 2009.

In 2017, the large population in Garbh Choire SSSI was relocated and monitored. The population appears to be similar in size to 2009, though flowering more freely with approximately 30% of rosettes with seed heads.

The 1979 record location in a gully below the Dounalt was visited but the species was not found. The outlier recorded in 2001 east of the main population in Garbh Choire was also not relocated.

No species target was set for this species. Despite the large number of individuals, the presence of only a single population puts this species at risk from localised extinction. As there is no evidence of decline, it is considered to be in favourable condition but at risk.

Favourable

3.2.4 *Carex x grahamii*

One existing population found in Corrie Sharroch in 2003 by Lynn Farrell, Lorne Gill, Iona McDonald and Alan Ross and monitored in 2009.

In 2017, the population was relocated and 450 flowering spikes were estimated, suggesting a possible slight expanse since 2009. The species is not fertile but appears to be expanding vegetatively.

The target for this species is a single population with no size limit, so the species is considered to be in favourable condition.

Favourable

3.2.5 Cerastium cerastoides

There is an old record from 1998 for this species in Garbh Choire. It was not relocated during subsequent monitoring visits.

In 2017, corries and snowbeds on Glas Maol were searched for this and other species, but the target species was not found. The lack of records from the last 17 years is worrying but the species could still be present and should be searched for in future monitoring cycles, as suitable habitat is present in all the corries to the north of Glas Maol.

Indeterminate

3.2.6 Cicerbita alpina

Two existing populations. The Caenlochan population was located in 1997 (Geddes) and monitored in 1999 (Leonie Alexander), 2009 (Loizou, 2010) and in 2016 by Natacha Frachon and Mike Smedley (Frachon, 2017). The Corrie Fee population was relocated in 1979 by Sandy Payne (Smedley 2015a) when checking old records for this species. It was monitored regularly by a range of surveyors and a detailed assessment was carried out in 2010/11 by Loizou and in 2015 by Mike Smedley, Gavin Powell and Natacha Frachon, using rope access.

In 2017, both populations were revisited, though only the Caenlochan population was counted. For the Corrie Fee population, monitoring photos from the 2015 survey were repeated for comparison but access into the gully was not attempted to avoid disturbance to the fragile terrain. The vegetation in the gully looks more lush in the 2017 photos, suggesting that there has been little disturbance or erosion in this location in recent years. Plants were flowering freely in this population and the total number of stems was estimated to be at least 500.

The Caenlochan population was similar in extent to the 2016 photos but looked less dense, with fewer stems present. Only three flowering spikes were counted from 40 stems, as opposed to 2016 when 88% of the 52 stems counted were flowering. There is much natural fluctuation in the population size from year to year at this location, but the overall population size over time appears to be unchanged (Frachon, 2016).

The species is considered to be in favourable condition as both populations contain more than 25 individuals and appear to have changed little over the years. However, both are present in unstable locations prone to erosion, and as such are vulnerable to localised extinction.

Favourable

3.2.7 *Cystopteris montana*

4 old records, one of which was relocated and monitored in 2009. The species was found in Corrie Fee in 2012, though in a different part of the corrie than the old, unlabelled record listed in the UID spreadsheet.

In 2017, the population monitored in 2009 was relocated and counted and appeared to have changed little since then. None of the other old records were relocated. The 2012 records in Corrie Fee were searched for but not found. The vegetation at the locality was not particularly calcareous and it is possible that there has been a mistake with grid references. A location photo might help clarify this.

As there is only one population confirmed in 2017, albeit that it seems to be stable. An additional population was recorded by Headley in 2012, which may suggest that this species is in **Favourable** condition.

3.2.8 *Draba norvegica*

2 populations. Monitored in 2001 but not seen before or since.

Not found in 2017. Considered to be an unlikely record by some, though suitable habitat is present in Caenlochan Glen. Recent fresh erosion may have opened up new localities for colonisation provided there is some seed present in the seedbank. Colonisation from elsewhere is unlikely as there are no other records within Angus. All *Draba* rosettes found during the survey were thought to be *Draba incana*.

Indeterminate

3.2.9 *Euphrasia frigida*

5 populations listed in UID, no information about the three in Corrie Fee. Caenlochan populations monitored in 2009 and 2012.

In 2017, the Caenlochan population at Craigie Doubs was surveyed and specimens keyed out. Plants found in the southern part of Craigie Doubs clearly keyed out as *Euphrasia frigida*, while those from the northern part showed more characteristics of *Euphrasia arctica*. This is a complicated species which would benefit from a more detailed survey at this as well as at other sites.

No *Euphrasia* spp found in Corrie Fee were assigned to this species, but a detailed survey was not carried out in this part of the site for this species. The target for this species is the presence of two separate populations. A single, albeit large and somewhat discontinuous, population was found. The species is unlikely to be at risk from localised extinction due to an extent of 100+ metres along the lower part and base of the cliffs, and although but it cannot be separated clearly into two populations is considered to be **favourable**.

3.2.10 *Gentiana nivalis*

Two populations listed in UID, a further two listed in Loizou (2010). All four monitored in 2009.

In 2017, all four locations were investigated for several hours each, but only a single plant was found eventually, at the Geni001CNL location. The exact location shown in the close up photograph from 2009 was identified and the photograph was repeated, showing that trampling and disturbance were higher in 2017 than in 2009 (Figure 1). The surrounding cliffs were searched thoroughly but no other plants were found. The species might have

flowered and disappeared early in 2017 due to the lack of snow lie during the winter of 2016/17 – the one plant found was partially dried up. It is also possible that the lack of snow lead to early growth of other species, limiting the potential area for colonisation, though there was much disturbed ground present due to erosion and trampling.



Figure 1. Geni001CNL photo location from 2009 (left) and repeat photo in 2017 (right). 2017 location of single plant found was above and to the west of the 2009 location (see location photos from 2017).

The main cliff close to the population grid reference was quite trampled with hoof and boot prints clearly visible. During the survey, three other botanists were met, all looking for rare species in the main gully and Craigie Doubs area. Recent large-scale erosion was present in the area with the two non UID populations and may have affected these. The resulting steep, unstable slopes are partially revegetating but remain vulnerable to disturbance. There does appear to be much suitable terrain for recolonisation and it is to be hoped that there is sufficient seed present for this annual species to re-colonise in larger numbers in future years.

Unfavourable

3.2.11 *Gnaphalium norvegicum*

2 old populations found in 1995 by Sandy Payne and Clare Geddes, last seen and monitored in 2001. Not found since.

Not found in 2017. Payne and Geddes (2006) conclude that the species has been lost from Caenlochan due to excessive grazing and trampling by deer and sheep. It is still possible that undiscovered specimens are present in inaccessible locations within the site, so the species should continue to be included in future monitoring cycles.

Indeterminate

3.2.12 *Homogyne alpina*

1 population, monitored regularly since 1986, including in 2009.

In 2017 the site was not visited by C Wells and R Maier as it had already been monitored by Mike Smedley on 13 June 2017. He counted 761 leaves and only 2 flowerheads, both grazed off, suggesting that this species, while expanding at this location is still at risk from grazing.

As the target for this species is a single population with more than 25 individuals it is considered to be in favourable condition at this site.

Favourable

3.2.13 *Juncus castaneus*

A total of 10 populations listed in the UID spreadsheet for this species, though only four of these with any plants present in either 2001 or 2009. The record ascribed to R Maier from 2008/09 labelled as 'recently rediscovered' is a mystery. The species was also found in 2 additional locations in Caenlochan Glen in 2012.

Most of the old population locations were searched for and the species was also looked for elsewhere in suitable habitat. Three small populations were found. One of these in Garbh Choire may include several populations labelled separately during previous surveys but now amalgamated into a single population due to the proximity of the small number of plants present. One population was located 100 m upstream from Juca004CNL and was provisionally labelled as this population. The other was a new population just below the edge of the plateau above Garbh Choire.

Locations investigated where the species was not found include Juca002CNL on the western slope of Glas Maul, Juca003CNL where 20 plants were found in 2009 and the two locations from 2012. The Payne/Geddes record from the Glas Allt Burn from 1976 and last recorded in 1982 was not investigated.

This suggests that this species may fluctuate considerably, with small populations appearing and disappearing in suitable areas, though it is always possible that single spikes of this species have been missed during surveys.

As the target for this species only requires the presence of 2 populations without a minimum size target, the species is considered to be in favourable condition. A detailed search of all the corries around Glas Maol may yield further populations.

Favourable

3.2.14 *Linnaea borealis*

3 populations in the UID spreadsheet, all monitored in 2009. Additional population below The Scorrie in Winter Corrie not monitored since 1998.

In 2017, the three populations monitored in 2009 were revisited and monitored. No flowers or seedheads were found but two of the populations were quite dense in patches, with many runners. The third population, Libo003, was more sparse and appears to have declined slightly since 2009. Despite this the species is still thriving at this site and is considered to be in favourable condition.

Favourable

3.2.15 *Oxytropis campestris*

1 existing population, within Corrie Fee NNR, monitored in 2009 and from 1999-2003 by Angus Rangers and in 2014 and 2017 by Mike Smedley.

In 2017, the existing population was monitored and the total number of plants was estimated to be similar to the 2009 estimate. Only two accessible clumps on the scree fan were flowering; all other flowering clumps were on poorly accessible cliff ledges. Some of the accessible clumps had been grazed, presumably by deer, as there were scattered deer tracks on the slope.

Due to the large size of the population it is considered to be in favourable condition, though the absence of seeding plants in the lower part of the site is a cause for concern. The presence of a single plants on a steep unstable slope is always at risk from erosion, though the population covers a large enough area to be able to survive localised events.

Favourable

3.2.16 *Pyrola media*

3 existing populations, monitored in 2008.

In 2017, all three populations were revisited and a new one was found in Caenlochan Glen. Only three rosettes were found in the area of the largest population from 2008, though due to the difficult terrain, parts of the population may have been missed. Despite the fact that four separate populations were found, the total number of rosettes was only 47. As none of the populations had the 25 individuals required by the species target, the species is considered to be in unfavourable condition.

Unfavourable

3.2.17 *Pyrola rotundifolia*

1 existing population, monitored in 2008.

In 2017, the population was relocated and counted. It was found to have increased from 16 to 30 plants, with 2 flowering rosettes and 18 immature ones.

The species was looked for elsewhere but no other populations were found. As only a single population is required for this species to be in favourable condition, the target is met.

Favourable

3.2.18 *Sagina nivalis*

No populations are listed in the UID spreadsheet but this plant was found and monitored by Viv Halcrow in 2000. There is an earlier record from 1971 in the BSBI database for this species in the same location.

In 2017, the location photo from Viv Halcrow was used to identify the 2000 White Braes location and this was searched thoroughly but no plants were found. The record is considered to be an error by Loizou (2010) and the plant has not been recorded anywhere else in Angus.

Indeterminate

3.2.19 *Sagina saginoides*

8 populations listed in UID spreadsheet, though some considered lost or misidentifications by Loizou (2010). Three of the listed ones found in 2005 by Ian Green (UID spreadsheet listing), 2 others monitored in 2009.

In 2017, one of these existing populations was relocated and monitored, together with an outlying population 10 metres away which was recorded separately. Two new populations in Caenlochan Glen were also found and monitored. The populations in Glas Choire and on the south side of Meall Odhar were searched for but not found. The existing population was the largest, with 30 clumps recorded, the others had 4, 9 and 1 clumps in each.

There was little suitable open terrain for this species in the locations where it was not found, suggesting it may have disappeared, though it is always possible that it was overlooked. The new locations are on sparsely vegetated terrain associated with recent erosion, and the one rediscovered population was on a steep bare slope above a stream.

The presence of four populations meets the target of two populations with no size limit for this species.

Favourable

3.2.20 *Salix arbuscula*

3 populations listed in UID spreadsheet, monitored in 2000 and 2009.

The status of this species at Caenlochan is uncertain, as leaves collected from stands have been found to blacken when drying, a sign that plants are likely to be a hybrid with *Salix myrsinifolia*, rather than pure *Salix arbuscula*.

In 2017, leaf samples were collected from the three populations monitored in 2009 and from three other locations in Corrie Fee. All showed blackening when frozen and dried, so none were considered to be true *Salix arbuscula*. The species may be present at this site but it is likely to be rare.

Indeterminate

3.2.21 *Salix myrsinifolia*

4 existing populations, one of these monitored in 2000 and all four in 2009.

In 2017, three populations were revisited and monitored. Population size was similar to 2009, with more bushes found for population Sxmy004CNL but fewer for Sxmy002CNL.

The species meets the site target of at least two populations with no size limit, so it is considered to be in favourable condition.

Favourable

3.2.22 *Saxifraga nivalis*

6 populations listed in UID spreadsheet, though one of these has not been found recently. Three of these monitored by Halcrow in 2000 and Loizou in 2009, the other two were found by John Edgington in 2009.

In 2017, all five of the populations monitored in 2009 were found and monitored. There was some fluctuation in numbers. The largest population from 2009 has increased from 25 to 34 rosettes. All plants found in this population were on the edge of the gully above the small cave shown in the 2009 location photo, not below as marked. There were slight decreases and increases in the smaller populations, but numbers were similar overall. None of the plants in Corrie Fee were flowering.

The target for this species is presence of two populations without a size target and it passes this.

Favourable

3.2.23 Thlaspi caerulescens

One population listed in UID spreadsheet. Recorded in 1991 and 1992 but not seen since.

Not found in 2017.

Indeterminate

3.2.24 Woodsia alpina

Two populations listed in UID spreadsheet, both monitored in 2009. Also one new population found in 2012 in a different part of Caenlochan Glen at NO 18332 77363.

Woodsia alpina is monitored regularly at this site. In 2017, the two populations monitored in 2009 were revisited and counted. Though the number of fronds recorded in population Woal001CNL has dropped from 13 to 22, the clumps look very similar in the photos taken in both years. The population in Corrie Fee took some time to locate but two clumps with thirteen fronds were eventually found. From the description in the 2010 report more clumps may be present in the vicinity, though no others were found during the search.

As only two populations without a size target are required for this site, the species is considered to be in favourable condition. Due to the small areas occupied by the two populations both are at risk from localised extinction events.

Favourable

3.2.25 Woodsia ilvensis

Three existing populations, all three monitored in 2009.

Detailed monitoring of this species has been carried out under reserve monitoring programmes, initially by the Angus Rangers and most recently by Mike Smedley in 2015 (Smedley 2015b), and 2017.

In 2017, all three populations were visited and counted. Detailed monitoring of this species is reported elsewhere (Smedley 2015) but the total count recorded in 2017 was 129 fronds for population Woil001CNL, 30 fronds for population Woil002CNL and 5 fronds for population Woil003CNL. The small Woil003 population looked healthier in 2017 than on previous whereas Woil002 looked more sparse, but on the whole there has been little change in the population. The target for this species is two populations with more than 25 individuals in each. Though there are more than 25 fronds in two of the populations, the number of crowns per population is below 25, not meeting the minimum size limit.

Unfavourable

4. DISCUSSION

Most species were found to be at similar levels to the 2008/09 monitoring cycle, with slight increases or decreases in populations. The exceptions were *Pyrola media* and *Gentiana nivalis*, both of which seem to have declined. The *P. media* population which appeared to have declined was on difficult terrain, potentially covering quite a large area and some plants could have been overlooked, but *G. nivalis* was searched for thoroughly on several occasions between mid-July and mid-August.

The winter of 2016/17 was quite mild and dry, with little snowfall, followed by an early dry spring. The lack of moisture may have led to poor seed germination in the spring resulting in the very small population size of a single plant found. Conditions were wetter during summer and autumn 2017, so there could have been some autumn germination in suitable locations. Though the cliff ledges associated with the population locations support much lush vegetation with a closed sward, there is sufficient disturbed ground present to provide suitable areas for seed germination. This species has been monitored by surveyors in other years and its inclusion in more regular monitoring by SNH, as carried out for *Cicerbita alpina* and *Woodsia ilvensis*, should be considered.

Many of the target species populations are present on steep unstable slopes prone to erosion. Populations are often dynamic with frequent local extinctions and re-colonisations in suitable areas opened up by erosion. There was some recent larger-scale erosion in Caenlochan Glen close to Craigie Doubs, and while this may have had a short-term detrimental impact on some species such as the two non-UID *Gentiana nivalis* populations, it may also have opened up new areas for colonisation by pioneer species such as *Draba norvegica* and *Thlaspi caerulescens*. Two new populations of *Sagina saginoides* were found to have colonised the erosion scar and other rare pioneer species may follow.

There was some obvious trampling, especially noticeable in steep gullies in Caenlochan Glen where it was caused by deer, sheep, and by other botanists. Deer were present in herds of 100+; some in Caenlochan Glen but many more in the corries on the northern side of Glas Maul. Sheep were present in smaller numbers with a flock of 20 or so seen every day on the edge of the plateau above Caenlochan Glen and mountain hares were also frequent. Recently eroded terrain at the plateau edge was criss-crossed with sheep and deer tracks. Trampling was also very noticeable on the calcareous cliff areas, especially at Craigie Doubs where both hoof and boot prints were clearly visible on ledges. This site is well known among amateur and professional botanists alike and it is also easily accessible from the Glen Shee car park.

Five of the species recorded showed signs of grazing. This was minor for *Saxifraga nivalis*, *Homogyne alpina* and *Cicerbita alpina*, with a few flowerheads broken or grazed off in accessible populations. None of the accessible rosettes of *Saxifraga nivalis* in Corrie Fee were flowering.

Grazing was much more obvious for *Oxytropis campestris* with many of the accessible leaf rosettes on the scree fan obviously grazed. Only two of the accessible clumps were flowering and most of the seed source produced in this population comes from plants on inaccessible cliff ledges higher up. The population is large and does appear to be stable but the level of grazing is a cause for concern.

Grazing was also noted for *Athyrium distentifolium*, with some clumps showing signs of grazing, especially those in Corrie Sharroch. This species has been stable since 2008/09 but was considered to have declined prior to this by Loizou (Loizou 2010), probably due to climate change.

None of the other target species appeared to be affected by grazing and the vegetation on the steep slopes within Caenlochan Glen was only patchily grazed, despite the constant deer presence.

The six target species which were not recorded during the survey, either due to local extinctions or past misidentification, should still be included in future monitoring cycles, as the possibility that they are still present somewhere within the site cannot be discounted, however unlikely.

Rare vascular plants are potentially at risk from a variety of factors, not all of which are connected to site management. Some, such as climate change are difficult to quantify and cannot be identified in brief spot checks such as the Site Condition monitoring surveys. The only risk factors which can be highlighted during the brief site condition monitoring surveys are those related to site management and natural erosion.

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www.nature.scot

© Scottish Natural Heritage 2018
ISBN: 978-1-78391-522-4

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