



Alpine lady's-mantle *Alchemilla alpina*  
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## Alpine lady's-mantle *Alchemilla alpina* L.

Climate Change Sensitivity: **HIGH**

Ability to Manage: **LOW**

Non climatic threats: **LOW**

Vulnerability: **HIGH**

### Summary

Alpine lady's-mantle *Alchemilla alpina* is a montane species which in England is confined to the Lake District and North Pennines. It is likely to decline and potentially disappear from England with rising temperatures, although it might persist in refugial locations, and the chances of this could be increased by local translocation. It is relatively common in parts of the Scottish Highlands and elsewhere in Europe.

### Description

Alpine lady's-mantle is a member of the Rosaceae, with distinctive palmate compound leaves and green flowers. It is a perennial plant with a woody rhizome. Maximum height is approximately 20 cm, although it is typically less than 10cm. It is apomictic, meaning seeds are produced without fertilisation.

Modelling indicates that the species is likely to lose all suitable climate space within England with 2°C warming, but will persist in the coldest parts of the Scottish Highlands (Pearce-Higgins *et al* 2015). Locally cooler places might allow the species to persist longer. However, work by Trivedi *et al* (2008a, b) shows that *A. alpina* and other arctic-alpine species may be more vulnerable than large scale models suggest as they already occupy the coldest places within 10km grid squares.

## Ecology and Distribution

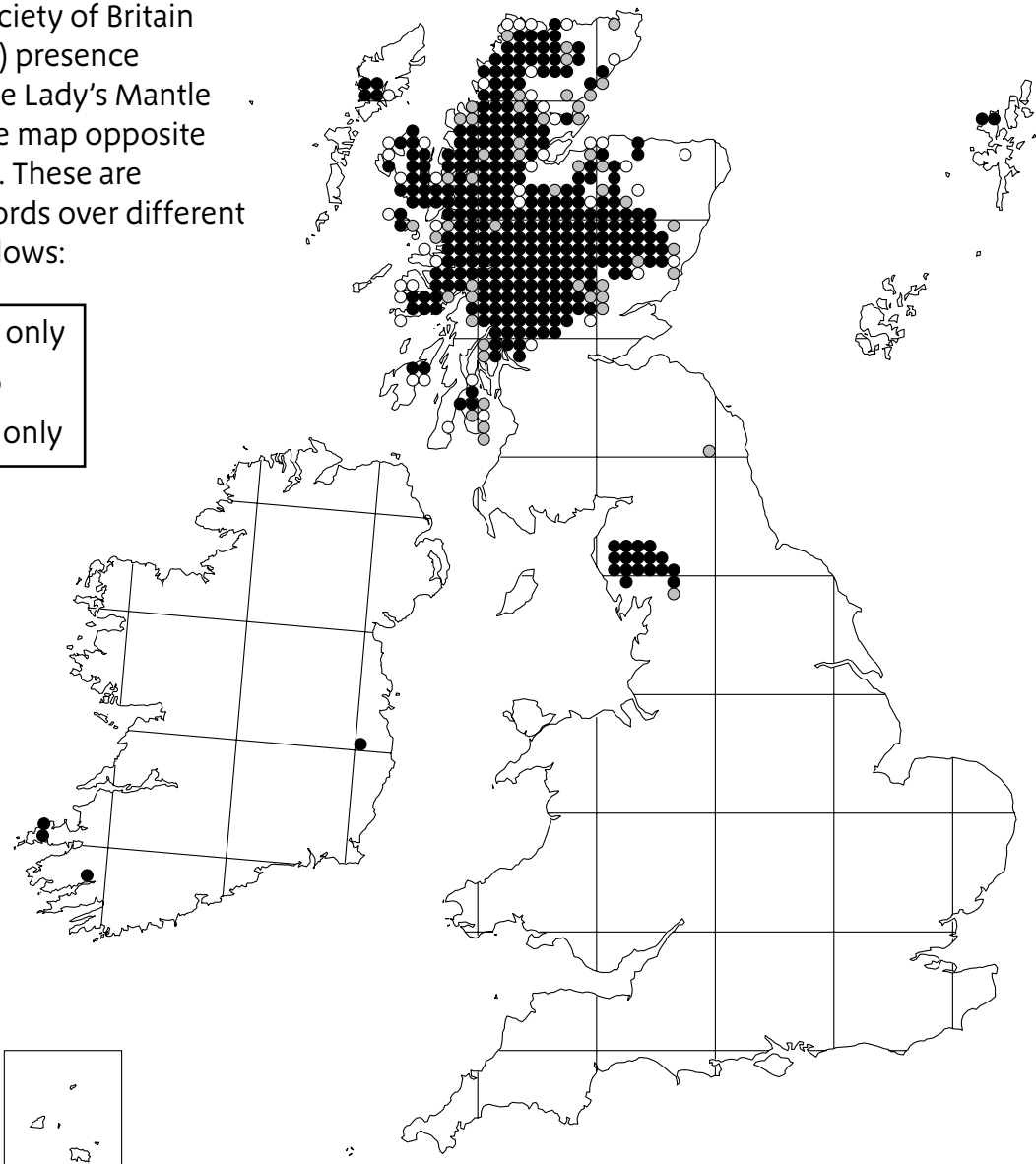
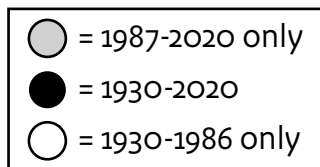
The natural distribution of Alpine lady's-mantle in England is confined to upland areas of the Lake District and North Pennines. It is relatively common in the Scottish Highlands and is found across northern and mountainous areas of Europe.

The New Atlas of the British and Irish Flora (Preston, Pearman & Dines 2002) describes its habitat as 'montane grassland and grass-heath, scree, cliffs, rocky stream sides, rock crevices and ledges. It is found in well-drained habitats, in areas of solifluction and late snow-lie, and sometimes on mountain slopes subject to severe wind-scour. The soils range from acidic to strongly calcareous. It is frequently washed down to lower levels on river gravels. It is found at a range of altitudes from near sea level in north-west Scotland to the tops of Scottish mountains, although at lower altitudes it is typically restricted to places with thin rocky soils and sparse vegetation. More broadly it is found in the colder parts of Europe and its distribution can be described as European Arctic-montane (Preston & Hill 1997).

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Presence of Alpine lady's mantle records at 10km<sup>2</sup> scale provided by the BSBI and are based on records collected mainly by BSBI recorders.

The Botanical Society of Britain and Ireland (BSBI) presence records for Alpine Lady's Mantle are shown on the map opposite (10km grid scale). These are displayed as records over different time slices as follows:







Alpine lady's mantle (*Alchemilla alpina*) and wild thyme (*Thymus praecox* subsp. *arcticus*) close-up detail. Wester Ross, Scotland. July. © Mark Hamblin (rspb-images.com)

## Confidence in climate change impacts<sup>14</sup>

Distribution change:

**HIGH CONFIDENCE**

Mechanism:

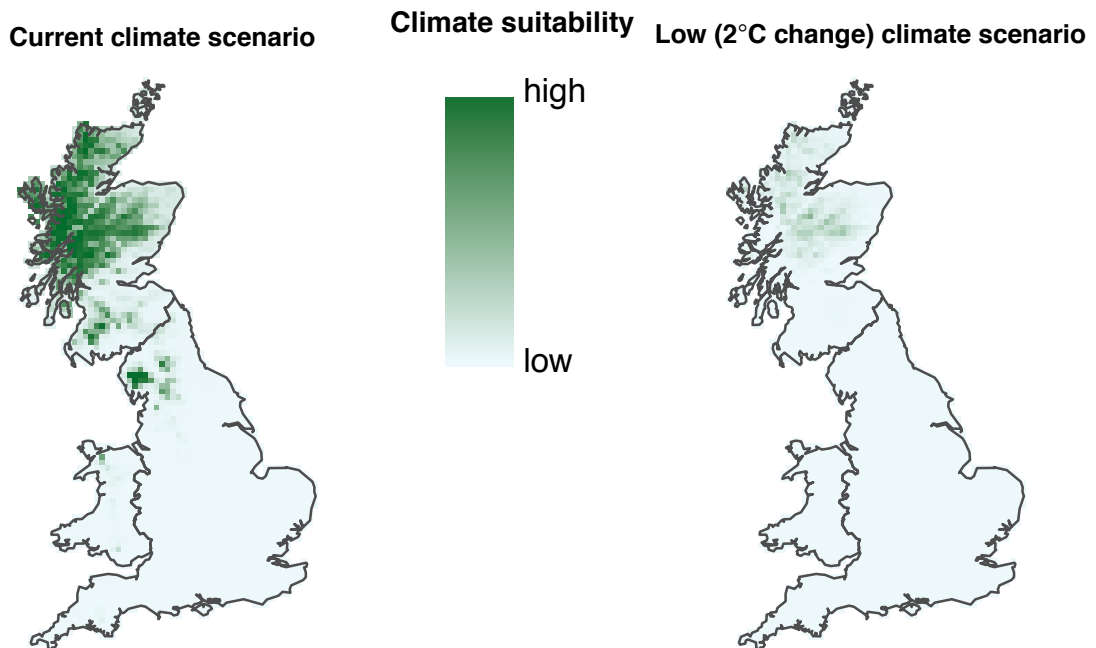
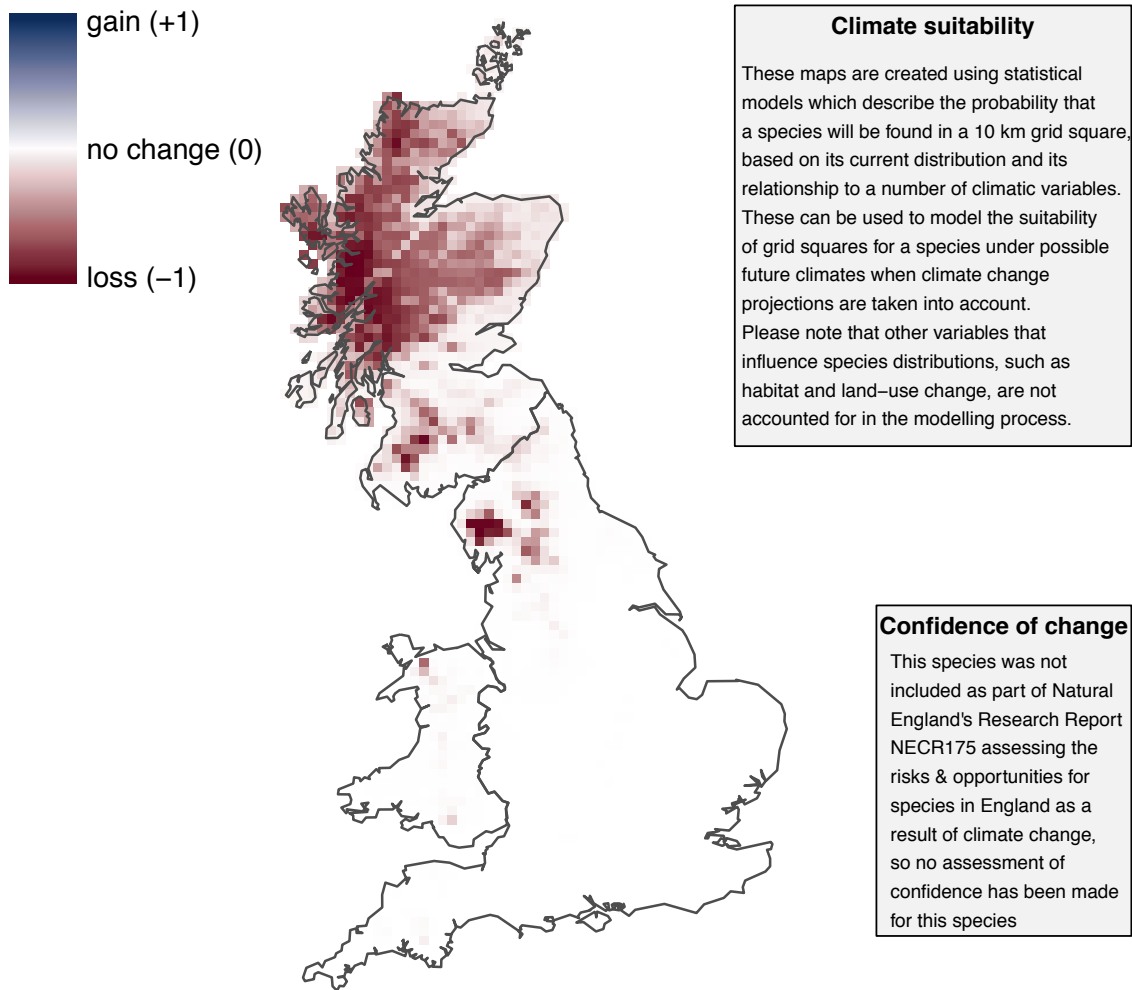
**MEDIUM CONFIDENCE**

Alpine lady's-mantle is found in relatively cold locations in the UK and its distribution would be expected to decrease with rising temperatures. It is probably restricted to cold places because it is not able to compete with species that are adapted to warmer conditions, and in the absence of competition it can grow in gardens at significantly higher temperatures. There is likely to be an interaction with soil; as plant growth increases soil may become deeper or start to accumulate on rocky areas, which may in turn support growth of a denser and taller sward. Similarly, atmospheric nitrogen deposition may promote growth of competitor species. Morecroft *et al* (1996) also noted that mortality of *A. alpina* increased with nitrogen input in a transplant experiment.

Modelling indicates that the species is likely to lose all suitable climate space within England with 2°C warming, but will persist in the coldest parts of the Scottish Highlands (Pearce-Higgins *et al* 2015). Locally cooler places might allow the species to persist longer. However, work by Trivedi *et al* (2008a, b) shows that *A. alpina* and other arctic-alpine species may be more vulnerable than large scale models suggest as they already occupy the coldest places within 10km grid squares.

<sup>14</sup> An assessment of the strength of evidence that distributions are changing and the mechanisms causing change are understood. Refer to Part B, section 5 of the species section introduction for more information.

Projected change in potential distribution of Alpine lady's mantle in the UK with a temperature rise of 2°C (Pearce-Higgins *et al* 2015)



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Further information on these projections can be found in the introduction to the species section (Part A, Section 3 and Part B Section 5). Note that this is a guide to where a species may be able to survive, it does not capture other issues such as habitat availability and fragmentation – see text above for further details. Contains public sector information licensed under the Open Government Licence v3.0. Please also see acknowledgement and copyright at the beginning of this manual.

Please read this case study alongside the relevant habitat sheets.

## Adaptation options

There are few management options to maintain Alpine lady's-mantle in England in the long-term in a warming climate. However, it is a long lived, stress-tolerant species and is likely to be able to persist for years or even decades in sub-optimal conditions. If global climate change is successfully limited to well under 2°C it may survive in well drained sites with thin soils in the coolest parts of the landscape, such as high-altitude north-facing slopes.

Three possible interventions are:

- Remove competitor species manually. Given the abundance of the species in Scotland it would probably not be a priority use of resources in England, although it might be carried out on a small scale.
- Transplant into potential refugia where it does not currently occur (high altitude, north facing sites on thin soil). The species can be successfully transplanted in turves (Rawes and Welch 1972).
- Adjusting grazing levels. The optimal level of grazing is unclear – Rawes and Welch (1972) found that *A. alpina* is relatively tolerant of grazing, and grazing may be beneficial in limiting the impact of competitor species.

Reducing nitrogen deposition is also likely to benefit this species.

## References and further reading

Morecroft M.D. & Woodward F.I. 1996. Experiments on the causes of altitudinal differences in the leaf nutrient contents, size and  $\delta^{13}\text{C}$  of *Alchemilla alpina*. *New Phytologist* 134(3), 471 - 480.

Pearce-Higgins, J.W., Ausden, M.A., Beale, C.M., Oliver, T.H. & Crick, H.Q.P. (eds). 2015. [Research on the assessment of risks & opportunities for species in England as a result of climate change](#). Natural England Commissioned Reports, Number 175.

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