Golden plover

Golden plover *Pluvialis apricaria* (Linnaeus)

Breeding populations

Climate Change Sensitivity:	HIGH	Ability to Manage:	HIGH
Non climatic threats:	HIGH	Vulnerability:	MEDIUM

Wintering populations

Climate Change Sensitivity:	POTENTIAL BENEFIT	Ability to Manage:	LOW
Non climatic threats:	LOW	Vulnerability:	LOW

Summary

Breeding golden plovers are found in upland habitats, especially heather or grass moorland and blanket bog. In winter, they vacate their breeding grounds and move to lower agricultural land or the coast, where they are joined by large numbers of migrants from Scandinavia. Breeding populations are vulnerable to warmer, drier summers due to the impacts on their favoured prey, craneflies, and adaptation aims to reduce drying by actions such as blocking drainage on bogs and wet moorland. Population resilience can also be enhanced by reducing other environmental pressures such as predation and disturbance. Warming temperatures may increase vegetation growth, reducing the availability of preferred short vegetation for breeding, requiring management such as grazing and cutting. Wintering populations are likely to be favoured by climate change, as warmer winters reduce the likelihood of frozen ground, ensuring that soil invertebrates are readily available. However, in cold winters, when golden plovers are often pushed to the coast, loss of coastal habitats as a result of sea level rise could have an impact.

Description

During the breeding season, the male golden plover has a striking appearance, with golden speckled plumage above and a solid black front, edged with white. Females are less distinctly marked, and in winter both sexes are more uniformly covered in golden-brown speckling.

Ecology and distribution

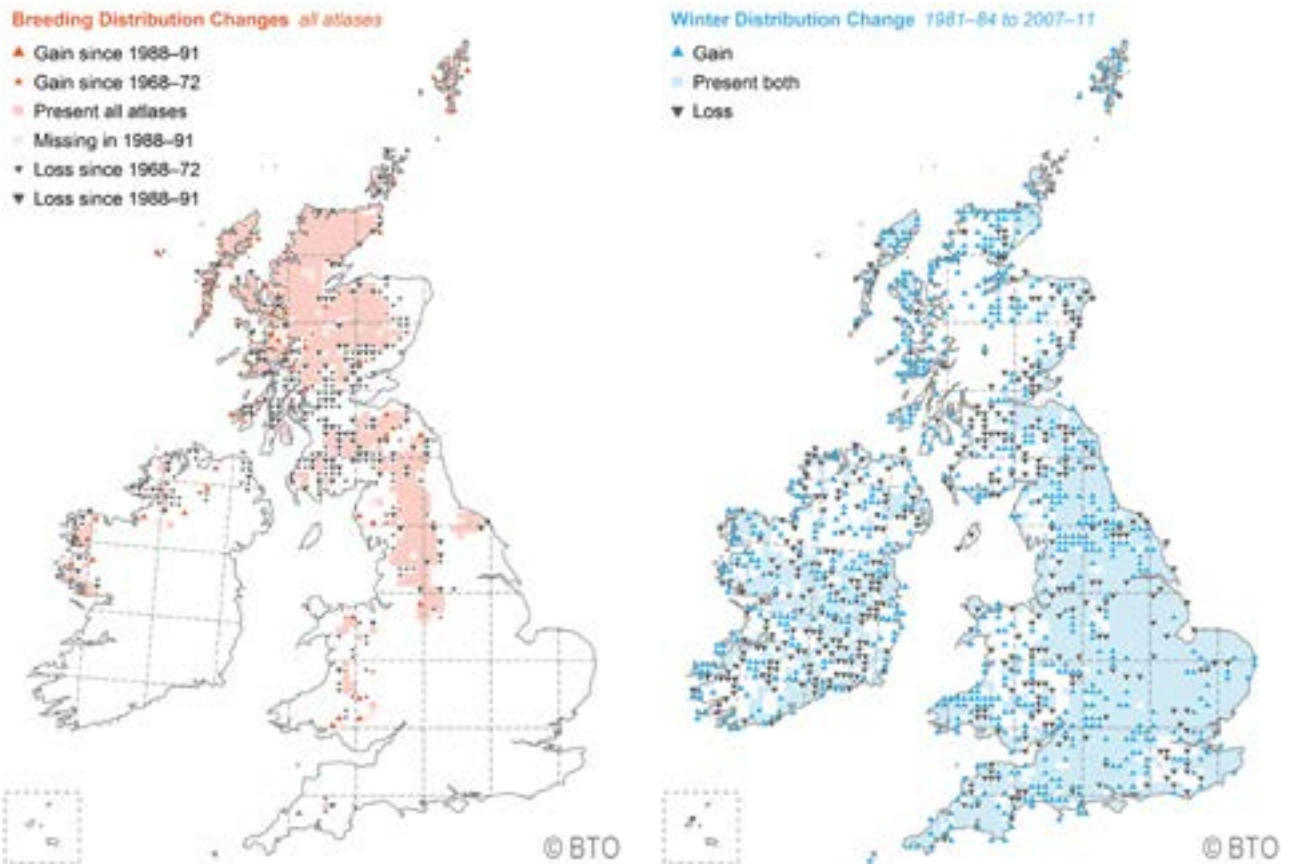
Breeding golden plovers are birds of flat or gently sloping heather or grass moorland or blanket bog, and avoid tall or dense moorland vegetation, and woodland and its vicinity. Population densities tend to be related to the productivity of the land, being higher on base-rich soils, near pastures or regularly burned moorland, and lower on acid soils. Moderate densities of breeding birds are 2-4 pairs per km^2, but can be higher in productive areas. The British and Irish breeding populations are considered distinct and are relatively isolated from the populations of Scandinavian birds that visit in winter.

In England, breeding golden plovers are found mainly in the Pennines and North York Moors. Small numbers nest in Cumbria, but the populations in south-west England (Dartmoor/ Exmoor) are effectively extinct. Population declines have been attributed to afforestation, increases in generalist predators (such as crows and foxes), changes to hill farming and, in some areas, disturbance from recreational walking (Crick 1992; Finney *et al* 2005; Fletcher *et al* 2010). Drying of peatland soils, as a result of artificial drainage and summer warming, has also been detrimental (Pearce-Higgins *et al* 2010). These declines match those that have occurred throughout NW Europe, where declines in range at the southern limits of its distribution have been related to loss of heathland to agricultural improvement and afforestation (Crick 1997).

Golden plovers usually leave their upland breeding areas in winter, but flocks return to low-lying pastures near their breeding grounds in mid-February. Territory establishment takes place on adjacent, higher altitude moorland during March, and the majority of eggs are laid in April and May. Pairs do not use their territories for feeding until their eggs hatch, preferring to feed on flushes, spring complexes and 'improved' pastures which may be distant from their breeding site. After they fledge at 5-6 weeks old, the young birds join flocks feeding on adjacent pastureland. Territorial defence of the nesting area ceases once the chicks hatch, although the birds are territorial around the mobile chicks, and birds that have not managed to breed may take over vacated nesting areas for their own breeding attempts.

The populations of Iceland, Scandinavia and Russia are wholly migratory, and many of these winter in England. Wintering flocks use inland fields of mown grass, closely cropped pasture, stubbles and fallow, and often feed in mixed flocks with lapwings *Vanellus vanellus*. They prefer to feed on permanent pastures because of the larger densities of soil invertebrates, but will roost in the centre of large bare fields that have been ploughed. Wintering populations have generally increased over the past 40 years.

Historic changes in the distribution of UK breeding and winter populations of Golden Plover
(reproduced with permission of the BTO, from Balmer *et al* 2013)



Confidence in climate change impacts[25]

Breeding populations

Distribution change: **HIGH CONFIDENCE** Mechanism: **HIGH CONFIDENCE**

Wintering populations

Distribution change: **HIGH CONFIDENCE** Mechanism: **MEDIUM CONFIDENCE**

Breeding golden plovers are projected to be at high risk from climate change. Analyses of suitable climate space suggest that there will be substantial losses of suitable space under both 2° C and 4° C climate change scenarios, leaving only small areas that will be potentially suitable sites in the uplands of Scotland and northern England. Detailed research has shown that the emergence of adult craneflies provides an important flush of food for young birds (Pearce-Higgins & Yalden 2004) and that high summer temperatures may kill cranefly larvae by drying out the surface of peatland soils (Pearce-Higgins *et al* 2010). This affects the number of larvae hatching out the next spring – with numbers of adult cranefly emerging down by as much as 95% (Pearce-Higgins *et al* 2010). Thus, the abundance of golden plovers is affected by dryness of the summer (especially August temperatures) two years previously: a hot summer will result in reduced cranefly emergence in the following year, and hence low golden plover productivity, resulting in few recruits and a population decline in the second year.

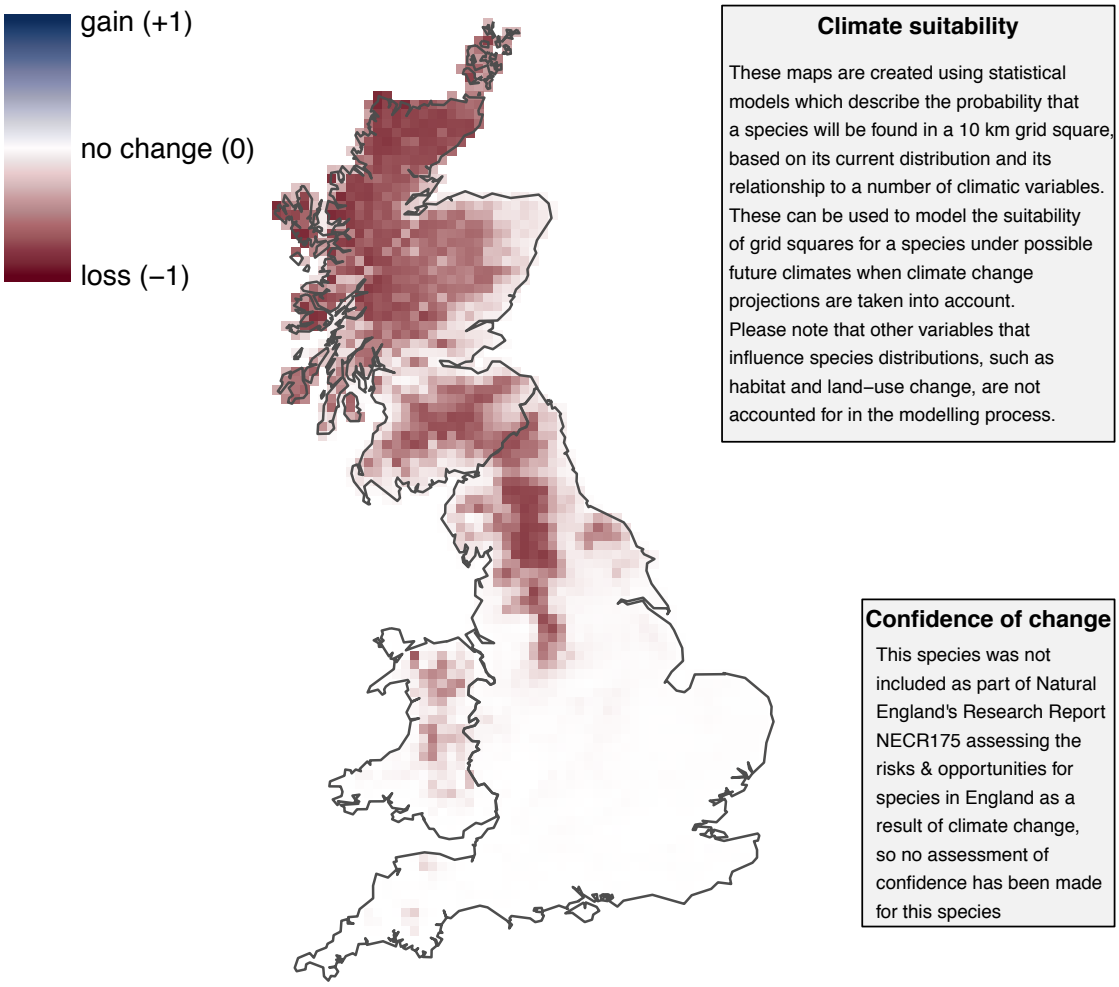
25 An assessment of the strength of evidence that distributions are changing and the mechanisms causing change are understood. Refer to Part B, section 5 of the species section introduction for more information.

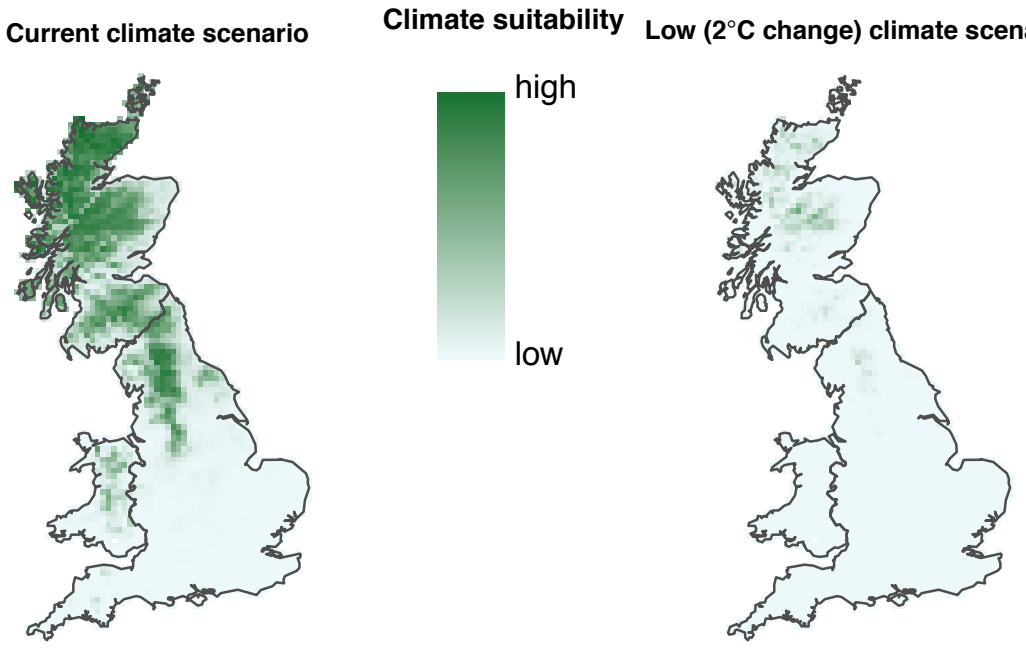
Another factor that has the potential to affect the survival of young golden plovers is mismatch between the emergence of craneflies and the hatching of chicks (Pearce-Higgins *et al* 2005. With climate warming, both are occurring earlier, but cranefly emergence is advancing more slowly than plover hatching, so that the plovers are increasingly missing the peak emergence of the craneflies, leading to reduced survival rates. However, this factor appears to be less important than the overall reductions in cranefly numbers due to the drying out of peat (Pearce-Higgins *et al* 2010).

Given the strong association between golden plovers and short vegetation (Pearce-Higgins & Yalden 2004), another plausible mechanism could be warming leading to increases in vegetation growth rates. This might reduce the areas of structurally suitable habitat for the species.

In contrast to breeding populations of golden plover, the important wintering populations that live on the wet grasslands and arable fields of lowland Britain have increased substantially in recent years. An analysis of the abundance of wintering populations suggests that they will be favoured by climate change, with substantial increases in the area of suitable climate (Pearce-Higgins *et al* 2015). This is likely to occur through the reduced probabilities of freezing weather, which would negatively affect the availability of the soil invertebrates in wet grassland upon which they feed. In addition, there is evidence of shifts away from inland sites to eastern estuaries, which may be attributable to increases in temperature and declines in invertebrate food availability on agricultural land. One potentially negative impact of climate change on the coast would be the impact of rising sea levels on the availability of foraging habitat and roosting or loafing areas due to more frequent flooding of coastal grazing marsh. This might be exacerbated by increasing levels of disturbance due to recreational use of coastal sites.

Projected change in potential distribution of golden plover (breeding population) 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

If current warming trends continue, many golden plover populations, especially those in the south of the bird's range where temperature rises will be highest, are likely to decline. However, because this species has been so well studied, our understanding of the processes linking climate, food resources, breeding success and population sizes, gives us the opportunity to respond. Adaptation management can be separated into two forms: counteracting and compensatory (Green & Pearce-Higgins 2010). Counteracting management reduces the severity of the negative climate change impact, while compensatory management does not address the mechanism by which climate change impacts upon a species, but seeks to increase productivity or survival rates through other mechanisms. For the breeding golden plover populations, there are options available to apply both counteracting and compensatory management practices.

The key mechanism by which golden plovers are affected by climate change is through the drying out of their wet bog and peaty upland heather moor habitats in the late summer, resulting in reductions of their cranefly prey in the following year. Management to increase cranefly populations requires blocking drainage ditches to raise and maintain water levels and re-vegetating bare peat, thereby increasing the resilience of the system to future warming. (Carroll *et al* 2011, 2015).

Modelling work has shown that compensatory action might also provide important population resilience, by tackling other factors that reduce golden plover populations. Breeding wader populations can be limited or decline as a result of generalist predators preying on nests and chicks. For example, one study showed that 18% of golden plover pairs successfully fledged young in areas with no predator control, compared with 75% in areas with predator control (Fletcher *et al* 2010). Legal control of generalist predators, especially foxes, has also been shown to benefit other wader species. The population models suggest that reducing the abundance of predators through control and other forms of management, and thereby increasing nesting success, may increase the resistance of a population to climate change. Thus, population persistence increases despite declines in productivity due to the warming effect on cranefly abundance.

There is a range of other management options that might be useful for golden plovers.

- To counter the possible impact of increased vegetation growth rates with warming, a potential adaptive response would be to manage the vegetation through suitable grazing or cutting regimes to create the short vegetation that the species prefers.
- Declines in numbers of upland breeding golden plovers have been associated with local exposure to forest edges (Amar *et al* 2011). Hence, key measures to benefit this species are to remove conifer plantations, and avoid new planting of both conifer and broadleaved woodland in areas close to golden plover breeding grounds.
- Populations of golden plovers which breed on upland heath feed on surrounding agricultural land. Thus, the provision of suitable conditions for foraging on this

agricultural land that encourage high densities of earthworms and craneflies, should also increase the resistance of these populations to climate change. Traditionally managed unimproved pasture is particularly valuable foraging habitat for these species, so it will be important to ensure these pastures are maintained.

- Recreational disturbance can be of localised importance for upland bird species such as the golden plover. In cases where disturbance may be limiting breeding success or distribution, measures to manage people by diverting them away from the most sensitive areas may help increase the resilience of those populations to climate change.

Wintering populations are likely to benefit from climate change through reductions in freezing conditions that would limit access to soil or inter-tidal invertebrates. Thus, adaptation actions should aim to ensure that there are suitable foraging and roosting areas in parts of the country where they currently occur and might occur in the future. It will be important to ensure that the foraging areas are not subject to excessive disturbance and are maintained in a damp condition.

Relevant Countryside Stewardship options

Several Countryside Stewardship options for lowland and upland marginal farmland and moorland are likely to offer benefits for breeding and over-wintering golden plovers. The most relevant options are listed below:

Breeding areas

GS5 ***Permanent grassland with very low inputs in Severely Disadvantaged Areas (SDAs)***

GS9 ***Management of wet grassland for breeding waders***

GS13 ***Management of grassland for target features***

GS14 ***Creation of grassland for target features***

SP2 ***Raised water level supplement***

SP9 ***Threatened species supplement***

UP1 ***Enclosed rough grazing***

UP2 ***Management of rough grazing for birds***

UP3 ***Management of moorland***

UP4 ***Management of moorland vegetation supplement***

UP5 ***Moorland re-wetting supplement***

WT10 ***Management of lowland raised bog***

Wintering areas

AB2 ***Basic overwinter stubble***

AB6 ***Enhanced overwinter stubble***

CT3 ***Management of coastal saltmarsh***

GS2 ***Permanent grassland with very low inputs (outside SDAs)***

GS10 ***Management of wet grassland for wintering waders and wildfowl***

GS12 ***Creation of wet grassland for wintering waders and wildfowl***

OP1 ***Overwintered stubble***

Case Study

Blanket bog restoration at Dove Stone RSPB reserve

Since 2010, a partnership between RSPB and United Utilities has been restoring 2,500 ha of degraded peatland at the RSPB Dove Stone reserve in the Peak District National Park. Working with tenant farmers, the project involves re-vegetating bare peat, blocking eroded gullies to hold water back and slow flows, and planting over 300,000 individual handfuls of peat-forming sphagnum moss. The work is ongoing, but there have been increases in breeding dunlins, golden plovers, curlews and red grouse, and these populations will be resilient to climate change impacts in the future through the provision of more drought resistant habitats.

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