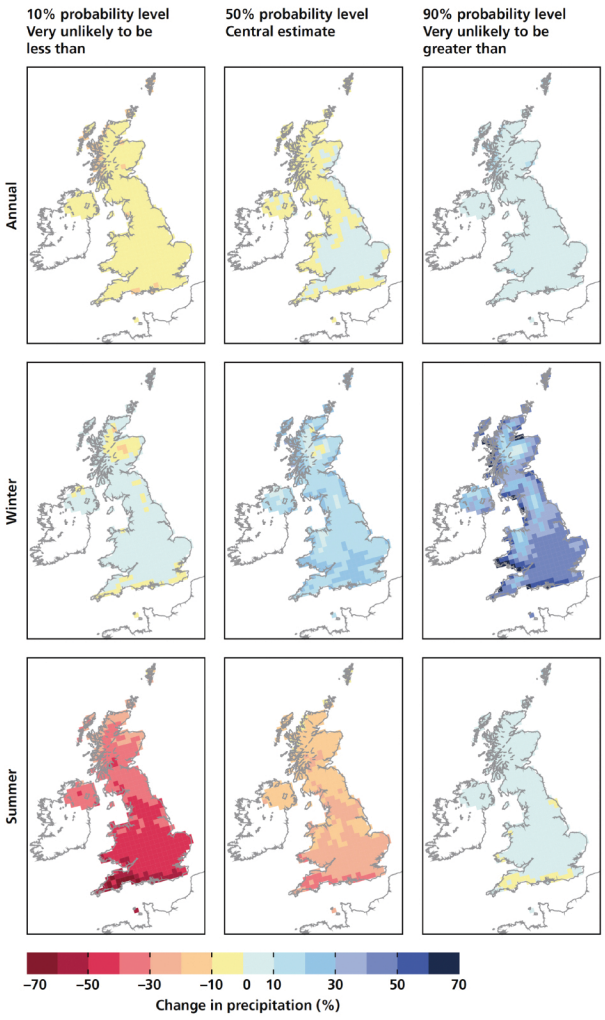
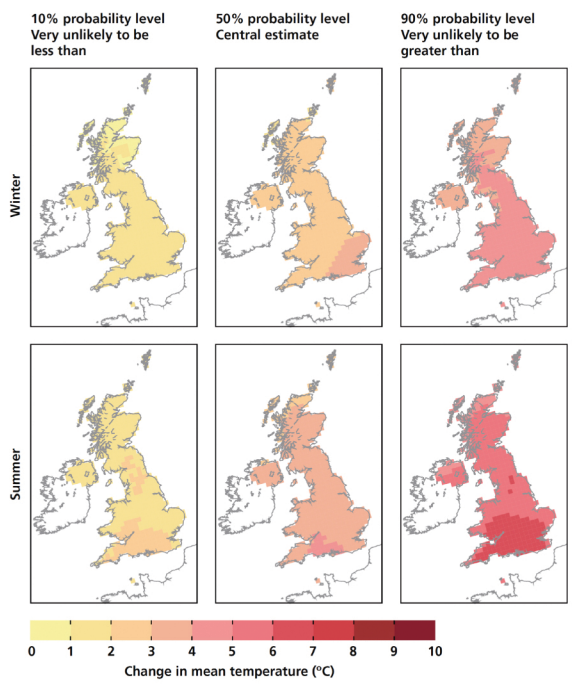
# Climate change in the New Forest




Forecast changes in annual (top), winter (middle) and summer (bottom) mean precipitation (%) by the 2080s under a medium emissions scenario. Source: Murphy *et al.* (2009).




Forecast changes to the average daily mean temperature (°C) of the winter (upper) and summer (lower) by the 2080s, under a medium emissions scenario. Source: Murphy *et al.* (2009).

| Species | Presence sites | Absence sites |
|---|---|---|
| *Chamaemelum nobile* | + 1.6 | + 9.8 |
| *Galium constrictum* | - 24.3 | - 3.5 |
| *Gladiolus illyricus* | + 3.4 | + 0.8 |
| *Hipparchia semele* | + 8.6 | + 12.5 |
| *Nemobius sylvestris* | + 3.8 | + 2.5 |
| *Plebeius argus* | - 6.0 | - 0.3 |
| *Pilularia globulifera* | - 40.3 | - 3.6 |
| *Poronia punctata* | + 6.0 | + 19.2 |

Changes in the probability of occurrence of selected species in the New Forest as a result of climate change. Values are given both for sites where the species are currently present, and on sites where the species are currently absent. Source: Newton *et al.* (2015).

Wild Chamomile *Chamaemelum nobile*

Slender Marsh-bedstraw *Galium constrictum*

Wild Gladiolus *Gladiolus illyricus*

Pillwort *Pilularia globulifera*

Grayling *Hipparchia semele*

Silver-studded Blue *Plebejus argus*

Wood Cricket *Nemobius sylvestris*

Nail Fungus *Poronia punctata*

Selected New Forest species.

## How will climate change affect the New Forest in the future?

Projections of future climate change are produced by the Intergovernmental Panel on Climate Change (IPCC), which is an international scientific body. Future climate trends are explored through the development of scenarios, which are based on assessment of the socio-economic driving forces that affect global climate through emission of greenhouse gases. These factors include changes in the economy, human population, technology, energy and agriculture. The development of climate change scenarios is supported by general circulation models (GCMs), which are complex, three-dimensional computer-based models of the global climate system.

The UK Climate Projections (UKCP09) provide forecasts of future climate for the UK, based on the IPCC scenarios and the Met Office regional climate model. This model enables global climate projections to be downscaled to a 25 km scale. These projections suggest that by 2080, areas of southern England including the New Forest might experience mean summer temperatures around 5 °C warmer than today. Summer rainfall could be around 30% less than current values, whereas winter rainfall could be significantly higher than at present. While these projections are associated with a great deal of uncertainty, they imply that a substantial change in local climate could occur in coming decades.

To explore the potential impacts of climate change on wildlife, we developed a series of computer models for some notable New Forest species. In this research, we employed Biomapper, a statistical tool that can build habitat suitability maps for any kind of species.

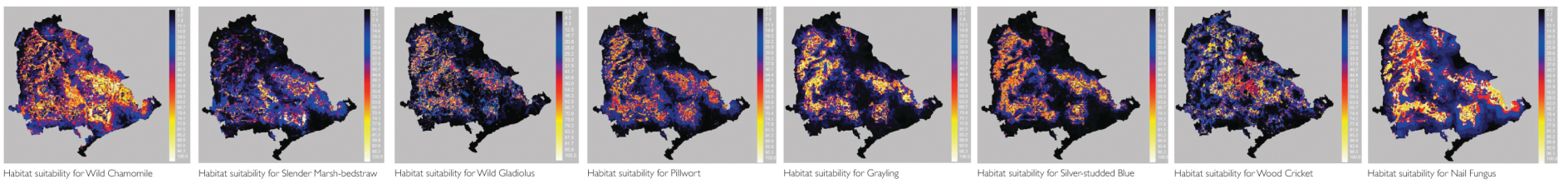
This approach quantifies the niche that a species occupies by comparing its distribution pattern with variation in environmental variables. We also used Bayesian networks, which are a form of artificial intelligence. To use these tools, we surveyed the distribution of species within the New Forest, and consulted experts familiar with their ecology.

Results highlight how habitat suitability for these different species varies over the New Forest landscape. Each species demonstrates its own particular pattern of habitat suitability. This reflects the large number of factors that can influence species distributions, including vegetation composition and structure, soil type and soil moisture, and the occurrence of different forms of disturbance such as grazing, fire and drainage.

When we used these models to forecast the potential impacts of climate change, we found that results differed markedly between species. Some species, such as Wild Chamomile and the Grayling butterfly, might actually benefit from climate change. Our analyses suggest that these species might increase in abundance in areas where they are already present, as well as spread to new areas within the New Forest. In contrast, other species such as Pillwort and Silver-studded Blue, may be adversely affected by climate change.

Changes to habitats may also be expected as a result of climate change. For example, warmer and drier summers may cause the wet heaths and mires to become drier, leading to their conversion to other habitats such as grassland. Increasing drought could also lead to the death of trees, and encourage attack by pests and diseases.

**But is there any evidence that such changes are already occurring?**



Habitat suitability for Wild Chamomile | Habitat suitability for Slender Marsh-bedstraw | Habitat suitability for Wild Gladiolus | Habitat suitability for Pillwort | Habitat suitability for Grayling | Habitat suitability for Silver-studded Blue | Habitat suitability for Wood Cricket | Habitat suitability for Nail Fungus

Source: Douglas (2009)