Dorset heaths

18. Lowland heathland

Climate Change Sensitivity: **Medium**

Introduction

Lowland Heathland is sensitive to changes in hydrological conditions and the frequency of fires that may result from higher temperatures and more frequent droughts. Heathland is also sensitive to potential indirect impacts of climate change such as increased recreational pressure. Coastal and dune heathlands may be lost if sea levels rise significantly. Future warmer temperatures, in addition to current increased nutrient availability, could cause grass species to become more dominant, leading to a shift from heathland to acid grassland. Some heathland species currently restricted to southern England are likely to benefit from climate change, including the Dartford warbler *Sylvia undata* which has already expanded its range. The fragmented nature of many heathland sites will increase their vulnerability to climate change.

The ability to undertake winter restoration and maintenance work such scrub or tree clearance may be affected as birds nest earlier in the spring, and the window of opportunity when weather conditions are suitable for controlled burning may narrow. More frequent extreme weather events such as flooding could also impact on winter maintenance.

Habitat Description

Lowland heath developed following prehistoric woodland clearance, and has been kept open through the centuries by grazing, burning and cutting. As the economic value of these uses declined, a considerable area of heath was lost to agriculture, forestry, housing, mineral working and other uses. Heathland is described as a broadly open landscape on impoverished, acidic mineral and shallow peat soil, which is characterised by the presence of heathers and gorses at a cover of at least 25%. It includes both wet and dry heath, usually below 250 metres.

Lowland heath grades into upland heath but is defined by the upper limit of agricultural enclosure and typically supports a range of birds, reptiles and invertebrates not found on upland heath.

Areas of heathland in good condition should consist of an ericaceous layer of varying heights and structures, plus some or all of the following additional features, depending on environmental and/or management conditions: scattered and clumped trees and scrub; bracken; areas of bare ground; areas of acid grassland; lichens; gorse; seasonally wet areas; bogs and open water. Lowland heathland can develop on drift soils and weathered flint beds over calcareous soils (limestone or chalk heath). Lowland heathland is a dynamic habitat which undergoes significant changes in different successional stages, from bare ground (e.g. after burning or tree clearing) and grassy stages, to mature, dense heath.

Lowland heath occurs across a variety of areas of lowland England, and includes the distinctive heaths of Cornwall, Devon and Dorset, those across Hampshire, Surrey and Sussex, the eastern heaths of the Suffolk coast, Breckland and Norfolk, parts of Staffordshire, Sherwood Forest in Nottinghamshire and The Vale of York. There are small heathland sites in other parts of the country too. The total area of lowland heath in England is approximately 70,000 ha.

Potential climate change impacts

Cause	Consequence	Potential impacts
Increased mean temperatures	Longer growing season	■ Dwarf shrub may become less dominant as other more competitive plants become established. ■ Increased nutrient cycling and insect herbivory could cause grasses to become dominant over dwarf shrubs (Ukreate 2006; Wessel *et al* 2004). ■ Increased length of growing season, and activity period of key species, means a reduced window of opportunity to conduct winter management, such as controlled burning and cutting. ■ Changes in soil biota (Haugwitz *et al* 2014).
Hotter summers	Increased evapotranspiration Potential for increased visitor numbers Increased risk of wildfire	■ Drying of sites may cause a change in balance of species, particularly on wet heathland areas. ■ Loss of habitat structural diversity and species changes, leading to risk of local-scale species extinction (Brys *et al* 2005). ■ An increase in unmanaged access could lead to more erosion on access routes, irreversible damage to vegetation and increased risk of wildfires (Albertson *et al* 2010), and increased disturbance of ground nesting birds (e.g. Underhill-Day 2005). ■ Climate change may have an impact on the amount of carbon stored or emitted from heathlands, as well as increasing fire risk (Alonso *et al*, 2012).
Warmer winters		■ Scarce heathland species such as Dartford warbler or invertebrates (Thomas *et al* 2015) could benefit from the warmer conditions. ■ Grass species could become more dominant as a result of increased nutrient availability, leading to a shift from dry heath to acid grassland (Wessel *et al* 2004; Jones *et al* 2015). ■ Bracken could have a competitive advantage over slower growing heather species, leading to changes in community composition (Chapman *et al* 2009, Aspden *et al* 2013). ■ Changes in soil biota (Haugwitz *et al* 2014).
Drier summers	Drought	■ Altered community composition. ■ Drying out and loss of wet heath (Carey 2013). ■ Increased susceptibility to wildfires, and risk of resulting peat/soil damage. ■ Surface peat (especially bare peat) could dry out and be vulnerable to wind blow. ■ Wet heathland species such as *Erica tetralix*, could be threatened because of its need for permanently moist conditions (Carey 2013). If lost it may be replaced with other *Erica* species.
Wetter winters	Increased surface runoff Increase nitrogen deposition	■ Loss of habitat, or water-logging of some areas not normally adjusted to these conditions. ■ Increased vegetative growth (Britton *et al* 2001). ■ Loss of nutrient poor specialist species in favour of more competitive generalists such as grasses (Wessel *et al* 2004). ■ The atmospheric deposition of Nitrogen increases the sensitivity of heather to drought, frost, and heather beetle outbreaks. ■ Reduced opportunity for winter management, such as controlled burning and cutting.
In combination		■ Growth of grasses and the loss of more characteristic plant species will be detrimental for some typical animal species. Key species currently at the northern end of their range such as the smooth snake and sand lizard may benefit as the climate becomes milder (Dunford & Berry 2012). ■ Loss of typical heathland landscapes.

Adaptation responses

Heathland is threatened by many pressures that are not related to climate change, such as habitat loss and an associated increase in fragmentation and isolation, heavy access and recreation pressure, and lack of appropriate management. Increasing the resilience of the remaining areas of heathland by reducing these pressures is likely to be a key adaptive response in many cases. Tree cover in the right places can provide wildlife benefits and reduce fire risk as broadleaved species are less flammable than heathland vegetation. This needs to be balanced against the loss of heathland species, and tree cover should be kept below 15% to maintain favourable condition.

Different aspects of climate change will interact and have different impacts on the various components of heathland systems. Management of existing sites will need to be flexible, and be adjusted to reflect these changes.

In addition to actions on existing areas of heathland, adaptation will also benefit from targeted habitat restoration and creation to address historic habitat loss and to improve the resilience of heathland networks.

Some of the potential adaptation options for this habitat are outlined below.

- Ensure optimal management through a combination of grazing, cutting and/or burning to achieve a diverse vegetation structure.
- Adapt the intensity of management to changing growth characteristics of the heathland, for example by increasing grazing pressure or burning/cutting cycles. More intensive management may be required to maintain condition.
- Ensure fire contingency plans are in place. These may include changes in the design and management of habitats to reduce fire risk, such as firebreaks, fire ponds and the closure of some areas at times of high fire risk.
- Ensure sufficient management capacity to be able to respond flexibly to changing conditions, such as a reduced window for winter management, and wetter conditions preventing winter operations.
- Consider maintaining broadleaved (not conifer) woodland in localised areas to provide a firebreak or a buffer next to urban areas.
- Within sites, identify areas that might act as potential refugia to climate change, such as areas with north facing slopes, complex micro-topography, robust hydrology and high species diversity, and ensure that these are under optimal management.
- Maintain structural diversity in the vegetation to provide a wide range of micro habitats and niches, including, where possible, bare ground, areas dominated by mosses and lichens, herbs, dwarf shrubs of diverse age classes, wet heath and mire, and scattered trees and shrubs.
- Ensure hydrological conditions are fully conserved, for example through blocking artificial drainage and reducing abstraction pressure.
- Increase the area of existing habitat and reduce the effects of fragmentation through targeted re-creation and restoration around existing patches, to increase the core area and reduce edge effects.

Ponies grazing heathland. Sutton Common, Surrey.

Relevant Countryside Stewardship options

LH1 Management of lowland heathland

This option is designed to encourage the appropriate management of existing lowland heathland, both in sites in good condition and in those not currently in good/favourable condition, including on sites whose management has been neglected. Such sites may have become degraded by scrub, bracken, gorse, invasive grasses or secondary woodland encroachment, and in some cases overgrazing and too frequent burning.

This option will benefit the environment by creating a diverse mosaic of vegetation, allowing all heathland types (such as wet or dry heath, transitional heaths, acidic mires and coastal heaths) to flourish. This includes pioneer heath and bare ground, which benefits rarer invertebrates, birds, reptiles and plants. The cover of undesirable species will be low and species that increase when undermanaged (bracken, trees, dense grass tussocks) kept under control. Locally characteristic plant communities and the species they support (such as nightjar *Caprimulgus europaeus*, woodlark *Lullula arborea*, smooth snake *Coronella austriaca*, and sand lizard *Lacerta agilis*, where within their range) are common.

LH2 Restoration of forestry areas to lowland heathland

This option aims to encourage the restoration of lowland heathland on existing or previously forested land. It is most likely to apply to conifer plantations which show evidence of heathland vegetation in forest rides or other open areas. Soil type, management history and location in relation to existing heathland sites will be significant factors in determining suitability. Significant site clearance and weed control may be needed, but it is expected that, following suitable treatment, heathland vegetation will re-establish without the need for seeding from external sources. Clear-felling forestry and the reintroduction of traditional grazing will help to restore areas of heathland, along with its associated wildlife, and will strengthen the vegetation mosaics characteristic of lowland landscapes.

This option will benefit the environment by re-establishing lowland heathland on forested land or land recently (since 1900) colonised by woodland. The area will have a tree cover under 15%, with a diverse mosaic structure and composition, including undisturbed bare ground and varied heathland vegetation types. Locally characteristic plant communities and the species they support (such as nightjar, woodlark, smooth snake or sand lizard) will successfully colonise the site, if within their range.

LH3 Creation of lowland heathland from arable or improved grassland

This option aims to encourage the creation of lowland heathland on arable or improved grassland sites that have effectively lost their heathland seed bank. Soil type, management history and location in relation to existing heathland sites will be significant factors in determining suitability.

Keys to success will include: controlling the availability of soil nutrients, providing a suitable seed source, achieving adequate establishment and controlling undesirable species. Subsequent management by a combination of grazing, or cutting and removal, will be required. The creation of heathland from arable or improved grassland will help to re-create and strengthen the vegetation mosaics characteristic of lowland landscapes.

This option will benefit the environment by creating heathland mosaics with lowland acid grassland, on arable or improved grassland sites that have largely lost their heathland seed bank. Locally characteristic plant communities and the species they support (such as nightjar, woodlark, smooth snake or sand lizard) will colonise the site, if it's within their range.

Further information and advice

Forestry Commission **Forest fires and climate change**.

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