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**UK Best Practice Guidance**

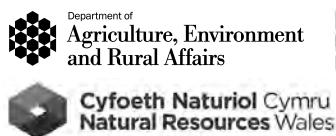
# Bracken Management





## UK Best Practice Guidance: Bracken Management

This document has been produced by Fera Science Ltd with input from Simon Thorp Associates and Natural England, NatureScot, Department of Agriculture, Environment and Rural Affairs (DAERA, Northern Ireland), Natural Resources Wales, Historic England, Cadw and Historic Environment Scotland.



## Context

For many years, the herbicide Asulox has been used as one of the primary forms of bracken treatment, but it is no longer available for use in any part of the UK, nor can it be used in EU countries. However, guidance on bracken management has to date been based around the existence of effective chemical treatment and is therefore outdated. In addition, current policy across the UK favours non-chemical treatment<sup>1</sup>.

As unmanaged bracken may cause problems to the natural and historic environment, there is a need to balance maintaining suitable habitat (that includes bracken) as part of a wider mosaic, with opportunities for enhancement of bracken dominated areas into higher quality habitat. The UK nature conservation bodies and national historic advisory bodies therefore, have an interest in appropriate management of bracken to protect biodiversity, landscape and the historic environment, in line with their statutory purposes.

This document updates the existing guidance on bracken management to reflect the current range of management techniques and the land management requirements of the nature conservation bodies and historic advisers. It has been produced to promote best practice in bracken management across the UK and will be updated as further information emerges.

A first step in identifying the best means of bracken management in an area is to establish whether bracken requires to be extensively removed. This is not likely to be the best approach in all circumstances. This guidance has identified four management options (as listed in the Management Options section), and they should all be considered, starting with the ‘no treatment’ option. **It is not the purpose of this guidance to assist with this decision making.** Plans are in progress to develop a strategic management framework to help land managers identify land use that is sustainable and appropriate in a particular area, taking into consideration factors such as soil type, topography, climate, hydrology, ecological and historic designations and priority species and habitats present. When the ideal land use type is identified, the framework will assist in determining whether bracken management is required and, if so, the best means of bracken management on that land.

It is unlikely that all site objectives can be met by any one form of bracken management. Each site will need a bespoke approach possibly involving more than one method.

Use of the terminology “management” is used in preference to “control” throughout this document. This reflects an approach that includes a wider range of actions that are likely to be better integrated into an overall approach to site management.

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1. For example, the Revised National Action Plan (NAP) for the Sustainable Use of Pesticides encourages the uptake of integrated pest management (IPM) as a core goal. IPM requires the consideration and combined use of all available crop protection methods to control pest populations whilst reducing risks to human health and the environment. Pesticides should be used only when alternatives are ineffective or unavailable. The Plant Protection Products (Sustainable Use) Regulations 2012 also take account of this approach.

## What is Bracken?

Bracken is an ancient, native species that has formed part of the UK's natural landscape for thousands of years. It is a natural component of a range of semi-natural habitats, particularly in woodland environments. The plant dies back in the autumn and lies dormant in the winter with new shoots emerging from the rhizomes (root system) the following spring.

Bracken rhizomes provide a substantial store of nutrients, enabling bracken to spread. It can exude allelopathic toxins, poisonous to other plants, which can limit competition and help bracken establish. Unmanaged bracken can form tall, dense stands where it can cut out light and moisture from other plants. This helps it to become dominant over large areas and reduces biodiversity.

## What are the benefits of bracken?

Bracken provides food and cover for a range of mammals, birds, amphibians, reptiles and invertebrates including rare and declining species. Where the cover is less dense it can be associated with protected and/or scarce plant species, including woodland plants such as the bluebell, climbing corydalis, autumn crocus and Solomon's seal, as well as several mosses. During hot, dry summers, bracken offers shade, reducing stress to understorey vegetation.

Bracken mosaic habitat has important biodiversity value and, where mixed with violets, is considered crucial for many existing populations of fritillary butterfly, which are of international importance. Nightjar may use bracken as its preferred habitat, laying its eggs on bare ground under bracken, and skylark also often nests in bracken using it for cover. Reptiles such as smooth snake and sand lizard also use bracken mosaics as habitat.

Bracken can also be harvested for livestock bedding, to create compost / growing media and as a biofuel.

Bracken adds structure and colour to the landscape including the orange-brown colour of bracken when it overwinters. Bracken functions as a surrogate woodland canopy in many areas, providing shade, moisture and predator camouflage for understorey species. The species can also stabilise slopes and prevent landslips, alongside other woodland and scrub habitats.





## Why manage bracken?

Bracken is an integral part of the UK landscape and has significant ecological value. However, as management of the landscape has changed, with removal of the natural constraints of shade from woodland and a decline in traditional management techniques to keep it in check, the species has spread. It is important to note that bracken is not an invasive species, as it is not a species outside its normal range<sup>2</sup> though it can dominate tracts of land if left unmanaged.

Bracken is viewed as a habitat element and/or a threat depending on the relationship with other interest features. This presents a nuanced picture of the requirements for its management. That bracken can be viewed as a problem is a consequence of historic land use and land management decisions that have had the unintended consequence of releasing bracken from environmental constraints on its abundance and distribution.

The key detriments of unmanaged bracken are that it:

- Can reduce biodiversity, replacing other important habitats such as heathland and species-rich grassland by outcompeting and shading the understorey vegetation, or adversely affecting the quality or structure of the habitat for protected species. Management may be needed to maintain appropriate mosaics of bracken alongside other habitats.
- Makes the task of gathering stock difficult and, in some situations, dangerous.
- Can make recreational access more difficult particularly where bracken is unmanaged and grows to a height covering footpaths.
- Can harbour ticks, which may cause disease in people, livestock and wildlife. The presence of ticks in dense vegetation, including bracken beds adds to the risks faced by workers, walkers and their dogs.
- Can make deer control more difficult.
- Can inhibit woodland regeneration.
- May obscure above ground historic remains (putting the remains at risk of inadvertent damage).
- Has an extensive rhizome network that can be very damaging to below ground archaeology.
- May be toxic and carcinogenic to stock if eaten in large quantities.
- Can be a significant source of fuel for wildfires when dead, if land management otherwise does not prevent this.





## Do I need to manage bracken?

Bracken management should be considered as one component of a long-term programme of habitat management.

Wherever bracken management is proposed, it should be carefully justified and achieved by methods that have least impact on the wider environment and integrate with broader land management activity, so that direct intervention to manage bracken is minimised. Management must consider the need to retain suitable habitat for wild birds and other species in key locations and to protect the historic environment.

Inappropriate management can be as damaging to biodiversity as retaining bracken. For example, management on steep slopes can lead to soil erosion, and silt can impact on upland rivers and their associated species.

The first step in any management programme is to develop a detailed plan of the work with clearly identified objectives, taking into account the species and/or historic interest of the site. The plan must include aftercare, which is a plan for managing the land after primary and follow-up treatment, and is an integral part of bracken management.

**Bracken management = primary and follow-up treatment (where necessary) + aftercare**

Every bit of land is different and will require an individual approach; even a single site may have localised differences requiring a tailored approach. To assist with planning work, a Bracken Management Plan template has been included as part of this Guidance. Please find the link to the template at the bottom of this page: [www.nature.scot/plants-animals-and-fungi/ferns/bracken](http://www.nature.scot/plants-animals-and-fungi/ferns/bracken)

As part of the management plan, it is strongly recommended to **monitor** and **record**:

- a. the condition of the bracken on any regrowth and
- b. the condition/diversity of the replacement vegetation.

This will enable an assessment of the effectiveness of the management implemented and hence identify whether the management should be continued or revised accordingly.



## Management Options

Whether or not bracken needs managed, or the extent to which management is required, depends on the **long-term use** of the land and may need to consider a range of outcomes including improvements in grazing, public access, reducing risk to historic monuments and protecting or improving (sensitive) habitats. Bracken is an integral part of the landscape in semi-natural habitats, therefore long-term management rather than intensive treatment or total removal is most appropriate and more achievable.

There are four management options:

Management	Description
No Treatment	<p>Bracken treatment is not always appropriate, for example on steep slopes, where it could result in erosion, may be too dangerous to access, or where regeneration of other habitats to replace bracken is difficult.</p> <p>In some areas there will be species of nature conservation value that could be harmed by inappropriate bracken treatment.</p>
Conservation Management	Where it is desirable to maintain low-density or patchy/ mosaic cover for supporting species and habitats of conservation importance, any treatment is likely to be limited and selective, and be undertaken only once a year.
Limited Treatment / Containment	Where the aim is to reduce the area or severely limit vigour and spread, but not eliminate.
Intensive treatment	<p>Where bracken is to be largely replaced with other vegetation as part of a wider habitat or historic feature restoration plan.</p> <p>The removal of large areas of bracken is only appropriate as part of a programme to restore priority habitats or historic features and needs to be highly targeted requiring careful planning as it is a significant undertaking that will be difficult to achieve. On steep slopes a plan will be required for staged treatment and aftercare to prevent soil erosion.</p>

*The recent report 'Rapid Evidence Review of the Implications of not Controlling Bracken with Asulam in Scotland' identified several evidence data gaps and work is ongoing to address this. In addition, plans are in progress to develop a strategic framework that will help land managers to balance the many ecological, agricultural, historical and amenity aspects of their land to determine the optimal land use which in turn will aid the development of the most appropriate bracken management plan. This will include conservation or historic environment designations, land under agri-environment schemes, and areas where nature recovery is beneficial. The proposed work will entail significant stakeholder engagement. Feedback received from practitioners will be used to refine this preliminary Guidance on bracken management.*

## Bracken Treatment Methods

Where bracken treatment is needed as part of the management strategy for the land, there are a number of physical and mechanical methods available to achieve this. Each has their own benefits and drawbacks depending on specific situations.

Typically, bracken treatment needs to be undertaken at least twice a year, particularly where the bracken stands are (initially) dense, and follow-up treatment will be required over several years until the balance of vegetation meets the objectives of the desired land use. This is due to the fact that bracken has an extensive rhizome system which can support sustained regrowth.

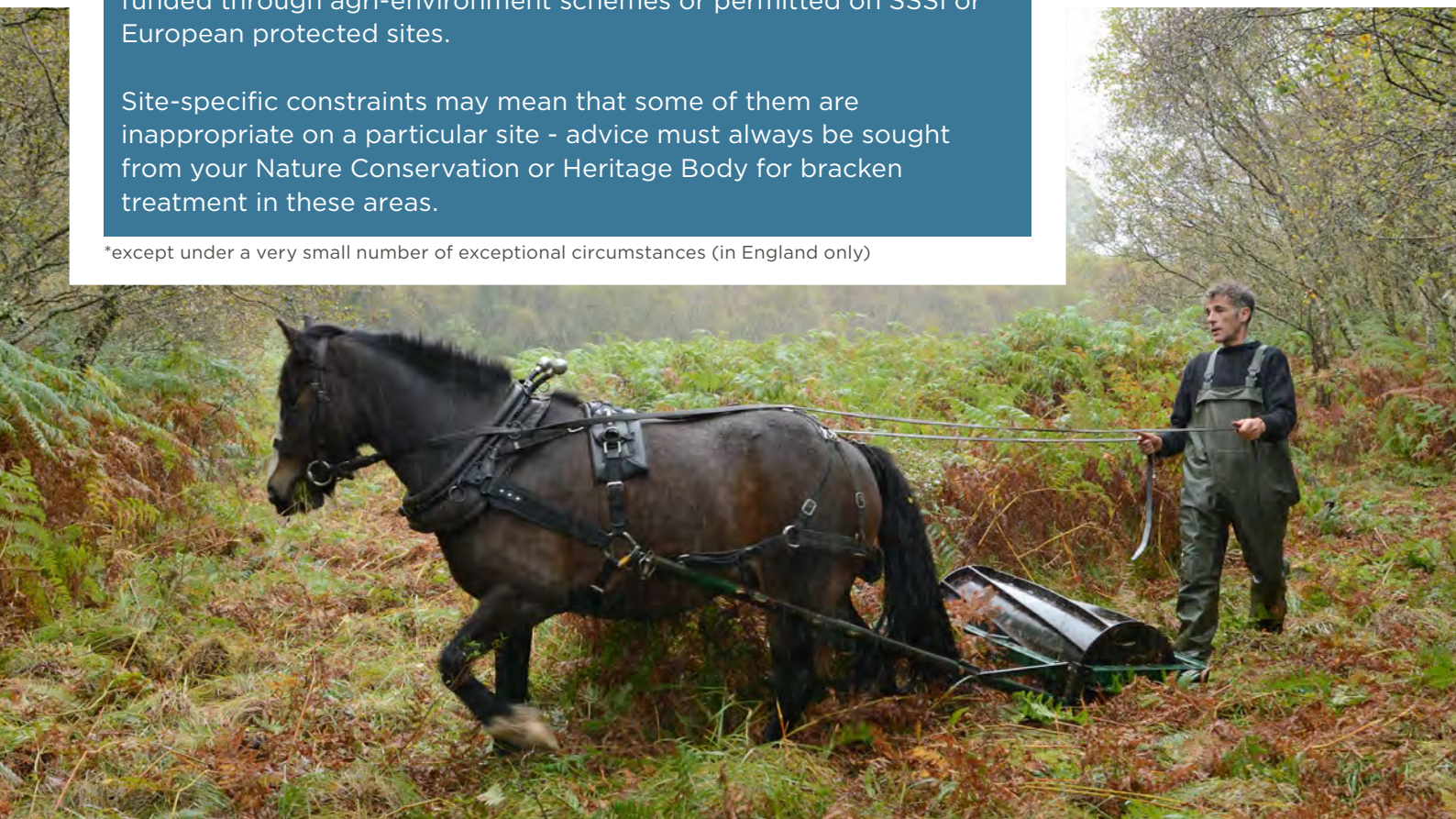
Different treatment methods can be used within the same year, and, as the density of bracken reduces, different methods of treatment may be more appropriate than those first implemented. Keeping a record and monitoring the condition of the land will assist with decision making. Details of each method is available at the links below (each link will open a separate document):

- [Hand pulling & whipping](#)
- [Hand Cutting equipment \(manual and powered\)](#)
- [Cutting - ATV/quadbike](#)
- [Cutting - Tractor equipment](#)
- [Livestock](#)
- [Rolling](#)
- [Bruising](#)
- [Tillage or ploughing- \(on in-bye land\)](#)

The above mechanical and physical means of bracken treatment must always be considered first and are the only\* options currently funded through agri-environment schemes or permitted on SSSI or European protected sites.

Site-specific constraints may mean that some of them are inappropriate on a particular site - advice must always be sought from your Nature Conservation or Heritage Body for bracken treatment in these areas.

\*except under a very small number of exceptional circumstances (in England only)





Examples of how and where the different treatment methods have been employed in practice are provided in separate Case Study files available at the links below (each link will provide a separate document):

- [Case Study: Hand pulling & whipping](#)
- [Case Study: Hand Cutting equipment \(manual and powered\)](#)
- [Case Study: Cutting - ATV/quadbike](#)
- [Case Study: Cutting - Tractor equipment](#)
- [Case Study: Livestock](#)
- [Case Study: Rolling](#)
- [Case Study: Bruising](#)
- [Case Study: Tillage or ploughing- \(on in-bye land\)](#)



The examples are limited to information that has been provided up to the point of publication of this Guidance document. Work is ongoing to gather further examples and the Case Study files will be updated accordingly.

Glyphosate is one of a few currently approved herbicides known to control bracken. However, glyphosate is a non-selective herbicide meaning that it will kill or damage any green plant material with which it comes into contact. Once bracken has been cleared from an area, via glyphosate or another approved herbicide, the entire landcover may be removed as a result. This can render the land more susceptible to erosion and can remove vegetation that could otherwise re-vegetate the area.

There are limited situations where applying glyphosate with weed wipers may be appropriate, i.e. where the bracken is sufficiently tall that there is clear separation between the bracken and the understorey/interspersed vegetation (which will be case-specific), but where the bracken is not so dense that it restricts access by vehicles.

**Burning** is not a method of bracken treatment and may encourage bracken growth by recycling nutrients and suppressing vegetation which would otherwise compete with bracken.

Whilst **removing bracken litter** is not a form of treatment, it will prevent nutrients contained in the vegetation matter returning to the soil and hence lower the vigour of subsequent bracken growth compared to if the litter is left, but the impact will be negligible compared to bracken treatment. It may also allow a more biodiverse understorey to develop.

Similarly, **tree planting** is not a form of bracken treatment per se, but due to increasing interest in this area, case studies, and other aspects of its implementation will be added to the guidance.





## How does bracken treatment work?

Bracken primarily reproduces via the rhizome system which acts as a store of energy. The plant consumes energy from the rhizomes to produce new fronds, thus, at this early stage, the energy supply of the rhizomes is being depleted. However, once the fronds have unfurled and start to photosynthesise, energy can be returned to the rhizomes and the store becomes replenished.

**The key to long-term bracken management is to gradually deplete the rhizome store.**

**Cutting** bracken prevents the return of energy to the rhizome store via photosynthesis. If the bracken is cut during the growing season, it will naturally try and re-grow, putting out new fronds to replace those cut. The bracken plant relies on the stored energy in the rhizomes for this re-growth, hence there is some depletion of the rhizome store with every cut.

In a similar manner, breaking the bracken stems – via **bashing, bruising, rolling or trampling with livestock** – causes the nutrient-containing sap to ‘bleed’ out of the plant reducing

- a) the vigour of plant growth and
  - b) its ability to return energy to the rhizomes via photosynthesis.
- Trampling** also breaks up the litter layer which encourages frost penetration to the rhizomes.

**Ploughing or tillage** physically disrupts the rhizomes, breaking the connection between the rhizome and the vegetative plant. In addition, bringing the rhizomes to the surface means they are susceptible to frost. Rhizomes typically extend to 50cm deep but can be deeper where the soil is favourable. This method has very limited application to in-bye ground only. If the ground is classed as permanent pasture or unimproved grassland, **EIA regulations must be followed and permissions sought before undertaking any work. This method must not be used on historic sites.**

**Herbicides (glyphosate)** chemically disrupt the internal pathway by which plants synthesise proteins and hence grow. As with the physical means of treatment, reduced growth ultimately depletes the energy store in the rhizomes.

Due to the vastness of the rhizome store, **bracken management is a long-term commitment** that can take in the order of 10 years to weaken the rhizomes to an extent that bracken growth is significantly reduced.



## Statutory Considerations

Before undertaking any bracken treatment, you will need to determine whether the proposed work falls within the remit of the Environmental Impact Assessment (EIA) (Agriculture) Regulations for your country. These Regulations protect land from damage caused by introducing or changing activities that will increase the agricultural productivity of the land, or work to restructure rural land.

Bracken management operations also require Nature Conservation Body consent if undertaken on a SSSI (or European Protected Site). Where a Scheduled Monument is present, advice should be sought from the relevant heritage body to establish the preferred treatment method and to determine whether Scheduled Monument Consent is needed.

All nesting birds have special protection in law across the UK. Before undertaking any bracken treatment during the breeding season (March - August), survey the site to identify areas where bird nests are present and avoid disturbance to the nests by avoiding the area around them when undertaking treatment and by delaying treatment on these areas until later in the summer or until nesting is finished.

Nature Conservation and Heritage bodies can be contacted for advice.

## Aftercare (vegetation recovery)

**Bracken management = primary and follow-up treatment (where necessary) + aftercare**

Aftercare is needed to:

- i. Minimise bracken regrowth from the rhizomes remaining;
- ii. Maximise vegetation recovery or growth in newly seeded/planted areas.

The exact nature of the aftercare - whether it is, for example, planting trees, (re-) establishing heathland, returning land to pasture or creating species-rich grassland - will depend on your overall objectives and the extant vegetation.

The success of re-establishment and/or growth of newly seeded areas is weather dependent (amongst other factors) and it may be necessary to revise the original vegetation management plan and planned bracken treatment to reflect the response of the site.

## Health and Safety

A written health and safety risk assessment must be undertaken before any treatment commences.



## More information

Further information can be obtained from the following websites:

Organisation	Website
NatureScot	<a href="http://www.nature.scot">www.nature.scot</a>
Natural England	<a href="http://www.naturalengland.org.uk">www.naturalengland.org.uk</a>
Cyfoeth Naturiol Cymru	<a href="http://naturalresources.wales">naturalresources.wales</a>
Natural Resources Wales	<a href="http://naturalresources.wales">naturalresources.wales</a>
Department of Agriculture, Environment and Rural Affairs (NI)	<a href="http://www.daera-ni.gov.uk">www.daera-ni.gov.uk</a>
Bracken Control Group (BCG)	<a href="http://www.brackencontrol.co.uk">www.brackencontrol.co.uk</a>
Historic Environment Scotland	<a href="http://www.historicenvironment.scot">www.historicenvironment.scot</a>
Historic England	<a href="http://www.historicengland.org.uk">www.historicengland.org.uk</a>
Cadw	<a href="http://cadw.gov.wales">cadw.gov.wales</a>
NI Communities	<a href="http://www.communities-ni.gov.uk">www.communities-ni.gov.uk</a>

## Please help us, to help you!

As part of ongoing work to develop a decision tool to help land managers balance competing interests and consider which bracken management methods are best suited to achieve this, we will be undertaking a survey to collect information on what method(s) are implemented where, in which landscapes, how successful the management has been and details of what you consider the pros and cons of the method(s) used. We will then collate the findings to identify under which scenarios there has been consistent success (or not) so this information can be shared more widely to support other land managers and the findings will be used to further develop this Guidance.

The success of different treatment methods depends on many local factors, including historical treatment methods which is why the survey will ask for this information.







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