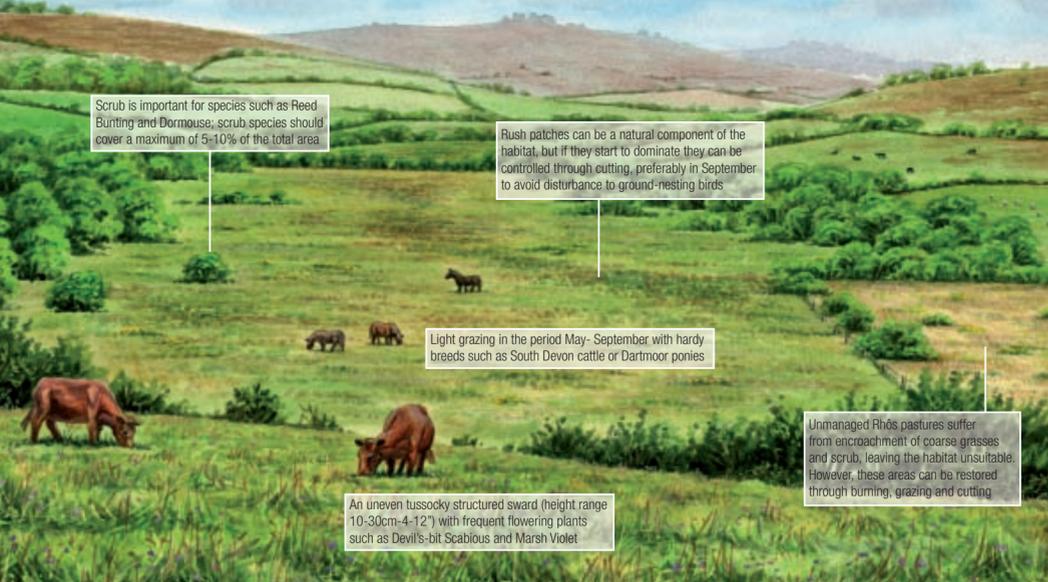


RHÔS PASTURE HABITAT DARTMOOR IN LATE SUMMER



Scrub is important for species such as Reed Bunting and Dormouse; scrub species should cover a maximum of 5-10% of the total area

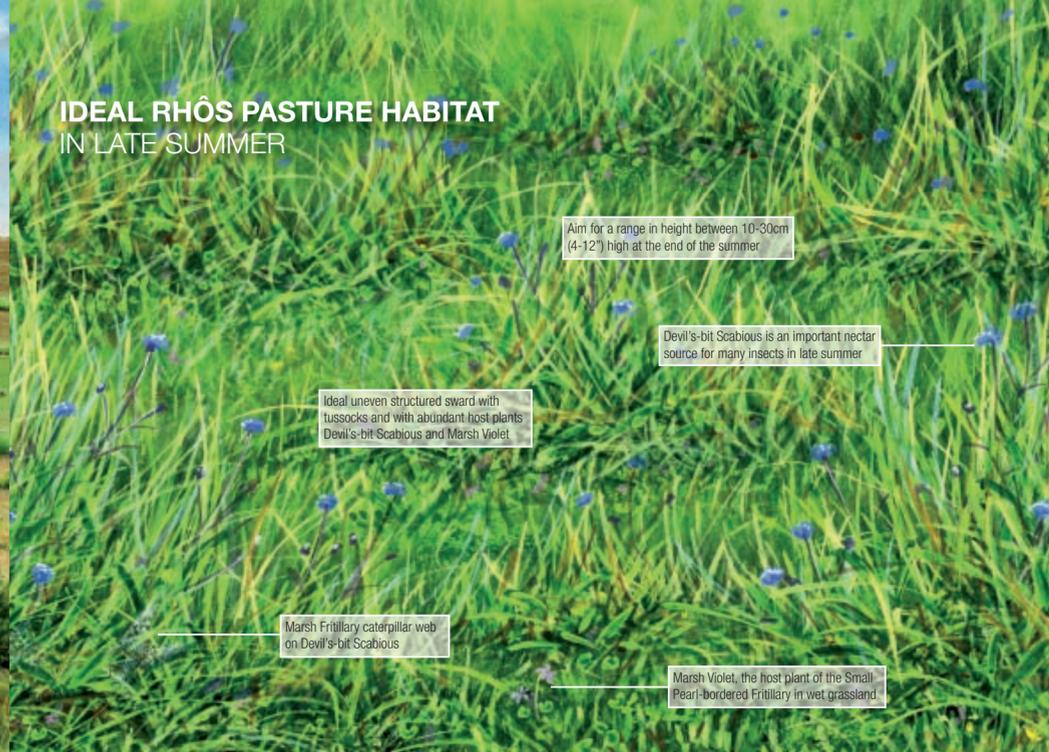
Rush patches can be a natural component of the habitat, but if they start to dominate they can be controlled through cutting, preferably in September to avoid disturbance to ground-nesting birds

Light grazing in the period May- September with hardy breeds such as South Devon cattle or Dartmoor ponies

Unmanaged Rhôs pastures suffer from encroachment of coarse grasses and scrub, leaving the habitat unsuitable. However, these areas can be restored through burning, grazing and cutting

An uneven tussocky structured sward (height range 10-30cm-4-12") with frequent flowering plants such as Devil's-bit Scabious and Marsh Violet

IDEAL RHÔS PASTURE HABITAT IN LATE SUMMER



Aim for a range in height between 10-30cm (4-12") high at the end of the summer

Devil's-bit Scabious is an important nectar source for many insects in late summer

Ideal uneven structured sward with tussocks and with abundant host plants Devil's-bit Scabious and Marsh Violet

Marsh Fritillary caterpillar web on Devil's-bit Scabious

Marsh Violet, the host plant of the Small Pearl-bordered Fritillary in wet grassland

WET GRASSLANDS

The unimproved, wet valley bottoms and poorly draining, shallow slopes away from the open moor on Dartmoor are known as Rhôs pasture or Purple Moor-grass and Rush pasture.

They are rich in wildlife with characteristic plants such as Meadow Thistle, Heath Spotted Orchid, Saw-wort and Devil's-bit Scabious usually growing amongst vegetation dominated by Purple Moor-grass and Sharp-flowered Rush. The habitat typically occurs as part of a patchwork with wet heath, drier grassland, wet woodland and scrub habitats.



Devil's-bit Scabious

On Dartmoor the **Marsh Fritillary** can be found on this type of wet grassland. The butterfly flies during May and June and lays its eggs on the underside of large leaves of the host plant, Devil's-bit Scabious. Another characteristic butterfly is the **Small Pearl-bordered Fritillary**. Adults fly from May until the end of July and the female lays her eggs singly on or near the host plant Marsh Violet. This butterfly can also be found in Bracken habitat, where other species of violet are used as host plant.



Other typical species include Dormouse, Snipe, Reed Bunting and Grasshopper Warbler. The habitat is also used by Barn Owls and Short-eared Owls for hunting.

A typical moth species associated with Rhôs pastures is the Narrow-bordered Bee Hawk-moth. This beautiful day flying moth, that resembles a large bumblebee, has undergone a substantial decline. Dartmoor Rhôs pastures are one of the remaining strongholds for this species.



Narrow-bordered Bee Hawk-moth

Many species associated with Rhôs pasture have declined rapidly. The primary cause has been loss of their habitat; damp grasslands have been drained, fertilised and stocked more heavily. More recently, populations are being lost because these agriculturally marginal areas are no longer grazed. This results in encroachment of coarse grasses and scrub, leaving the habitat unsuitable for the butterflies and many of the other associated species.

WHAT YOU CAN DO TO HELP

To manage your Rhôs pasture to benefit a wide range of characteristic species, including the **Marsh Fritillary** and **Small Pearl-bordered Fritillary**, aim for:

- An uneven, tussocky, structured sward at the end of the grazing season (normally end of September) between 10-30 cm high (4-12").

- Frequent flowering plants present such as Devil's-Bit Scabious, Marsh Violet and Heath Spotted Orchid. Also dwarf shrubs like Cross-leaved Heath.

- Scrub species covering a maximum of 5-10% of the total area.

This is best achieved by:

- Light grazing in the period May-September with cattle (eg. Galloway, South Devon) and/or hardy ponies (eg. Dartmoor).

- Check the site regularly; a rough guideline is 1 cow or pony per hectare (2.5 acres) for 3 months, but stocking rates may need to vary according to site conditions; it may be necessary to move the stock off early in a dry year, or to stock later in a wet year (September-November) to achieve suitable habitat conditions.

- Occasional cutting or burning in late winter (January-early March) might be useful in areas of the site that are ignored by the livestock and if a litter layer has built up; avoid burning or cutting more than 1/3 of the site in any year.

Please avoid:

- Extensive poaching or over-grazing where the sward is grazed tightly; this leaves the habitat unsuitable for species that are dependent on the shelter provided by a tussocky sward.

- Under-grazing that leads to encroachment of coarse grasses; a dead litter layer will build up smothering the flowering plants and scrubby species will rapidly invade the site.

Because of natural variation in site conditions and grazing preferences of stock it might not be feasible to achieve ideal habitat conditions across the whole site all of the time. However, aim to maximise the amount of ideal habitat by adjusting stocking levels and the grazing period to the site conditions during that year. If necessary, encourage grazing of under-grazed areas by burning or cutting.



Marsh Fritillary caterpillar web on the host plant Devil's-bit Scabious.



Meadow Thistle in Rhôs pasture

FRITILLARIES AS INDICATORS OF A HEALTHY ENVIRONMENT

Butterflies are very sensitive and react rapidly to changes in their environment.

Healthy populations of specialist butterflies, like the Fritillaries on Dartmoor, are associated with the occurrence of other specialist species, areas of high biodiversity and habitat quality. Habitat management for the Fritillary butterflies therefore benefits a wide range of other species associated with Rhôs pastures and Bracken habitats, and thriving populations of the Fritillaries indicate a healthy natural environment.



RESTORATION OF SITES

Many sites where Fritillaries used to occur have declined due to lack of management.

Coarse grasses in Rhôs pastures and dense Bracken in Bracken habitats tend to dominate and out compete the host plants that are so important for the butterflies. Scrub encroachment, left to continue, will result in the loss of grassland to scrub and woodland.

If you are planning to restore management to a site, contact one of the organisations listed under further help and advice. In general, re-introduce grazing management gradually and when cutting or burning areas, avoid tackling more than 1/3 of the habitat in any one year. This is especially important if populations of important species like the Fritillaries are still present.



Green Hairstreak



SCRUB WORKS
Regular scrub management is often necessary in Fritillary habitats. However, scrub is important for many species, such as Green Hairstreak, Yellowhammer, Dormouse, Reed Bunting and other insects.

Scrub should therefore never be eradicated; levels of 5-10% across the site are desirable. When carrying out scrub control, avoid damage to the habitat by heavy machinery.

Always remove cut materials from the site, or burn cut materials in a few designated areas, preferably on galvanised iron sheets so that the nutrient-rich ash can be easily removed from the site. Treat stumps with an appropriate herbicide to prevent re-growth immediately after cutting.

FURTHER HELP AND ADVICE

For further information and advice, please contact Butterfly Conservation below.

Financial support may be available through Environmental Stewardship to enable sympathetic management of environmental features on your holding. This grant scheme is administered by Natural England.

Visit www.naturalengland.org.uk or contact your local office for more information.

Dartmoor National Park Authority also has management agreements on some Fritillary areas and can provide advice on management. **contact 01626 832093**



Butterfly Conservation

Fritillary Butterflies of Dartmoor



upper Emsworthy Mire
lower Pearl-bordered Fritillary

This leaflet has been part-funded by Natural England and has been produced as part of the Two Moors Threatened Butterfly Project funded by:

Butterfly Conservation, Dartmoor National Park Authority, Environment Agency, Exmoor National Park Authority, Natural England, Dartmoor Sustainable Development Fund, Exmoor Sustainable Development Fund, Esmée Fairbairn Foundation and the Exmoor Trust.



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A practical guide to
managing Bracken and
Rhôs pasture habitats
for Fritillaries on Dartmoor

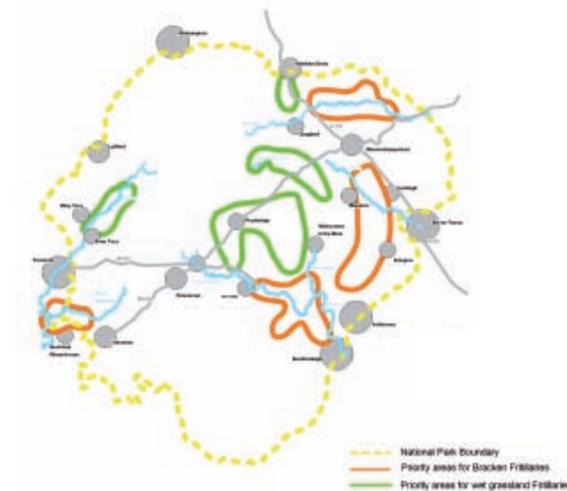
THE DARTMOOR LANDSCAPE

The beautiful Dartmoor landscape that we see today is the product of centuries of traditional land-use, creating a landscape rich in wildlife. The future of the characteristic Dartmoor wildlife is strongly linked to the continuation of traditional farming practices.

Recently, changes in the economics of agriculture have led to the cessation of management within land that is marginal to the farm business. It is exactly these areas like Bracken slopes and Rhôs pastures that are vital for the Fritillary butterflies of Dartmoor, as they have escaped previous major agricultural improvements.

Cessation of management quickly leads to these areas becoming unsuitable for the Fritillaries and many other species of animals and plants. As a result, many species are declining dramatically and urgent action is needed to save them.

PRIORITY AREAS FOR FRITILLARIES ON DARTMOOR



This leaflet describes the habitats in which these threatened butterfly species occur and explains how your land can be managed to safeguard these species.

There are five species of Fritillary butterfly for which Dartmoor is important and they can be found in two different types of habitat:

- Bracken stands containing abundant violets.
- Rhôs pastures (the local name for Purple Moor-grass and Rush pastures).

One of the most important areas of Bracken habitat for the Fritillaries is the Dart valley, where cattle and ponies graze extensive areas of acid grassland and Bracken in late winter and summer to benefit the High Brown, Pearl-bordered, Small Pearl-bordered and Dark Green Fritillary.

One of the typical Rhôs pasture areas where the Marsh Fritillary and the Small Pearl-bordered Fritillary are found is the sheltered, wet valley system in the enclosed farmland between King Tor and Easdon Tor, west of the village of North Bovey. Here, landowners are grazing their Rhôs pastures in summer with cattle and ponies to create ideal habitat conditions for these butterflies and other species such as Narrow-bordered Bee Hawk-moth, Snipe and Reed Bunting.



Bracken habitat at Aish Tor



Rhôs pasture habitat near Easdon Tor

HIGH BROWN FRITILLARY ● This butterfly is one of the most rapidly declining species in the UK and there is huge potential for conserving this species on Dartmoor.

The butterfly flies from mid June to August with eggs being laid singly on dead leaves or Bracken stems. The species over-winters as an egg, hatching in early spring. The caterpillar can be found basking on Bracken litter in the spring, but they are well camouflaged, resembling dead Bracken fronds. They pupate under dead Bracken or leaves.



DARK GREEN FRITILLARY ● Adults fly from June to August, and eggs are laid singly on dead plant material, or on violets. Eggs hatch in summer, but the caterpillar immediately hibernates. They begin feeding in spring on violets, and bask on the vegetation. They pupate in a tent of grass stems held loosely together with silk. This is one of the most common Fritillaries across Dartmoor and the one most likely to be encountered in Bracken habitats.

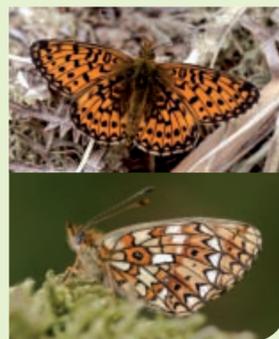


PEARL-BORDERED FRITILLARY ● This is the earliest Fritillary to be seen flying and can be found from April until the end of May, although occasionally second broods occur, with adults flying in August.

Eggs are laid singly on dead Bracken near violets. The caterpillars hibernate and re-emerge in spring, basking in the warmest and driest habitats, and feeding on the leaves and flowers of violets. Dartmoor is an important area for this butterfly and it is found more widely in Bracken habitats compared to the High Brown, but despite this, it is still suffering massive declines.



SMALL PEARL-BORDERED FRITILLARY ● This species flies in June and July, and can be found in both Bracken habitats and Rhôs pastures. Eggs are laid singly near violets on dead vegetation. The caterpillars feed until September, when they hibernate. These caterpillars do not bask in the spring, but spend their time hidden in the vegetation, only coming out to feed on violets. This species is declining nationally but still found widely on Dartmoor. In warm summers a second brood may occur in August.

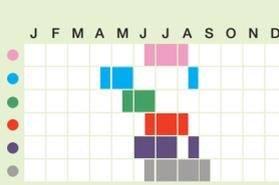


MARSH FRITILLARY ● The Marsh Fritillary flies from mid-May until the end of June. Eggs are laid in large batches on the host plant Devil's-bit Scabious.

The caterpillars spin a protective web over their host plant. The webs are conspicuous by the end of August, and the caterpillars can be found basking on the surface. The caterpillars hibernate and can be seen again in early spring, when they bask on dead leaf litter. This species is declining across Europe and Dartmoor is one of the few strongholds for the butterfly in Britain.

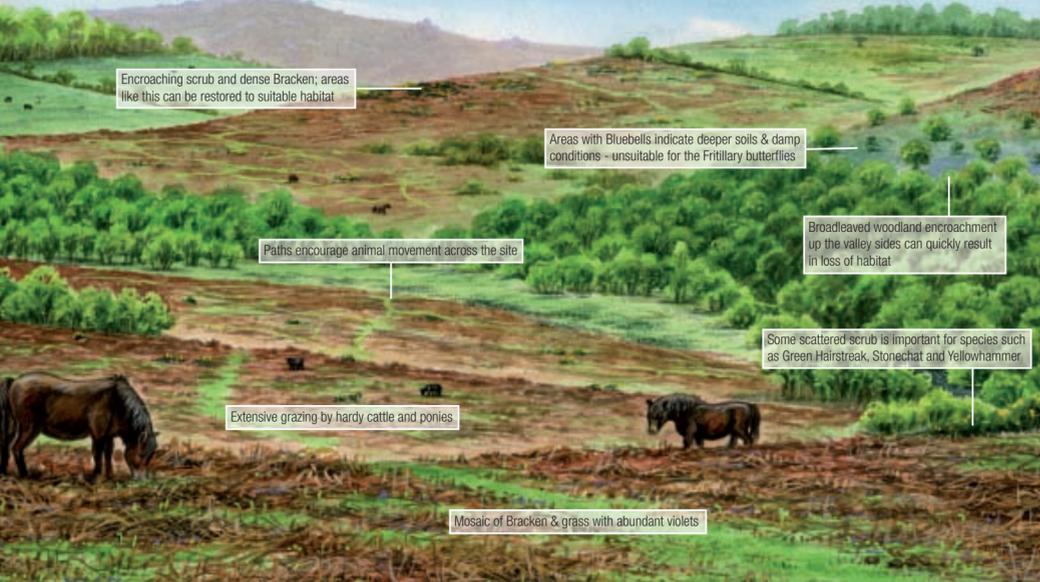


SILVER WASHED FRITILLARY ● The Silver-washed Fritillary also occurs on Dartmoor, but as it is predominantly a woodland species, it is beyond the scope of this leaflet.



FLIGHT PERIOD OF EACH SPECIES

BRACKEN HABITAT DARTMOOR IN SPRING



BRACKEN HABITATS

Bracken is very common on Dartmoor covering about 5000 hectares. Most of it is found in exposed areas that are unsuitable for Fritillary butterflies. However, sunny, sheltered slopes (below 300m) where there is a patchwork of grass, Bracken and scrub, on south-facing hillsides, often provide ideal conditions.

Here, the ground flora contains an abundance of violets, with a mixture of woodland plants such as Wood Sage, Bugle, and acid grassland plants such as Tormentil.

Bracken is very important for the Fritillaries; during the summer it acts like a woodland canopy, helping to suppress grass growth and favour violets. The dead Bracken litter and standing trash provides a warm microclimate for the caterpillars when they are feeding on their hostplant the violet in early spring. Bracken litter refers to the broken down fragments in contact with the soil surface. Standing trash refers to the dead, un-degraded remains of fronds and stalks still standing or lying on the ground.

Within Bracken habitats, each Fritillary species occupies a distinct patch that reflects the temperature requirements of the caterpillar.

The High Brown Fritillary uses the warmest areas of the site. It is usually restricted to south-facing slopes and requires the violets to grow through a thin layer of Bracken litter. Dartmoor is one of the few areas in the country where this species survives.

The Pearl-bordered Fritillary is usually restricted to sites with similar conditions, but can also be found in smaller, more fragmented sites and woodland fringes.

Two other Fritillary butterflies can be found in Bracken habitats; the Small Pearl-bordered Fritillary and the Dark Green Fritillary. Both species can breed in cooler vegetation and select violets growing in fairly tall, grassy vegetation with scattered Bracken. The Dark Green Fritillary is one of the most widespread Fritillaries and flies from mid-June to Mid-August. The Small Pearl-bordered Fritillary is also found in wet grassland habitat where it uses Marsh Violet as its host plant.

Many Fritillary colonies in Bracken habitat are under threat as a result of the decline or abandonment of grazing, unsympathetic Bracken control and occasionally over-grazing. Abandonment and under-grazing quickly leads to total domination by Bracken or scrub encroachment resulting in the loss of plant species on which Fritillaries and other insects depend.



Over-grazing can lead to an increase in grass cover, which is particularly detrimental to the High Brown and Pearl-bordered Fritillaries. Sympathetic management of Bracken, acid grassland and scrub mosaics will benefit a wide range of other species, including Whinchat and Lesser Butterfly Orchid.

IDEAL BRACKEN HABITAT IN SPRING



WHAT YOU CAN DO TO HELP To manage your Bracken habitat to benefit a wide range of species including the Fritillaries, aim for:

- A mosaic of Bracken interspersed with grassy patches and gaps in the canopy.
- Abundant violets growing through shallow Bracken litter and standing trash where there is little or no cover of grass.
- This is best achieved by:
 - Extensive grazing of these acidic grassland and Bracken habitats by hardy cattle and ponies. The trampling action of the animals through Bracken stands, in particular during winter and early spring (usually February to April), is most important to help break up the dense standing trash. This also creates a network of paths running through the Bracken, which provides germination sites for violets. Light pony or cattle grazing in summer helps to open up the Bracken canopy and maintain grazing for stock.
 - Cut scrub regularly where it is encroaching, but never eradicate it completely from the site.
- Small amounts of mineral supplements & hay can be used to encourage stock to move through areas of dense Bracken, in particular in late winter, but please rotate feed areas to avoid poaching and move mineral licks regularly. Paths (approx tractor width) can also be cut through dense Bracken to encourage livestock movements.
- If Bracken becomes too dense and is out-competing other species, it can be controlled by cutting or bruising (only patches or strips) during the summer. Where cutting or bruising is not safe or appropriate, spraying can be an option. However, the impact should be carefully assessed before works should commence. When managing Bracken, avoid treating more than 1/5th of the site in any year.
- Areas with a thick Bracken litter layer with sparse or no violets can also be burnt or cut in late winter. However, burning stimulates Bracken growth, so always follow up with further Bracken management, and/or appropriate grazing levels to produce the right conditions.



High Brown Fritillary caterpillar in May with characteristic feeding damage showing on the violet leaf.

Please avoid:

- Excessive poaching of the habitat as this often leads to grassy swards unsuitable for the Fritillaries.

Because of natural variation in site conditions and grazing preferences of stock, it might not be feasible to achieve ideal habitat conditions across the whole site all of the time. However, aim to maximise the amount of ideal habitat by adjusting stocking levels if necessary, managing dense Bracken stands and by implementing measures to encourage livestock to move throughout the site.