




Managing for bespoke species/assemblages within Countryside Stewardship – guidance template

Species/assemblage name	Conservation status
<p>Pearl-bordered Fritillary (<i>Boloria euphrosyne</i>)</p>	<p>Section 41</p>
	
<p>Image Steve Wheatley, Butterfly Conservation</p>	<p>Cleared coppice (Image Caroline Bulman, Butterfly Conservation)</p>
	
	<p>Bracken grassland (Image Caroline Bulman, Butterfly Conservation)</p>

Introduction

Significant declines due to habitat loss and fragmentation, scrub encroachment, the reduction in winter grazing on grassland/bracken mosaic and decline in woodland management.

Pearl-bordered Fritillary is one of our most threatened species in the UK, having suffered a 61% loss in distribution and 66% decline in abundance between the 1970s and 2004. These losses have continued, with the most recent analysis showing a distribution loss of 43% and a 42% decline in abundance between the 1995–1999 and 2005–2009 recording periods. A third of English colonies became extinct between 1997 and 2004, leaving an estimated 170 populations with Dartmoor, Wyre Forest and Morecambe Bay Limestones being the main strongholds.

The butterfly uses three main habitats in Britain: woodland clearings in recently coppiced or clear-felled woodland; grassland with a mosaic of dense bracken; and light scrub or open deciduous wood-pasture in Scotland. In all these habitats the most widely used host plant, Common Dog-violet *Viola riviniana*, needs to be growing within a mosaic of dry, dead leaf litter or Bracken *Pteridium aquilinum* with short, sparse vegetation. This fritillary hibernates in the larval stage amongst dead leaves or Bracken and the larvae emerge in early spring, spending much of their time basking on dead leaf litter with short bouts of feeding. The availability of suitable basking sites is critical for successful development as these warm, dry areas allow the larvae to develop rapidly in cool spring weather. With lack of management the habitat becomes shaded and overgrown, violet abundance decreases and the temperature at ground-level for basking is reduced.

Why a bespoke species/assemblage?

The Pearl-bordered Fritillary requires tailored management for each habitat type that it occurs in to create sunny and sheltered conditions with abundant foodplants. Techniques such as coppicing, scrub control, burning, bracken control and creation of ground disturbance should be used. These methods are not characteristic of routine management based on the 'mosaic' approach.

When and where to apply this guidance

At all sites where the species is present, on historical sites where restoration is undertaken to encourage recolonization or potential new sites.

Developing a Countryside Stewardship agreement

Relevant CS options

GS6	Management of species rich grassland
GS7	Restoration towards species rich grassland
GS13	Management of grassland for target features
WD7	Management of successional areas and scrub
WD8	Creation of successional areas of scrub
SP6	Cattle grazing supplement
SP8	Native Breeds at Risk supplement
SB4	Chemical bracken control
SB5	Mechanical bracken control

Prescription guidance for GS6/GS7

P42 - [Control/Manage] [scrub/ SPECIES] [in XXXX] [by method] so that [by year [NUMBER]] cover [of the [LOCATION] is no more than [NUMBER] %]. [Remove all cut material.]

P455 - Manage [one fifth of the area per year of dense Bracken stands / deep Bracken litter layers] rotationally in years [1 to X] [by cutting / bruising / spraying. Do not clear fell except as a restoration tool where the butterfly is not present]. Cut bracken by hand on [XXXX] historic and archaeological features.

P464 - Maintain the extent of [<15cm deep bracken litter over at least 40% of the area] of interest within the [grassland/bracken mosaic] as identified [XXXX].

P470 - [By year X], [at least 2 moderate/high value indicator species bugle, daisy, ragged robin, for Priority habitat feature XXXX must be frequent/in flower during May and June and 2 high value indicator species XXXX for Priority habitat feature XXXX occasional (as defined in XXXX (currently the FEP Handbook)]. [By year X], cover of [species XXXX must be less than 10% / between 50% and 90%/frequent].

P667 - [From [establishment] onwards], manage by [grazing lightly with cattle/hardy ponies in particular early spring and summer, at least 6 weeks grazing between May and September] [to maintain a bracken and grass mosaic] [so that there is a medium height sward with abundant violets with some bare patches from light cattle poaching. Some late winter/early spring cattle grazing is needed to break up the bracken litter].

P706 - Keep a monthly record of stock numbers grazing on [Parcel(s) XXXX]. Make the record available on request.

IoS for GS6/GS7

[By year XX/ in all years], cover of wildflowers in the sward (excluding undesirable species but including rushes and sedges), should be between [20% and 40%]. At least [40%] of wild flowers should be flowering during [May-July].

[in all years] [Pearl-bordered Fritillary] [should be present and maintained except on sites where recolonization is being encouraged where the breeding habitat should be maintained] on the site

[By year X/ in all years], species [Common Dog-violet *Viola riviniana*, Heath-dog Violet *V. canina* and in the north Marsh Violet *V. Palustris* and Hairy Violet *V. hirta* should be at least occasional/ (locally) frequent], and flowering during [May to July]

[By year 1, year 5 for restoration sites], cover of [species bracken litter <15cm high should be between 40% and 60%]

Prescription guidance for GS13

Where bracken occurs on non priority habitats

P42 - [Control/Manage] [scrub/ SPECIES] [in XXXX] [by method] so that [by year

[NUMBER]] cover [of the [LOCATION] is no more than [NUMBER]%. [Remove all cut material.]

P138 - Retain the full extent of well-established scrub [where cover is below 5%]. [Where the cover is 5% or greater, maintain scrub over at least 5% and a maximum of 10% of the parcel area.] It must be retained as discrete small patches, lines and occasional individual bushes scattered across the site. [Do not cut more than half of the scrub in any one year except on historic and archaeological features.]

P455 - Manage [one fifth of the area per year of dense Bracken stands / deep Bracken litter layers] rotationally in years [1 to X] [by cutting / bruising / spraying. Do not clear fell except as a restoration tool where the butterfly is not present]. Cut bracken by hand on [XXXX] historic and archaeological features.

P470 - [By year X], [at least 2 moderate/high value indicator species XXXX for Priority habitat feature XXXX must be frequent/in flower during May and June and 2 high value indicator species XXXX for Priority habitat feature XXXX occasional (as defined in XXXX (currently the FEP Handbook)]. [By year X], cover of [species XXXX must be less than 10% / between 50% and 90%/frequent].

P520 - Do not supplementary feed [except:

- o [for the provision of mineral blocks (non-energy based)]
- o [scattering of hay/haylage on areas XXXX identified in XXXX]
- o [concentrates/XXXX on areas XXXX identified in XXXX]].

P667 - [From [year NUMBER /establishment] onwards], manage by [cattle and/or hardy pony grazing in the late winter/early spring and summer] [to maintain up to 15cm deep bracken litter layer over 40% of the area] [so that the bracken grass mosaic is maintained with plenty of edge habitat and livestock paths in the summer].

IoS for GS13

See GS6/GS7

Prescription guidance for SP6/SP8

Extensive grazing by cattle and ponies is ideal. 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 creates a network of paths running through the Bracken, which provides germination sites for violets and opens up the Bracken canopy to allow sunlight in. Some sites may be maintained in suitable condition by sheep grazing, though these animals are not as effective at trampling Bracken and maintaining good densities of violets. Grazing by sheep between April and June should only be light and extensive as these animals can remove nectar sources used by the related Pearl-bordered Fritillary.

Prescription guidance for WD7/WD8

P30 - Do not plough, cultivate or re-seed. – *Both Tiers*

P42 - [Control/Manage] [scrub/ SPECIES] [in XXXX] [by method] so that [by year [NUMBER]] cover [of the [LOCATION]] is no more than [NUMBER]%. [Remove all cut material.] - *Higher Tier*

P455 - Manage [dense Bracken stands / deep Bracken litter layers] rotationally in years [1 to X] [by cutting / bruising / spraying /]. Cut bracken by hand on [XXXX] historic and archaeological features. – *Higher Tier*P578

P579 - Graze in years [5 to 10] to maintain areas of [closely grazed turf interspersed with taller tussocks over 50% of the area]. – *Higher Tier*

IoS for WD7/WD8

[By year X] shallow (<15cm deep) bracken litter extends over at least [10%] of the total area.

[By year X] Violets growing in areas of shallow (<15cm deep) bracken litter are [at least occasional] during [late winter/ early spring].

[In each year] fresh gaps/ pathways through bracken stands (that result in the exposure of bracken litter to direct sunlight) are at least [occasional] in June and July.

[By year 2] one or more of species [bugle, daisy, XXXX] are in flower during May and June, and at least [occasional] across the target area.

[By year XX], the following desirable species [plant or animal] are [present / frequent / at least occasional.]

[By year XX], the area of bare ground is between [5% and 10%].

[By year 2], the following undesirable species [ragwort / creeping thistle / XXXX] are no more than occasional.

Prescription guidance for WD2

A woodland management plan (PA3) would be required for the site following the ideal management described below: Aim to produce a succession of flower-rich, sunny clearings where adults can feed and larvae can bask in sparse, dry vegetation with abundant brown leaf litter.

Clearings are best produced by coppicing or group felling of high forest, but continuity of management is essential and clearings should be connected by broad sunny rides. (Note that many clearings are unsuitable; e.g. those on damp ground, or with a ground flora dominated by plants such as Dog's Mercury, Bluebell and vigorous grasses). Ideally, coppice adjacent woodland plots of 0.5-2ha in succession and encourage standard trees (especially oaks) at less than 20% canopy cover. In high forest, suitable conditions can be provided a regular sequence of felling and replanting with deciduous trees. Retain potential breeding areas amongst Bracken or areas with abundant leaf litter during the spring provided by oaks or bramble. Boundary banks and ditch edges are especially favoured and should be maintained as sheltered unshaded habitat. Deer control may be needed on sites with high levels of browsing. An alternative is to fence the coppice coupes, though this is expensive and may lead to rapid regrowth that shades the habitat too rapidly.

IoS: A network of rides and open ground should cover between 10-30% of the area.

SB4/SB5 can be used for bracken control

Monitoring:

Timed count/transect

Further information

The Pearl-bordered Fritillary occurs in woodland clearings or on rough hillsides with scrub or bracken. It flies from April until June, and occasionally has a small second brood in south-west England. The butterfly was once very widespread but has declined rapidly in recent decades, and is now highly threatened in England.

Two main habitats are used in England: 1) woodland clearings, usually in recently coppiced or clear-felled woodland; 2) well-drained habitats with mosaics of grass, dense bracken, and light scrub. In all habitats it requires abundant foodplants growing in short, sparse vegetation, where there is abundant dead leaf litter.

The most widely used foodplant is Common Dog-violet (*Viola riviniana*) although it can use other violets such as Heath Dog-violet (*V. canina*) and in the north, Marsh Violet (*V. palustris*). The eggs are laid singly, usually on dead bracken or leaf litter near to violets, though a few are laid on the foodplant itself. The larvae develop until the early fourth instar when they hibernate amongst dead leaves or bracken. They emerge in early spring when they spend much of their time basking on dead litter, interspersed with short bouts of feeding. The selection of warm, dry habitats and the basking behaviour of larvae enable them to develop rapidly even in cool spring weather. The larger larvae can move tens of metres in search of suitable basking sites and foodplants. They pupate in the leaf litter and emerge after a few weeks.

The Pearl-bordered Fritillary usually forms discrete colonies around suitable breeding areas, often comprising many hundreds of adults. Mark-recapture studies show that adults move freely within their colonies regularly covering 100 m or more. A significant proportion also disperses and can move at least 4.5 km between adjacent colonies. Nearby colonies are thus linked and the butterfly almost certainly forms metapopulations covering networks of discrete breeding areas.

Grass/Bracken/scrub habitats

Aim to maintain a mosaic of Bracken and sparse grassland vegetation with abundant violets growing among dead leaf litter.

Grazing

Grazing by large herbivores, especially cattle and/or ponies, is probably essential in order to break up the Bracken litter and encourage a mosaic of litter and abundant violets. Grazing during winter and early spring may be especially important to trample the litter though grazing at any time of year can help break up Bracken stands. Some sites may be maintained in suitable condition by sheep grazing, though these animals are not as effective at trampling litter and maintaining good violet densities. Grazing by sheep between April and June should only be light as these animals can remove nectar sources.

Burning

The role of burning is poorly understood, though occasional burning may be helpful to reduce Bracken litter and scrub, and encourage good violet density. Only burn on sites where there is a history of burning and burn in patches comprising less than one-fifth of the breeding habitat per year.

Cutting and bruising

Periodic cutting of Bracken may improve breeding conditions on ungrazed or lightly grazed sites, though the effects are complex and poorly understood. Cutting should not be seen as a replacement for grazing, which appears to be the best way to maintain good breeding

habitat.

Areas of dense Bracken may be improved by cutting patches (0.5-1ha) during June and July on a 5-10 year rotation, combined with cutting of paths if stock have not made enough.

Alternatively, periodic cutting (preferably with a swipe rather than flail) or raking and disturbance of Bracken litter during autumn and winter may help maintain high violet densities. Special Bracken-bruising machines have been developed and these may reduce Bracken densities more rapidly than cutting. Bruising should take place during June when the Bracken is just unfurling, with follow-ups in July and August for maximum control. This technique is best used in patches or strips of bruised Bracken to vary the structure across a site.

Widespread Bracken control or eradication is very damaging to breeding habitat as it severely reduces Bracken density and leads to grassy sward unsuitable for breeding. However, some control and the clearing of patches or strips may help improve conditions where Bracken has become too dense. Occasional grassy patches amongst dense stands provides some keep for livestock and encourages traffic of grazing animals through denser areas.

Scrub edges

Suitable breeding conditions may also be provided around the edges of scrub patches, notably gorse. Such habitats are enhanced by cutting (or burning) the scrub on a rotation of 5-10 years, which should maintain abundant violets growing in short, sparse vegetation.

Woodland

Aim to produce a succession of flower-rich, sunny clearings where adults can feed and larvae can bask in sparse, dry vegetation with abundant brown leaf litter.

Priority species factsheet

http://butterfly-conservation.org/files/marsh_fritillary-psf.pdf

Authorship/version control

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