



Species Action Plan: Marsh Fritillary

Introduction

Scope

This species action plan is for the Marsh Fritillary (*Euphydryas aurinia*). However, many actions aimed at conserving this species will be directed towards the habitats upon which they rely and reference should be made to the relevant Habitat Action Plans listed in the related plans and policies and further information section, below.

Vision Statement

To maintain and enhance the number and distribution of Marsh Fritillaries in Pembrokeshire and to increase the resilience of populations to environmental change.

Description of Species

The Marsh Fritillary is a medium-sized and weakly flying butterfly that is marked with yellowish patches on a reddish-orange background. Adults are on the wing from early-mid May until late June. The larvae live communally in a silk web on their food plant, devil's-bit scabious (*Succisa pratensis*) and these can be readily identified during late summer. The larvae overwinter low down in the vegetation to avoid frost and emerge the following spring.

The Marsh Fritillary is described as living in metapopulations - a group of local colonies connected by occasional dispersal, in which there are local extinctions and colonisations. Each group is separated by at least 0.5km of unsuitable habitat, which probably restricts the free exchange of individuals. It is believed that at least 40 hectares of suitable habitat are required to maintain a metapopulation.

The species occupies two distinct habitat types: dry calcareous grasslands in central southern Britain, and damp neutral/acidic grasslands throughout most of its range where the larval host plant is present. Wet grassland supporting Marsh Fritillary populations, should ideally receive adequate grazing to maintain a sward with a vegetation structure that is variable – a mosaic of grazed sward height ranging between 5cm-25cm with occasional tussocks exceeding 25cm to provide warm micro-climates to aid larval development.

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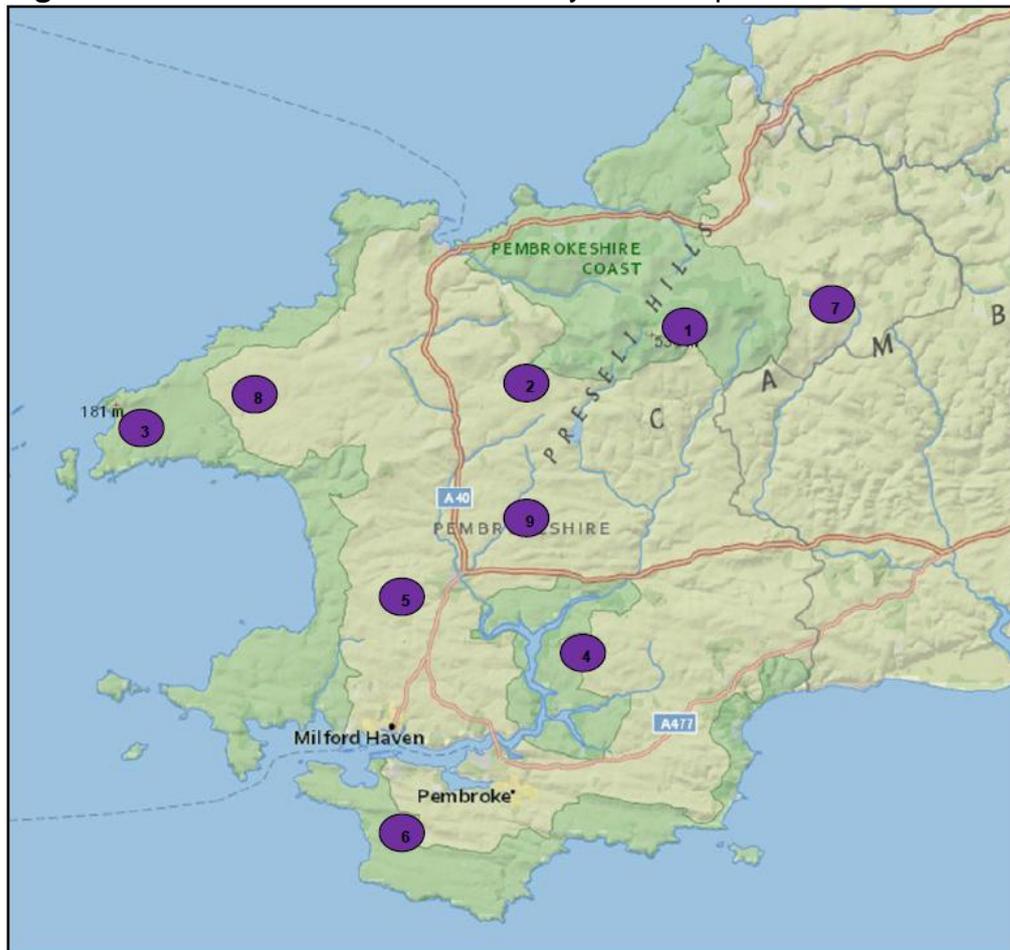
Sheep grazing is unsuitable, as sheep preferentially graze the larval food plant and produce a homogenous sward.

Distribution in Pembrokeshire

The Marsh Fritillary butterfly occurs in nine meta-populations in Pembrokeshire as indicated in Figure 1. These are:

1. Mynachlog-ddu
2. Ambleston –Puncheston
3. St. David's
4. Yerboston Moors
5. Keeston-Tiers Cross
6. Castlemartin
7. Isolated Populations in North East Pembrokeshire
8. Isolated Populations in North West Pembrokeshire
9. Isolated Populations in Mid Pembrokeshire.

Figure 1. Pembrokeshire Marsh Fritillary Meta-Populations



Population size

The numbers of individuals in a population fluctuates annually on a cyclical basis in response to climate, predation and parasitism. Data from Rhos Llawr Cwrt National Nature Reserve in Ceredigion indicates that the cycle may be at least 10 years between maxima/minima and therefore data collected from Pembrokeshire sites over a shorter period must be set in this context.

In order to establish the status of the Marsh Fritillary in Pembrokeshire a greater number of sites require monitoring each year. To achieve this, in 2013 Natural Resources Wales (NRW), Butterfly Conservation Wales (BCW) and local recorders developed the Pembrokeshire Marsh Fritillary Recording and Monitoring Strategy to help establish standardised, repeatable annual monitoring on at least one site in each of the current Pembrokeshire meta-populations. This monitoring has not yet yielded enough data to allow the population size to be assessed. However, the available evidence provided by recent surveys does seem to indicate that the Marsh Fritillary is at serious risk of extinction at four out of nine meta-populations. It seems likely therefore that the population size in Pembrokeshire has declined.

Trends

The Marsh Fritillary has suffered a significant decline in its range across Europe. The UK is now a European stronghold of the species. In the UK, it appears to have been lost from many of its former sites over the last thirty years and populations are now largely confined to the south and south west of England, the west of Scotland and Wales.

In Wales, the major losses have particularly occurred in the east and northwest although substantial losses are also occurring in the Welsh strongholds of the south and southwest. Approximately 160 colonies are still extant of which about 50% are under threat as a result of habitat loss, inappropriate management or agricultural neglect. Many of the remaining populations are still on unprotected sites and many are vulnerable due to their small size. Five of the twenty key areas included in the Butterfly Conservation Species Action Plan for this species are in Wales.

Between 1982 and 1985, national data indicates that populations appeared to experience a significant expansion with increased movement of butterflies between meta-population sites. The butterfly is possibly more sedentary in lean years, contracting to core sites during sequences of poor seasons.

The Pembrokeshire Marsh Fritillary Recording and Monitoring Strategy is ongoing, but the monitoring has not yet yielded enough data to allow local population trends to be fully assessed.

The available evidence provided by recent surveys does seem to indicate that the species is thriving in the Castlemartin, Ambleston/Puncheston and Mynachlogddu meta-populations. The Yerboston Moors and North East

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Pembrokeshire meta-populations appear to be at a low ebb but limited numbers are regularly seen. Elsewhere, the St. David's, Keeston/Tiers Cross, isolated populations in North West Pembrokeshire and isolated populations in Mid Pembrokeshire appear to be at serious risk of extinction. Furthermore, many of the outlying populations do not appear to be part of viable, sustainable meta-populations. None of these populations have sufficient connectivity to ensure continuous exchange of individuals between sites within each population. It seems likely therefore that the population trend in Pembrokeshire is declining.

Conservation status

European: The Marsh Fritillary is protected under the Bern Convention and is listed on Annex II of the EC Habitat and Species Directive 1992.

UK: The Marsh Fritillary is protected under Schedule 5 of the Wildlife and Countryside Act, 1981. It is a UK Biodiversity Action Plan species and a named feature of the Gweunydd Blaencleddau Special Area of Conservation (SAC), the Preseli SAC and the Yerbeston Tops SAC.

Threats

A. **Loss and fragmentation of habitat:** Fragmentation due to loss or reduction in quality of habitat leads to the isolation of small populations. The most serious threat to the Marsh Fritillary in Pembrokeshire is under-grazing and encroachment of scrub or purple moor grass leading to a reduction in the quality and extent of suitable habitat. Occasionally, over-grazing or a long-term absence of grazing management has affected Pembrokeshire sites - particularly on the commons. The optimal grazing stocking rate for high quality sites is 0.1-0.4 livestock units/ha/yr¹, although rates may need to be increased initially during restoration management. This needs to be considered on a site by site basis, which is not always possible under terms of agri-environment schemes. All sites within these meta-populations could probably support larger areas of "suitable" and "good condition" habitat if they were better managed. Most sites would benefit from more appropriate grazing regimes, although burning and cutting may be required, particularly during restoration. Improvements to management could possibly reverse the fortunes of the declining meta-populations in the County. Other secondary threats are drainage and changes in land use (such as afforestation).

Most colonies occupy very small patches of habitat, typically less than 2ha and only 15% of occupied patches are greater than 10ha. Meta-populations require a network of habitat patches, in suitable condition, to allow local colonisation to occur. Work on other fritillaries has shown that up to 60% of the necessary habitat is unoccupied at any point in time but it is still needed for the meta-population to survive. The dispersal powers of

¹ Livestock units are used to define the grazing pressure applied by different types of stock. It is based upon feed requirements and does not take account of differences in grazing efficiency or tendency to trample/poach the ground between stock types. It is necessary, therefore to stipulate both the grazing pressure and the stock type for conservation management.

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this butterfly vary within the natural cycle of the meta-population and with climatic factors. However, the presence of unsuitable habitat such as dense woodland or arable farmland as well as up to 1 km of open but unoccupied semi-natural grassland will restrict dispersal. Fragmentation of habitat combined with annual fluctuations in the population, typical of this species, increases the threat of localised extinction. Large areas of land need to be maintained with networks of potentially suitable, but unoccupied habitat between.

- B. **Parasitism:** A major cause of larval mortality and fluctuations in population size from year to year is the parasitic wasp *Cotesia* (= *Apanteles*) *bignellii*. Each generation of butterfly larvae can form the host for up to three generations of wasps. First instar butterfly larvae are injected with wasp eggs during July, forming grubs that feed on the larvae, killing them in August when they form their own cocoons. Adult wasps emerge in time to infect larvae that are preparing their hibernation webs, within which the *Cotesia* grub overwinters. Host larvae are killed in spring of the following year and adult wasps emerge soon after to lay a third generation of eggs which develop in the marsh fritillary larvae as they enter their final instar. In some years, parasitic wasps can kill 75% of the larval population.
- C. **Climate change:** Long term changes in climate may induce changes in species composition and ecology. The extent to which changes may occur, and their significance is not known, and long-term monitoring will be required. Short term weather change, such as a succession of wet or cool summers, may reduce the potential for dispersal and affect breeding success. Spring weather also has an effect on the rates of parasitism.

Where populations are small, extinction is more likely if other habitat factors are sub-optimal.

Related Plans and Policies and Further Information

Other plans / policies directly affecting the management of this species in Pembrokeshire are:

- Preseli SAC Management Plan:
<https://naturalresources.wales/media/673203/Preseli%20SAC%20management%20plan.pdf>
- Gweunydd Bleanclleddau SAC Management Plan:
<https://naturalresources.wales/media/672462/Gweunydd%20Blaenclleddau%20Mplan%20English.pdf>
- Yerboston Tops SAC Management Plan:
<https://naturalresources.wales/media/674433/yerboston-moors-tops-sac-plan-english.pdf>
- Grassland Habitat Action Plan. Email:
biodiversity@pembrokeshire.gov.uk for a copy.

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- Lowland Farmland Habitat Action Plan. Email: biodiversity@pembrokeshire.gov.uk for a copy.
- Butterfly Conservation Marsh Fritillary Factsheet. Available here: <http://butterfly-conservation.org/files/habitat-marsh-fritillary.pdf>

Current Action and Future Recommendations

Monitoring and survey: Under the Pembrokeshire Marsh Fritillary Recording and Monitoring Strategy, NRW and volunteers undertake standardised annual Marsh Fritillary web monitoring of two meta-populations - the Mynachlogddu meta-population (on Gweunydd Blaencleddau SAC) and the Castlemartin meta-population (on the Limestone Coast of South West Wales SAC). NRW, BCW and volunteers will monitor the Yerboston meta-population (on Yerboston Tops SAC and some of the Yerboston SSSIs). BCW and volunteers will undertake monitoring of the meta-population on Ambleston and Puncheston commons. Pembrokeshire Coastal National Park Authority (PCNPA) will monitor the isolated populations in North East Pembrokeshire on all of their management agreement areas (Fynnon Samson, Penrallt-ddu and Rhosfarchned Fawr).

Land management: Many of the sites where Marsh Fritillaries either occur or have occurred in the past are commons where management has been neglected. Some (but not all) of these sites were included in the Heritage Lottery Fund Heathland Partnership project. Reintroduction of a suitable grazing regime to restore habitat for Marsh Fritillaries (particularly on sites within the vicinity of a meta-population) was a priority. This has not been successfully achieved to date. Management must now focus on maintaining and expanding appropriate grazing regimes to all Marsh Fritillary sites. Some key sites are managed under management agreements with NRW and PCNPA. Dowrog Common and many of the St. David's sites are managed sympathetically by the Wildlife Trust of South and West Wales (WTWW) and the National Trust. Despite this, under grazing and scrub encroachment remains the most urgent and serious threat to the Marsh Fritillary in Pembrokeshire. On most sites grazing levels therefore need to be increased. On sites that have been abandoned, appropriate grazing regimes need to be re-established. Some mowing, scrub clearance and burning may be required in order to prepare these sites for grazing.

Advice/liaison: Advice and liaison between landowners, conservation partners and other organisations to further the understanding of habitat requirements is essential. All landowners involved with the Pembrokeshire Marsh Fritillary Recording Group have been advised.

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Plan Aims

No	Aim	Deadline	Comments
MF01	Maintain range and/or population of Marsh Fritillary in Pembrokeshire (there should be at least 50% of known sites annually supporting larval webs and these should include the sites in the Mynachlogddu and Yerboston areas).	Ongoing: review 2022	
MF02	Expand range and/or population of Marsh Fritillary in Pembrokeshire to achieve a viable, resilient suite of meta-populations.	Ongoing: review 2022	
MF03	Monitor populations and habitat condition at known sites to inform management for Marsh Fritillary in Pembrokeshire.	Ongoing: review 2022	

Action

Code	Action	Report By	Lead Role	Progress / Additional Information
MF01.01	Promote systems and support for farming that enables maintenance of suitable habitat. Include habitat requirements of Marsh Fritillary in prescriptions for agri-environment schemes in wet grassland where habitat appears suitable.	Next review: January 2022	NRW	
MF01.02	Encourage/reinstate appropriate grazing management on sites currently supporting	Next review:	NRW/PCNPA/WTSWW/NT	

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	populations and on former sites through practical advice and management agreements.	January 2022		
MF02.01	Identify potential habitat in close vicinity of each meta-population. Encourage appropriate management through practical advice and management agreements.	Next review: January 2022	NRW/PCNPA/WTSWW	
MF03.01	Maintain annual surveillance of known and former Marsh Fritillary sites where management is restored. Monitor habitat condition.	Next review: January 2022	NRW/BCW/PCNPA	
MF01.03	Review this plan by January 2022.	January 2022	PBP	