

ENVIRONMENTAL FARMING SCHEME: SPECIES-SPECIFIC ADVICE

Managing Habitats for Marsh Fritillary



Marsh Fritillary adult, caterpillars and habitat

The Environmental Farming Scheme (EFS) is the new agri-environment Scheme for Northern Ireland funded under the Rural Development Programme 2014-2020. EFS supports farmers and land managers to carry out environmentally beneficial farming practices over and above mandatory requirements. One of the key aims of the Scheme is to restore, preserve and enhance biodiversity.

This species-specific advice has been written for EFS Planners and agreement holders. It provides background information on the Marsh Fritillary, along with advice on important landscape features and management best practice for this species, within the range of EFS Habitat Options.

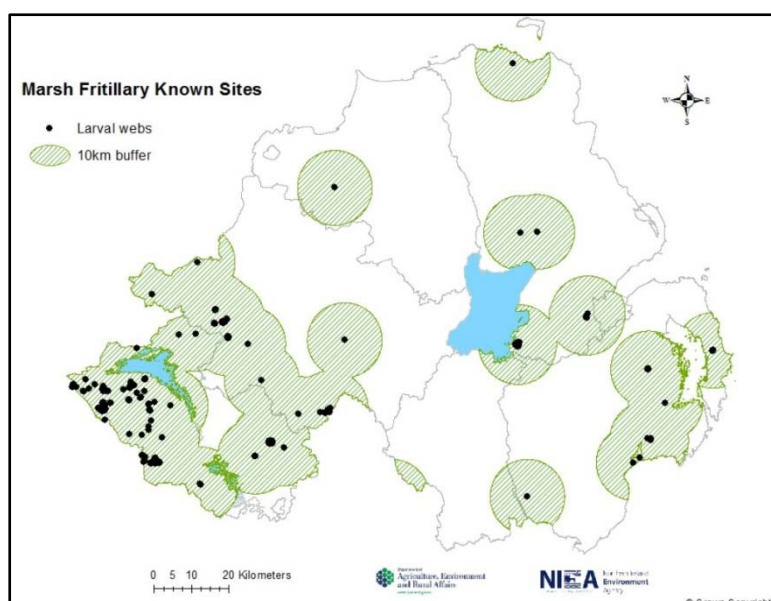
Habitats Options which may apply to Marsh Fritillary are; purple moor-grass rush pasture, calcareous grassland, cut-over bog, lowland meadow, fens, upland heathland, lowland heathland and coastal sand dunes.

The Marsh Fritillary is a threatened species of butterfly in need of urgent conservation action. Once widespread throughout Europe, this species has dramatically declined in recent years and is now only found across a fraction of its former range.

Although some parts of the island of Ireland continue to support strong populations of the Marsh Fritillary, there has been a severe decline here too. In Northern Ireland there are two distinct landscapes in which the Marsh Fritillary is now found.

In **Antrim, Armagh, Down** and **Londonderry** the Marsh Fritillary persists on small, isolated sites of suitable habitat within a wider landscape of improved agricultural land.

In **Fermanagh** and **Tyrone** the extent of unimproved land is much greater, forming an extensive landscape which supports much larger and more sustainable populations of the species.



Marsh Fritillary 'Known Sites' within 10 km buffers.

Sources: CEDaR, NIEA, NPWS, LPS and OSNI.

The adjacent map shows the 'Known Sites' for Marsh Fritillary, set at the centre of 10 km buffer zones.

'Known Sites' are specifically related to where the caterpillars of the Marsh Fritillary have been found. The data excludes adult butterfly records, records pre-1999 and any records with less than a six figure grid reference.

A 10 km buffer has been drawn around these locations because it is predicted that Marsh Fritillary can re-colonise suitable habitat from a distance of 3 to 10 km.

The long-term survival of the Marsh Fritillary is dependent on suitable management of its habitat.

The caterpillars of the butterfly feed only on the leaves of one plant, Devil's-bit Scabious or 'Blue Button' (*Succisa pratensis*). Like the Marsh Fritillary, Devil's-bit Scabious was once a widespread, common species but has disappeared from some areas of the countryside due to agricultural intensification. Devil's-bit Scabious grows in several habitats and is associated with various types of species-rich grasslands, sand dunes, cut-over bogs and the edges of fens. In areas where the Marsh Fritillary is still found, it can exist on any of these habitats as long as there is abundant Devil's-bit Scabious, managed by extensive grazing, ideally by cattle.



© Peter Eeles



© NIEA

Marsh Fritillary caterpillars feeding on Devil's-bit Scabious *Devil's-bit Scabious in flower*

Evidence shows that the Marsh Fritillary requires large areas of suitably managed, well connected habitat in order to maintain a sustainable population¹. This is because of the large fluctuations in numbers that occur from year to year due to weather, parasitism and food source availability. The species cannot survive long-term if the only habitats available are on small sites that are isolated from each other. Work is currently being carried out across the UK and the Republic of Ireland to identify, restore and connect suitable habitat.

Management should be carried out for the underlying priority habitat.

An EFS Remedial Management Option for each habitat type has been developed which includes grazing levels and grazing times, along with restrictions and advice on other aspects of management.

More information is available on the DAERA EFS website.

www.daera-ni.gov.uk/publications/environmental-farming-scheme-higher-options

As part of the EFS (H) habitat Remedial Management Options, there may be additional capital management items or activities which may improve or retain the condition of the habitat.

Additional capital items which may be relevant include primary and follow-up rush control, stock-proof fencing and scrub control. A full list of additional EFS capital items (Non-Productive Investments – NPIs) and their EFS Information Sheets can be downloaded from the DAERA website.

www.daera-ni.gov.uk/publications/environmental-farming-scheme-higher-non-productive-investments-npis

In known Marsh Fritillary sites or in Devil's-bit Scabious habitat within the 10 km buffer of known sites these management needs should be considered.

¹ Bulman, Caroline R.; Wilson, Robert J.; Holt, Alison R.; Galvez Bravo, Lucia; Early, Regan I.; Warren, Martin S.; Thomas, Chris D. **Minimum viable metapopulation size, extinction debt, and the conservation of a declining species.** Ecological Applications, Vol. 17, No. 5, 07.2007, p. 1460-1473.

Marsh Fritillary Management Needs

1. Abundance of Devil's-bit Scabious

Areas of locally frequent Devil's-bit Scabious are vital as this is the only food plant for the Marsh Fritillary caterpillar.

- Devils-bit Scabious is a slow-growing perennial. It has the following characteristics;
 - The flowers are round in shape, purple-blue in colour and arranged singly as the end of stems that grow up to a metre tall.



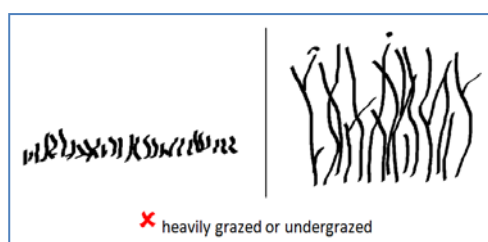
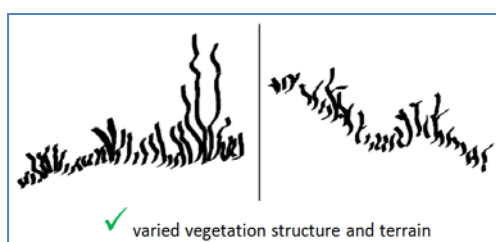
Images showing the Devil's-bit Scabious plant, flower, leaf rosette and distinctive vein patterns on underside of the leaf.

- The leaves form a cluster at the base of the plant and vary from oval to lance-like in shape.
- Each leaf has a single, strong, heavy, vein down the centre, combined with distinctive patterning of smaller veins on the underside.
- “Good condition” Marsh Fritillary habitat should have three or more Devil's-bit Scabious plants per square metre, across more than one fifth or twenty percent of the habitat.
- To maintain and increase the cover of the plant it is important to let it flower and set seed annually. The plant can be very sensitive to grazing levels and management (e.g. rush cutting) during the flowering season. At this time (mid-August to mid-October) stocking levels should be reduced, especially if the site is grazed by sheep as they selectively feed on the plant, including the flowers.
- If required, rush cutting should be carried out prior to March or delayed until after the Devil's-bit Scabious flowering period has finished.
- Extensive grazing prevents the build-up of grasses which, over time, can overcome and shade out wildflowers such as Devil's-bit Scabious.

2. Varied vegetation structure and terrain

Marsh Fritillaries thrive in habitats where there is a varied sward structure and where features of the terrain such as banks, ditches and hollows persist.

- Terrain such as earth banks or slopes is attractive to female Marsh Fritillaries when they are selecting egg-laying sites, especially if they are in sunny positions. Varied sward height including grass tussocks, edges of animal tracks and stock resting areas are all beneficial. These create heat traps or ‘micro-climates’ where developing caterpillars will be sheltered and warm.



- Extensive grazing (low- intensity) is essential to maintain a varied vegetation structure.

- Longer periods of lighter grazing are far more preferable than shorter periods of heavier grazing. Autumn/winter grazing is also suitable, as is spring/summer grazing on wetter sites.
- Cattle grazing is preferable, ideally by traditional breeds as they are less selective grazers and consequently cope better with coarse vegetation and scrub. Sheep selectively feed on Devil's-bit Scabious and at high stocking levels can reduce and even eliminate it from sites.
- There is no specific Remedial Management Option for Marsh Fritillary, due to the great variety of habitats where the species is found in NI. Land within EFS (H) must be managed at the standard remedial management levels for the underlying priority habitat e.g. if purple moor-grass and rush pasture is the underlying habitat, the habitat should be managed through grazing at a stocking rate of 1.0 LU/ha in each year, between 1st May- 31st December.

3. Shelter

Sheltered areas are vital as they help protect the Marsh Fritillary from the worst of the elements and promote the best conditions for survival.

- Features that provide shelter from wind such as hedgerows, scrub patches, ditches and earth banks should be maintained especially if they occur on western, south-western and north-western sides (the prevailing wind direction in NI is south-westerly).
- Any management of these features such as scrub control or hedge-laying should be carefully planned to ensure shelter is maintained.

4. Sun

South or east facing slopes and sunny aspects are particularly important as they provide ideal conditions both for caterpillar development and for the adult butterfly during the flight period.

5. Historic/current management

If the site is already in favourable management for the habitat and Marsh Fritillary then it is important that this established management is maintained.

More advice on Marsh Fritillary habitat condition assessments is available online from the National Biodiversity Data Centre.

www.biodiversityireland.ie/wordpress/wp-content/uploads/Marsh-Fritillary-Habitat-Condition-Form.pdf

Managing Marsh Fritillary habitats in this way will also benefit other insects associated with species-rich grassland including pollinators such as bees.

Key dates:

1st March to 31st August: Bird breeding season. Scrub removal should not occur during this time.

- **Mid-February to early-April:** Marsh Fritillary caterpillars re-emerge after winter hibernation. This is the ideal time to check for presence/absence of the species breeding as webs are easier to identify.
- **May-June:** Marsh Fritillary adults on the wing and may be detected in suitable habitat.
- **Mid-August to mid-October:** Devil's-bit Scabious is in flower, the ideal time to gauge the extent of potential Marsh Fritillary habitat. During this time consider **reducing** stocking levels. Substantial works which could damage the webs or habitat should be **avoided**.
- **November to February:** The Marsh Fritillary caterpillars hibernate deep in the vegetation and are less sensitive to light disturbance. In known or potential sites, field operations (such as rush and scrub control) should **only** be carried out during this period, unless other measures, as discussed in the wildlife law section below are in place.

Marsh Fritillary Key Information

This section provides background information to the species including its protected status, ecology and identification to best inform management of Marsh Fritillary habitat.

The Conservation Status of Marsh Fritillary

The Marsh Fritillary is listed as 'vulnerable to extinction' within the International Union for Conservation of Nature (IUCN) Red List in Ireland. It is also protected under Annex II of the EU Habitats Directive and Article 10 of the Wildlife Order 1985 (NI) as amended. It is a priority species in NI and is listed in many Local Biodiversity Action Plans.

Wildlife law

The Marsh Fritillary is protected by law (Wildlife (NI) Order 1985). It is an offence to intentionally or recklessly kill, injure or take any from the wild or disturb the Marsh Fritillary in its resting place.

Field operations and vehicular access should be carefully planned in known or potential Marsh Fritillary sites as otherwise you may be in breach of the legislation.

Damage can be prevented through either careful timing of field operations and/or restricting the areas where work takes place.

A four step approach is recommended to minimise disturbance.

1. When planning field operations, ensure that they are necessary to bring the site into favourable management or into eligible land. If not, are they required?
2. Field operations and vehicular access should always attempt to **avoid areas of Devil's-bit Scabious**. The best time to identify areas of Devil-s-bit Scabious is August-October when the plant is in flower and clearly visible.
3. If, despite steps 1 and 2, field operations using machinery are required in **areas of Devil's-bit Scabious**, they should be undertaken at times which limit damage to the Marsh Fritillary i.e. in November – February, when the larvae are hibernating deep in the vegetation.
4. If any field operations using machinery in **areas of Devil's-bit Scabious** are unavoidable then ideally a walkthrough of the area should be carried out before work commences and any larval webs should be clearly marked and avoided. These walks should be undertaken annually during February-March or August-October when the larval webs are visible. Marsh Fritillary larval webs move from year to year and the most recent web location information should be used. A five meter buffer should then be created around each web where no field operations or vehicular access should be carried out.



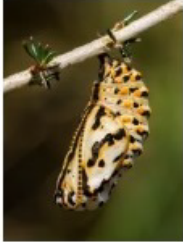
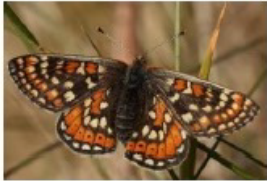



The NIEA Wildlife Team can also be contacted by telephone (028 905 69551) and guidance on adhering to the wildlife legislation can be found online.

www.daera-ni.gov.uk/publications/wildlife-law-and-you

Marsh Fritillary Facts

- The Marsh Fritillary is a butterfly and follows the well-known lifecycle. They start life hatching from an egg, feeding and growing through the larval or 'caterpillar' stage, forming a chrysalis and transforming within this into the adult butterfly, which is able to breed.
- Marsh Fritillaries live together in colonies, both as caterpillars and as adults.
- Marsh Fritillary caterpillars spend most of this part of their lifecycle living together in a communal web. They spin the web from silk and it helps to protect them from both predators and the elements.
- Marsh Fritillaries are insects. Insects are cold-blooded and rely on the sun to raise their body temperature to enable them to move, feed and breed. Insects struggle during cold weather and can be very badly impacted by extreme weather such a persistent heavy rain or drought.
- Marsh Fritillary populations are described as 'boom and bust' and operate on a roughly 7-year cycle. Their numbers can explode one year and then they may almost vanish the next, gradually building up numbers again over ensuing years.

Marsh Fritillary lifecycle and identification

Month	Activity	Stage	Best time to....	What to look for
January	Hibernating	Caterpillar		  
February	Feeding			
	Basking in groups			
March	Feeding			
	Basking in groups			
	Dispersing as individuals			
April	Pupating	Chrysalis		
May	Mating	Adult	Look for adults	 
	Feeding			
June	Mating			
	Feeding			
	Growing	Egg		
July	Hatching	Caterpillar		 
August	Feeding in Groups			
September				
October	Spinning hibernation web			
November	Hibernating			
December				

Images; Butterfly Conservation – Autumn caterpillars. Glen Campbell – adult. Stephen Craig – Black caterpillar group, Marsh Fritillary eggs. James O’Neill – Single caterpillar, chrysalis. NIEA – Devil’s-bit Scabious flower.

If you need any further advice, and are within an Agri-environment Scheme, and you should contact DAERA. However, if you are in a group option, please contact the group facilitator.

APPENDICES – Species that can cause confusion

If you are not familiar with the Marsh Fritillary or its habitat, it is possible to misidentify both the species and its food-plant. Here we illustrate some of the other species found in Marsh Fritillary habitat and show the differences between them.

Marsh Fritillary Food Plant: Devil's-bit Scabious, *Succisa pratensis*



Devil's-bit Scabious has round, purple-blue flowers arranged singly as the end of stems that grow up to a metre tall.

The leaves form a cluster at the base of the plant and vary from oval to lance-like in shape. Each leaf has a single, strong, heavy, vein down the centre, combined with distinctive patterning of smaller veins on the underside.

Commonly Confused Plant Species

Common Knapweed, *Centaurea nigra*



Common Knapweed is superficially similar to Devil's-bit Scabious. It is in flower at the same time of year, but the flowers are a very different shape and a lot more pink.

The leaves can be found all year round. They also have a strong centre vein, but do not have the fine veining on the underside that Devil's-bit Scabious has.

Meadow Thistle, *Cirsium dissectum*



Meadow Thistle closely resembles Common Knapweed. It too has a striking pink flower of a similar shape, but flowers in June when the adult butterflies are on the wing. It is a favourite nectar plant and an indicator of potential Marsh Fritillary habitat.

The leaves are grey green, lance shaped, and have weak spines. They grow in clusters as Devil's-bit Scabious does.

Ribwort Plantain, *Plantago lanceolata*



Ribwort Plantain flowers are very distinctive in the spring time, flowering in April and May. Their flowers will have finished by the autumn

The leaves can be confused with Devil's-bit Scabious but they have multiple strong veins running along their length rather than one single one.

Additional Photo Credits: Roger Butterfield, Earthfast Images <http://www.rogerbutterfield.co.uk/> Peter Eeles, www.ukbutterflies.co.uk APhotoFlora, www.aphotoflora.com

Version one: June 2017