HABITAT MANAGEMENT

The Marsh Fritillary Butterfly

Menter ar Gyfer Cadwraeth Natur Cymru
Initiative for Nature Conservation Cymru

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The Initiative for Nature Conservation Cymru (INCC) was founded in 2018 as a charitable incorporated organisation (charity number: 1180113).

Our vision is of 'a Wales with more wildlife in more places, created by a society that intrinsically values the natural world'.

INCC was formed in response to the growing need for a truly independent nature conservation organisation for Wales. An organisation that was able to speak out and challenge environmental decision makers to do more for wildlife and nature conservation in Wales. To help achieve this we undertake a wide variety of nature conservation activities, including:

- Targeted species and habitat conservation projects
- Research, wildlife surveys and monitoring
- Practical habitat management and landowner advisory
- Community engagement and education
- Advocacy and campaigning

Initiative for Nature Conservation Cymru (INCC)

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THE AMMAN VALLEY – WHAT'S SO SPECIAL?

Wildflower-rich lowland and marshy grassland habitats in Wales have declined dramatically in recent decades. Over 90% of these grassland habitats were destroyed in Wales between the 1930s and the 1990s. A great deal of the remaining unspoilt, species-rich grassland now occurs in post-industrial valleys. In this respect, the Amman Valley is still one of the most unspoilt in Wales and supports incredible wildlife, including the marsh fritillary butterfly.

Industrial activity of the past such as mine works, settlements and railways were scattered throughout the lower parts of the Amman Valley. Most of the fields in the landscape at this time would have been damp, tussocky grasslands full of wildflowers. Being too wet much of the year, these fields could only be grazed in summer by cattle, horses, or pit ponies. Local inhabitants practiced only small-scale, non-intensive farming as a means of supplementing their incomes.

As heavy industry waned in the 20th century, its buildings, settlements and infrastructure tended to remain in place with little major change to how the landscape was managed. Many of the grassland habitats at the time were too small, too scattered, too wet or too difficult to access for modern large farming operations. As a result, the Amman Valley has largely escaped the more damaging impacts of industrial farming.

Other, more pastoral areas of Wales have been less fortunate

Wildflower-rich rhôs pasture habitat with heath-spotted orchids © *Sorcha Lewis*

and many of the species-rich grassland habitats have been lost to practices such as year-round intensive sheep grazing, re-seeding with rye grass and annual spreading of fertiliser.

It is the mosaic of semi-natural grassland habitats scattered amongst the other natural habitats (woodland, rivers, moorland and heathland) that helps to make the Amman Valley so wildlife rich today.

Wildlife-rich grassland habitats can be easily lost or impoverished through inappropriate or insufficient management. Once lost they can no longer support the

The marsh fritillary butterfly can be found throughout much of the Amman Valley © *Vaughn Matthews*

Saw-wort flowering in well-managed rhôs pasture habitat
© *Sorcha Lewis*

wealth of specialist plant and animals that depend on them. When managed appropriately marshy grassland (rhôs pasture) can be one of the most diverse and unique habitats Wales has to offer.

What is Rhôs Pasture?

Rhôs pasture is a distinctive Welsh marshy grassland habitat. It occurs throughout Wales on poorly drained, mainly acidic soils in lowland areas (valley bottoms to upland fringes) that receive high rainfall. The habitat is usually dominated by tussocks of purple moor-grass (a deciduous grass that is white in winter) and various rush species. It is often found with other habitats, such as wet heath, wet flushes, scrub and drier grassland, making up a patchwork mosaic that supports a correspondingly rich diversity of wildlife.

Wildlife of Rhôs Pasture

Good quality examples of rhôs pasture will be rich in flowering plants, with species such as, saw-wort, marsh bedstraw, meadow thistle, southern marsh orchids and whorled carraway, amongst others. The habitat can also support a rich array of bird species such as snipe, grasshopper warbler, barn owl and reed bunting. The uneven sward structure is also particularly good for invertebrates, the most significant of which locally and Wales-wide is the marsh fritillary butterfly. Well-managed rhôs pasture supports devil's-bit scabious, a marshy grassland plant that marsh fritillary caterpillars depend on for food. Indeed, the Amman Valley and adjoining areas just into neighbouring Neath Port Talbot and Powys is one of Carmarthenshire's largest landscape areas occupied by marsh fritillaries.

Why Manage Rhôs Pasture?

Species-rich marshy grassland, particularly with the potential to support marsh fritillary butterflies, is a much-reduced habitat in Wales. Carmarthenshire however is still a real strong-hold and you can justifiably feel proud to have on your land such a superb resource for wildlife. This habitat, and the marsh fritillary are so special, vulnerable and rare within a European

Barn Owl © *Jeff Slocombe*

Common Snipe © *Jeff Slocombe*

Bumblebee on devil's-bit scabious flower © *Sorcha Lewis*

context that they are afforded special protection.

Also, where devil's-bit scabious flourishes, together with other typical late-flowering wild plants like sneezewort or fleabane, it is a valuable source of pollen and nectar for a wide range of pollinating insects like bees, butterflies, hoverflies and moths.

It is therefore of great importance that habitats are protected and enhanced, and we would very much like to assist you in achieving this goal by both highlighting the threats to this habitat and providing management recommendations.

About the Marsh Fritillary

Do not be put off if you do not see a marsh fritillary butterfly. They have a complex life cycle which involves them necessarily moving around nearby habitat fields to avoid specialist predators. If you manage your rhôs pasture correctly for devil's-bit scabious, they should return in due course.

The marsh fritillary flies in late May and June. The females lay batches of up to 300 eggs on the underside of larger leaves of devil's-bit scabious. From July until late September the brown-black, spiny larvae (caterpillars) feed together on scabious leaves inside a silken web, which is white when fresh but soon becomes dark with droppings as they feed. During the winter they hibernate together in a small web, hidden in grass tussocks. The larvae emerge as early as February or early March in some years and soon separate; sometimes wandering several metres to find fresh scabious leaves. On sunny days larvae can be seen basking on exposed grass stems or leaf litter. The larvae pupate between late April and

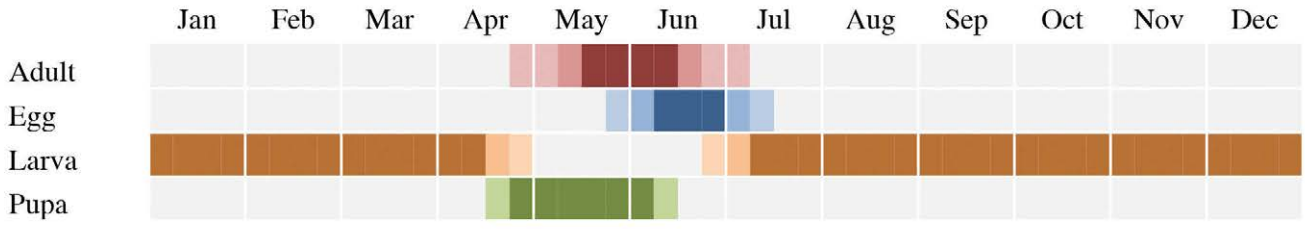
Marsh fritillary butterfly (Euphydryas aurinia)
© *Vaughn Matthews*

early May. The adults (butterflies) emerge 2-3 weeks later.

Caterpillars are prone to parasitism by a couple of species of tiny wasp, which seek to lay their own eggs into the marsh fritillary caterpillars as they develop. If weather conditions favour the parasite in spring, they can decimate caterpillar numbers. To survive long-term, marsh fritillaries need a high concentration of suitable habitat nearby to mitigate potential effects of parasitism and possible varying condition of habitat each year.

Habitat Needs

The marsh fritillary breeds in habitat patches of unshaded, flower-rich damp grasslands with a plentiful supply of devil's-bit



Marsh fritillary larval web
© Rob Parry

scabious. The best breeding areas are usually a patchwork of short vegetation and long, tussocky grasses, 12-25cm (5-10"), where prominent scabious plants and other wildflowers are plentiful. These conditions provide the larvae with plentiful food and somewhere to shelter through the winter months. Some dead grass or leaf litter is important for the larvae to bask on. Hedgerows, scrub, woodland or uneven ground usually shelter (but not shade) these areas.

HOW TO MANAGE FOR THE MARSH FRITILLARY

It is difficult to maintain perfect habitat every year. The condition of the habitat will vary from year to year depending on factors such as weather, growing season and grazing. Occasional years of no grazing or heavier grazing are not necessarily a problem. The trick is to maintain the overall suitable breeding habitat patches in the landscape each year. In any one year, some fields will be at optimum habitat condition and others sub-optimum.

Grazing

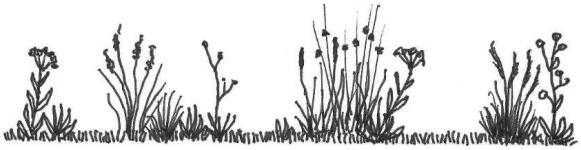
Grazing with livestock is the best way to manage marshy grassland habitat for wildlife. Livestock benefit grassland habitats in four crucial ways:

a) Livestock removes vegetation as it grows, allowing less competitive wildflowers to flourish alongside the more competitive grasses. Without grazing, grasses form dense clumps and shade out many, more delicate wildflowers.

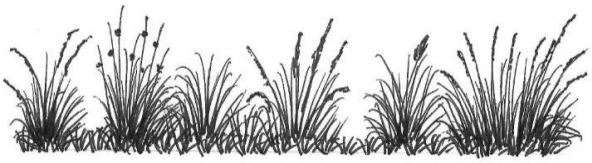
b) Livestock also play an important function in removing the dead grass and leaf-litter (thatch) that builds up in the grassland sward each year. Thatch creates shading of the soil and prevents many wildflowers from setting seed and germinating. Often, only the more robust and competitive grasses and rush can grow through the thatch.

c) Livestock trample vegetation as well as graze it, creating an uneven sward structure of tall vegetation, short vegetation and bare soil. Patches of bare soil (poaching) are essential

Sward heights for Marsh Fritillary



Ideal rhôs pasture sward for marsh fritillary. A mosaic of tall and short vegetation between 12 and 25cm high (5 – 10 inches).



Undergrazed rhôs pasture sward. Unsuitable for marsh fritillary. Averaging more than 25cm (10 inches) in height, few shorter sheltered areas.

Overgrazed rhôs pasture sward. Unsuitable for marsh fritillary. On average less than 12cm (5 inches), not enough taller vegetation for shelter.

Undergrazed rhôs pasture with dense grass tussocks and encroaching scrub *© Richard Smith*

Overgrazed rhôs pasture with little sward structure
© Lizzie Wilberforce

Cattle grazing wildflower-rich rhôs pasture habitat with plentiful supply of devil's-bit scabious © *Sorcha Lewis*

for wildflowers to germinate and establish roots. However, too much poaching can be detrimental to the vegetation and soil.

d) Livestock manure is essential for a host of specialised fungi and invertebrate fauna (coprophilous organisms). These organisms provide food for other invertebrates, birds and species of bat.

For marsh fritillary, the aim is to produce an uneven patchwork of short and long vegetation throughout the grazing period. Grazing animals should be moved elsewhere if the vegetation becomes shorter than 12cm (5 inches) or if wet weather poses a risk of over-poaching. Overgrazing leads to the loss of devil's-bit scabious, whilst neglect or abandonment results in devil's-bit scabious plants being shaded out by tall grasses and scrub.

Sheep are generally unsuitable as they continually target the devil's-bit scabious plants, preventing their flowering and seeding, ultimately eliminating them completely, and producing a 'tight' sward.

As all livestock predominantly eat grasses, it is best to graze when grasses are actively growing. In good growing years, or if there has been a wet spring, grazing into autumn may be necessary. Light cattle grazing in spring and summer is

Cattle help remove dead thatch that can build up in the sward each year © *Sorcha Lewis*

Key Points

- **Aim for an uneven sward 12-25 cm (5-10 inches) high throughout the grazing season.**
- **Light grazing is ideal, though stocking rates may need to vary from year to year.**
- **Avoid placing supplementary feeds in areas of good quality habitat**
- **Only burn on sites with a history of burning or as a one-off operation to restore neglected sites and only burn a maximum of a third of each site/field in a year. Find the larval webs in early September and avoid burning these areas.**
- **Mow dense rushes or tussocky grasses in March and June to help restore neglected marshy grassland and if possible, remove the cuttings.**
- **Cut scrub as necessary from part of the site each year, as the light grazing needed to maintain the habitat is unlikely to be sufficient to control scrub.**
- **Avoid grazing rhôs pasture with sheep. Sheep graze in a way that damages the habitat.**

Mountain ponies grazing wet heathland habitat in the Amman Valley © *Rob Parry*

ideal for the marsh fritillary habitat management, but it should be remembered that any well-managed grazing with cattle or ponies is better than none.

Ponies, such as Welsh Mountain, Exmoor, or Dartmoor, are also suitable on their own or with cattle. Ponies are especially useful in late Summer/early Autumn, as they do not eat the scabious flowers. Light winter grazing with native ponies on soft rush infested fields can be beneficial.

For a farmer/grazier, these low productivity grasslands can:

- Produce high quality beef carcasses.
- Release improved pasture for forage cropping.
- Ensure cows get in prime calving condition.
- Provide valuable back-up grazing in dry summers.

Stocking rates may need to vary between different sites and between years depending on the damp grassland's productivity. Roughly 1 cow every hectare (2.5 acres) for three months is recommended.

Graziers may want to use supplementary feeding in the form of mineral licks to boost growth rates, although at low stocking rates, the grassland should provide all the nutrition the stock need. To avoid overgrazing and nutrient enrichment, feeding stations should be located on adjacent agriculturally improved land, areas of scrub, on tracks, or in less favourable habitat areas.

The application of Avermectins, commonly used broad-spectrum anti-parasitic drugs, should be avoided. These persist in the dung and kill dung beetles and dung fly larvae, important food sources for species of bat and birds. Where organic grazing is not an option, precautions can be made, such as dosing livestock a month before turning them on to the field.

Burning

Although burning can damage the habitat and kill marsh fritillary larvae, the management practice has been traditionally used to maintain some sites and can be useful for restoring a neglected field as a one-off operation. It provides a fresh flush of grass in spring that will entice stock into ungrazed areas of the pasture, as well as open the sward for smaller plants to flourish that would otherwise be smothered by dead leaf-litter. It is important to remember that burning should only be undertaken with careful planning and preparation. Your local fire service will be able to provide advice. A 'Burning Management Plan from the Welsh Government (https://gov.wales/land-management) must be completed and the fire service informed of your intention.

If burning is the only option, the following guidelines will help protect marsh fritillary larvae:

- Only burn on sites where burning has been used in the past, or as a single operation to restore neglected grassland with a 'thatch' of dead grass.

Light grazing with cattle creates a good sward structure and lightly poaches the ground © *Rob Parry*

Controlled burn to restore rhôs pasture, carried out by trained and experienced operators © *Amanda Evans*

Scrub clearance of bramble and willow, encroaching into the marshy grassland © *Rob Parry*

- Avoid known marsh fritillary breeding areas by searching for webs in early September.
- Burn only between the 1st of October and the 31st of March in upland areas and the 1st of November and the 15th of March elsewhere. Burning outside these periods is illegal. For least impact on any undetected larvae burn between early January – 15th March.
- Where possible burn no more than one third of a field a year, dividing the area up into smaller, manageable compartments.
- Cool, quick fires are best but are difficult to control so cut firebreaks to protect breeding areas or use natural fire breaks such as wet, rushy areas or ditches.
- For further details see Welsh Government's website https://gov.wales/land-management for advice and application forms.

Mowing

Mowing is difficult at most sites and not suitable for marsh fritillary breeding areas. When access is possible, topping can be used to control patches of dense rushes, young scrub, or rank grasses, creating suitable conditions for scabious to re-establish. Mowing can also be useful to encourage grazing stock into neglected fields by mowing tracks into the field. Mow in March and June (or late July if snipe or curlew are likely to be breeding) and if possible, remove the cut material.

Neglected rhôs pasture with mown path to promote fresh growth and encourage livestock to penetrate into the field © *Emily Foot*

Scrub Cutting

Scrub is an important part of the mosaic of vegetation, for instance providing habitat for insects and nesting sites for birds and dormice. Between October and February, target scrub that is encroaching onto marsh fritillary breeding areas and avoid clearing all the scrub in one winter. Remove the cut scrub - species like willows will re-grow from cut stems if left on the damp ground.

Restoring Neglected Sites

- **Grazing** - Ideally, management of neglected sites should be reintroduced gradually. This will allow existing wildlife, particularly insects and small mammals to adapt to the changes. The aim is to gradually open-up the vegetation by grazing and/or cutting to encourage the spread and density of scabious and other smaller plants. This spreads the work and enables the grazier to assess how the stock are responding and adjust the stocking rates accordingly.
- **Rotational Grazing** – Where the reintroduction of gradual, extensive grazing is unachievable, other grazing practices can be adopted. Heavier grazing can be a useful tool to restore neglected habitats, but it must be used carefully on sites where marsh fritillaries are present. If there is a network of fields, then short periods of heavy grazing on rotation over several years can be a suitable option. Dividing a field (or fields) into separate management compartments enables the grazier to concentrate grazing in specific areas for a specific time. Once one compartment has been grazed, it does not need to be grazed again for another three or four years. Rotational grazing therefore helps reduce and remove rank vegetation (built up through neglect) in relatively small areas.

- **Mowing** – Mechanical cutting may be an appropriate management practice in some circumstances. If mowing is the only management practice, then it is important that only a small area (no more than one-third) of the grassland is cut in any one year. Ideally, all cut material should be collected from the sward to enable fresh vegetation to grow. Where cattle or pony grazing is the intended long-term management practice of the grassland, cutting initial pathways through the sward can help grazing animals reach more areas.

- **Burning** - Burning can be a useful management tool, provided it is done with careful planning, at the right time of year with appropriate weather conditions. Burning outside the dates stated above is illegal and can kill wildlife and damage the habitat. A quick burn during winter should just take the top off the dead grass without causing any damage to tussocks or the ground below.

- **Supplementary Planting** - Once a good sward height of 12-25 cm (5-10 inches) is achieved for significant parts of a field, hopefully devil's-bit scabious and other wildflowers will start to spread. However, if devil's-bit scabious is absent or sparse, you can scatter seed, or "plug-plant" extra plants grown locally from local provenance seed.

  For more information on sourcing devil's-bit scabious and other native wildflowers from local and environmentally sustainable sources, please contact INCC (info@incc.wales or 01558 667181).

- **Habitat Islands** - Where current grazing pressure is too great to allow for the ideal sward structure and wildflower diversity needed for marsh fritillary, 'islands' of devil's-bit scabious can be created in the grassland. Habitat islands are small paddocks created within a field that are heavily planted with devil's-bit scabious and ring-fenced to protect against inappropriate grazing stock e.g. sheep. Although the islands are no substitute for well-managed rhôs pasture habitat, they can provide important refuges for marsh fritillary in the landscape and help the butterfly better navigate through the landscape to find other, more suitable habitat.

CASE STUDY – BRYNWITHAN

The ground-breaking Caeau Mynydd Mawr Project began in September 2013. The project helps mitigate the impacts of development in Cross Hands, Carmarthenshire on the protected marsh fritillary butterfly and the habitat which supports it.

Funded by contributions from developers, the project is essential to the delivery of Carmarthenshire County Council's Local Development Plan, securing sufficient habitat to support the butterfly in the area.

Currently, the project has 26 sites in management, a total area of 130ha, of which 42ha is owned by the project. The remaining area is in management agreements with other organisations and private landowners. One success story is that of Brynwithan.

The Brynwithan site was bought by the project in 2014. It is directly adjacent to Rhos Cefn Bryn (owned and managed by The Wildlife Trust of South and West Wales) which supports a good population of marsh fritillaries. The fields had not been grazed for many years and had become very rank, with no marsh fritillaries present. Areas of the site were mown to reduce the density of the dead purple moor grass and the site is now grazed with cattle. The grassland habitat is improving, the butterfly has now been recorded on the fields and devil's-bit scabious and an increasing diversity of plant species are appearing.

Brynwithan (May 2015) © *Amanda Evans*

Brynwithan (May 2016) © *Amanda Evans*