European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC)

Fourth Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2013 to December 2018

Supporting documentation for the
conservation status assessment for the species:

S1065 - Marsh fritillary butterfly (*Euphydryas aurinia*)

WALES

IMPORTANT NOTE - PLEASE READ

- The information in this document is a country-level contribution to the UK Report on the conservation status of this species, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.
- The 2019 Article 17 UK Approach document provides details on how this supporting information was used to produce the UK Report.
- The UK Report on the conservation status of this species is provided in a separate document.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Explanatory notes (where provided) by the country are included at the end. These provide an audit trail of relevant supporting information.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species) and/or (iv) the field was only relevant at UK-level (sections 9 Future prospects and 10 Conclusions).
- For technical reasons, the country-level future trends for Range, Population and Habitat for the species are only available in a separate spreadsheet that contains all the country-level supporting information.
- The country-level reporting information for all habitats and species is also available in spreadsheet format.

Visit the JNCC website, https://jncc.gov.uk/article17, for further information on UK Article 17 reporting.

Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)

NATIONAL LEVEL

1. General information

1.1 Member State	**UK (Wales information only)**
1.2 Species code	**1065**
1.3 Species scientific name	**Euphydryas aurinia**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Marsh fritillary butterfly

2. Maps

2.1 Sensitive species	No
2.2 Year or period	2010-2017
2.3 Distribution map	Yes
2.4 Distribution map Method used	Based mainly on extrapolation from a limited amount of data
2.5 Additional maps	No

3. Information related to Annex V Species (Art. 14)

3.1 Is the species taken in the wild/exploited?		No
3.2 Which of the measures in Art. 14 have been taken?	a) regulations regarding access to property	No
	b) temporary or local prohibition of the taking of specimens in the wild and exploitation	No
	c) regulation of the periods and/or methods of taking specimens	No
	d) application of hunting and fishing rules which take account of the conservation of such populations	No
	e) establishment of a system of licences for taking specimens or of quotas	No
	f) regulation of the purchase, sale, offering for sale, keeping for sale or transport for sale of specimens	No
	g) breeding in captivity of animal species as well as artificial propagation of plant species	No
	h) other measures	No

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3.3 Hunting bag or quantity taken in the wild for Mammals and Acipenseridae (Fish)

a) Unit

b) Statistics/ quantity taken	Provide statistics/quantity per hunting season or per year (where season is not used) over the reporting period					
	Season/ year 1	Season/ year 2	Season/ year 3	Season/ year 4	Season/ year 5	Season/ year 6
Min. (raw, ie. not rounded)						
Max. (raw, ie. not rounded)						
Unknown	No	No	No	No	No	No

3.4. Hunting bag or quantity taken in the wild Method used

3.5. Additional information

BIOGEOGRAPHICAL LEVEL

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs

Atlantic (ATL)

4.2 Sources of information

Bulman, C.R., Wilson, R.J., Holt, A.R., Bravo, L.G., Early, R.I., Warren, M.S. & Thomas, C.D. 2007. Minimum viable metapopulation size, extinction debt and the conservation of a declining species. Ecological Applications. 17: 1460-1473.
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5. Range

5.1 Surface area (km²)		
5.2 Short-term trend Period		
5.3 Short-term trend Direction	Stable (0)	
5.4 Short-term trend Magnitude	a) Minimum	b) Maximum
5.5 Short-term trend Method used		
5.6 Long-term trend Period		
5.7 Long-term trend Direction		
5.8 Long-term trend Magnitude	a) Minimum	b) Maximum
5.9 Long-term trend Method used		
5.10 Favourable reference range	a) Area (km²) b) Operator c) Unknown d) Method	
5.11 Change and reason for change in surface area of range	No change The change is mainly due to:	
5.12 Additional information		

6. Population

6.1 Year or period	2010-2017	
6.2 Population size (in reporting unit)	a) Unit	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	
	c) Maximum	
	d) Best single value	287
6.3 Type of estimate	Best estimate	
6.4 Additional population size (using population unit other than reporting unit)	a) Unit b) Minimum c) Maximum d) Best single value	
6.5 Type of estimate		
6.6 Population size Method used	Based mainly on extrapolation from a limited amount of data	
6.7 Short-term trend Period	2010-2017	
6.8 Short-term trend Direction	Increasing (+)	

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6.9 Short-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval
6.10 Short-term trend Method used	Based mainly on extrapolation from a limited amount of data
6.11 Long-term trend Period	1990-2017
6.12 Long-term trend Direction	Decreasing (-)
6.13 Long-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval
6.14 Long-term trend Method used	Based mainly on extrapolation from a limited amount of data
6.15 Favourable reference population (using the unit in 6.2 or 6.4)	a) Population size b) Operator c) Unknown d) Method
6.16 Change and reason for change in population size	Genuine change The change is mainly due to: Genuine change
6.17 Additional information	

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (to maintain the species at FCS)?	No
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	No
7.2 Sufficiency of area and quality of occupied habitat Method used	Complete survey or a statistically robust estimate	
7.3 Short-term trend Period	2010-2017	
7.4 Short-term trend Direction	Decreasing (-)	
7.5 Short-term trend Method used	Based mainly on extrapolation from a limited amount of data	
7.6 Long-term trend Period		
7.7 Long-term trend Direction		
7.8 Long-term trend Method used		
7.9 Additional information		

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	H
Intensive grazing or overgrazing by livestock (A09)	H

Drainage for use as agricultural land (A31)	H
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	M
Conversion from other land uses to commercial / industrial areas (excluding drainage and modification of coastline, estuary and coastal conditions) (F03)	M
Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (L02)	H

Threat	Ranking
Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	H
Intensive grazing or overgrazing by livestock (A09)	H
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	M
Conversion from other land uses to commercial / industrial areas (excluding drainage and modification of coastline, estuary and coastal conditions) (F03)	M
Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (L02)	H
Droughts and decreases in precipitation due to climate change (N02)	M
Change of habitat location, size, and / or quality due to climate change (N05)	M

8.2 Sources of information

8.3 Additional information

9. Conservation measures

9.1 Status of measures

a) Are measures needed? Yes

b) Indicate the status of measures Measures identified and taken

9.2 Main purpose of the measures taken: Maintain the current range, population and/or habitat for the species

9.3 Location of the measures taken: Both inside and outside Natura 2000

9.4 Response to the measures: Medium-term results (within the next two reporting periods, 2019-2030)

9.5 List of main conservation measures

Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land (CA01)
Maintain existing extensive agricultural practices and agricultural landscape features (CA03)
Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures (CA04)
Adapt mowing, grazing and other equivalent agricultural activities (CA05)

Stop mowing, grazing and other equivalent agricultural activities (CA06)

Manage drainage and irrigation operations and infrastructures in agriculture (CA15)

Reduce impact of transport operation and infrastructure (CE01)

Manage conversion of land for construction and development of infrastructure (CF01)

Reinforce populations of species from the directives (CS01)

Improvement of habitat of species from the directives (CS03)

9.6 Additional information

10. Future prospects

10.1 Future prospects of parameters

a) Range
b) Population
c) Habitat of the species

10.2 Additional information

Despite being a feature on thirteen SACs in Wales and 34 SSSI, the marsh fritillary continues to decline rapidly. In the UK, it has declined by 79% in terms of occurrence and 10% in abundance between 1976 and 2014, with a 22% occurrence and 64% abundance decline over the last ten years. At a Wales level, there has been an overall long-term decline between 1993 and 2017 (Tordoff & Williams, 2018). During the 2007-12 Article 17 reporting round, ten of the thirteen SAC populations were classed as Unfavourable with just two (Corsydd Eifionydd; Preseli) as Favourable and one (Corsydd Mon) not assessed. Both Corsydd Eifionydd and Corsydd Mon would be classed as Unfavourable at the moment. Most of the populations on the suite of Welsh SSSI are likely to be Unfavourable as most sites are too small and fragmented to support viable (meta)populations.
An annual larval web surveillance programme of up to 21 key sites carried out by Butterfly Conservation Wales up to 2017 showed that in 2017 seven sites showed a population increase, seven a decrease, with five unchanged (Tordoff & Williams, 2018). Key sites such as Morfa Harlech and Rhos Llawr Cwrt returned zero counts, with the former population almost lost as a consequence of over-grazing.
A recent assessment of the landscape at Aberbargoed Grasslands SAC showed a dramatic decline in habitat condition and extent between 2004 and 2017 (Caerphilly County Borough Council, 2017; Smith & Sazer, 2017). This is the last remaining population in Monmouthshire and is under immediate threat of extinction. The last remaining population on Anglesey, on Cors Erddreiniog, is very small and also highly vulnerable to extinction. A recent assessment of populations in Ceredigion highlight that the butterfly has been lost from the north of the county and has declined elsewhere (Williams, 2018). The strongest population in Wales is on Castlemartin Range and should be a SAC feature of the existing SAC but was found too late to be included in the original designation.
The prospects for the marsh fritillary in Wales are not good unless concerted efforts are made to protect the key metapopulations by improved habitat management on both occupied and suitable sites, by reducing habitat fragmentation and increasing the porosity of the landscape to improve connectivity and successful dispersal/colonisation.

11. Conclusions

11.1. Range

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11.2. Population	
11.3. Habitat for the species	
11.4. Future prospects	
11.5 Overall assessment of Conservation Status	
11.6 Overall trend in Conservation Status	
11.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status No change The change is mainly due to: b) Overall trend in conservation status No change The change is mainly due to:
11.8 Additional information	

12. Natura 2000 (pSCIs, SCIs and SACs) coverage for Annex II species

12.1 Population size inside the pSCIs, SCIs and SACs network (on the biogeographical/marine level including all sites where the species is present)	a) Unit	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	
	c) Maximum	
	d) Best single value	59
12.2 Type of estimate	Best estimate	
12.3 Population size inside the network Method used	Complete survey or a statistically robust estimate	
12.4 Short-term trend of population size within the network Direction	Decreasing (-)	
12.5 Short-term trend of population size within the network Method used	Complete survey or a statistically robust estimate	
12.6 Additional information		

13. Complementary information

13.1 Justification of % thresholds for trends
13.2 Trans-boundary assessment
13.3 Other relevant Information

Distribution Map

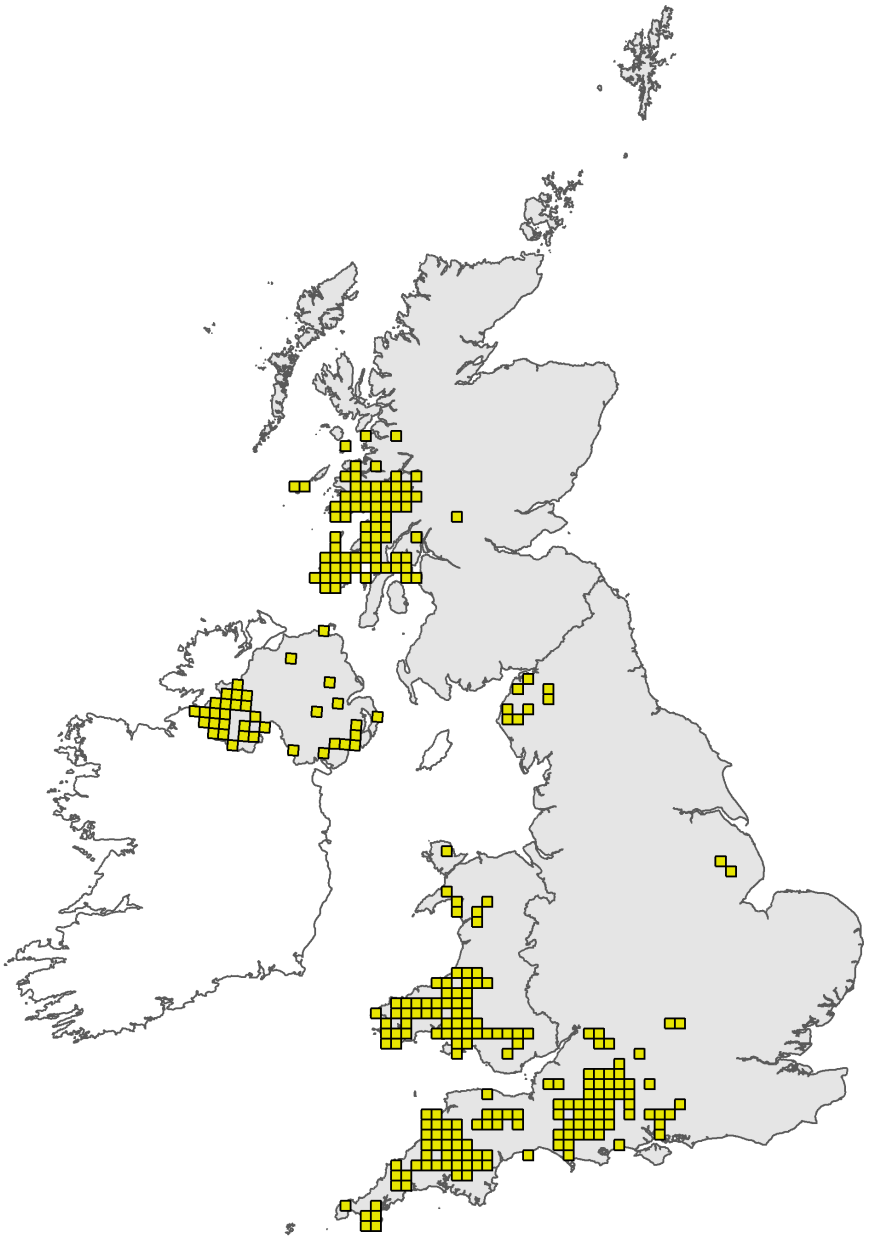

Figure 1: UK distribution map for S1065 - Marsh fritillary butterfly (*Euphydryas aurinia*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The 10km grid square distribution map is based on available species records within the current reporting period. For further details see the 2019 Article 17 UK Approach document.

Range Map

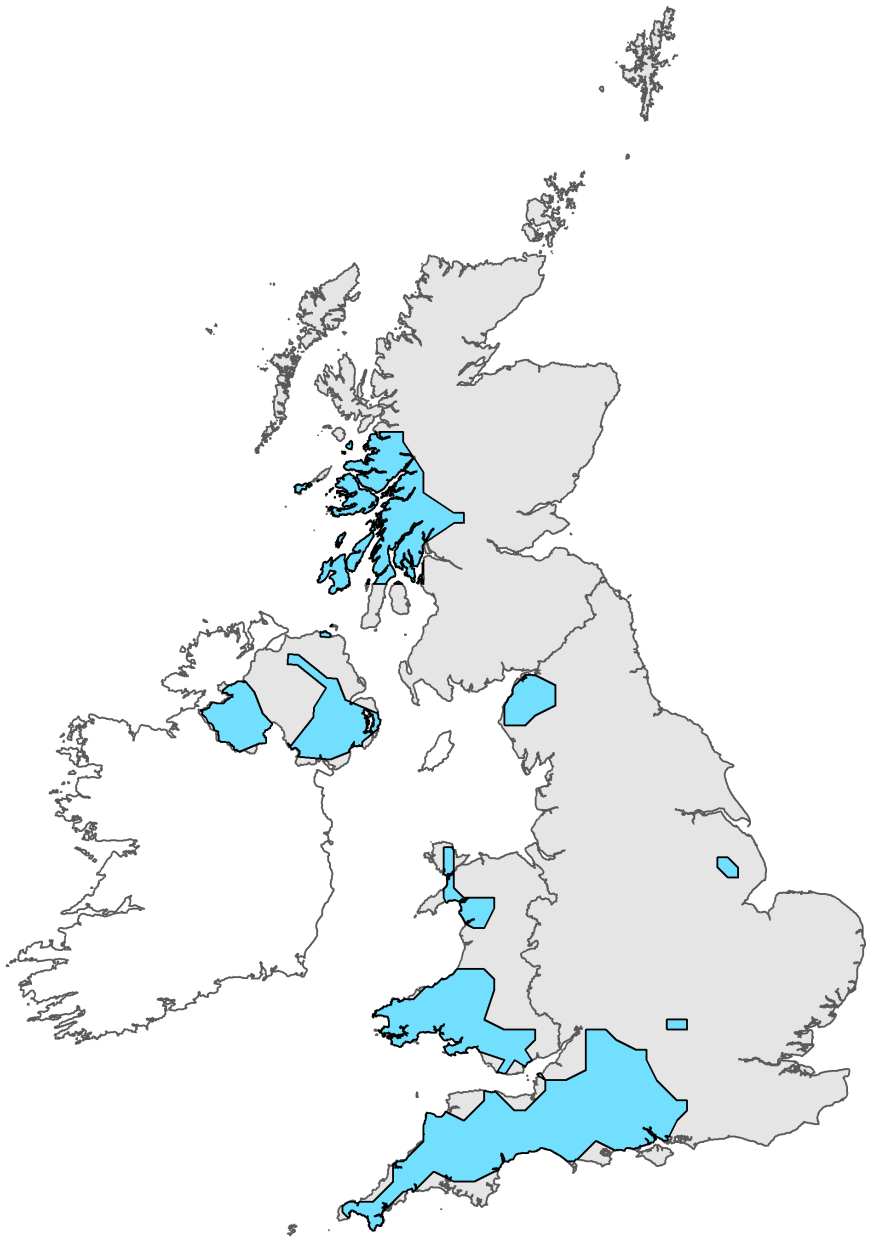

Figure 2: UK range map for S1065 - Marsh fritillary butterfly (*Euphydryas aurinia*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The range map has been produced by applying a bespoke range mapping tool for Article 17 reporting (produced by JNCC) to the 10km grid square distribution map presented in Figure 1. The alpha value for this species was 20km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Species name: Euphydryas aurinia (1065) Region code: ATL

Field label	Note
5.3 Short term trend; Direction	See 5.11
5.11 Change and reason for change in surface area of range	Fowles (2013) states that although 'comprehensive surveys have not been undertaken recently, the marsh fritillary has been recorded from 52 10km squares in Wales since 2007. 49 squares were recorded in the period 2001-2006 (there has been increased survey effort recently) so the range can be considered as stable in Wales, even though individual populations within these squares are continuing to go extinct.' From 2010-2017, it has been recorded in 60 10km squares suggesting that the range continues to be stable, despite the long-term declines between 1993 and 2017 reported by Tordoff & Williams (2018) and the extinction or effective loss of individual populations and metapopulations. However, with single and vulnerable populations in VC35 and VC52, and small population numbers in VC48 and VC49, the range status could change dramatically in the future.
6.2 Population size	It has been recorded from 287 x 1 km squares in 60 hectads over this period (Best single value). Monad and hectad counts over this period are from data supplied by Butterfly Conservation Wales and NRW SAC Monitoring Officers.
6.8 Short term trend; Direction	The most recent UK BMS data for Wales (up to 2017) shows a 607% increase since 2007, based on a sample of 26 sites. Since 2010, the larval web index has fluctuated markedly but with a slight but not signifcant decline over the period (Butterfly Conservation, pers. comm.). Tordoff & Williams (2018) report a small but positive net change [of populations] in the past five years' but also highlight a decreasing trend in larval web counts since 2013. Fowles (2013) suggested that there were 99 to 153 occupied 1 km squares from 2001-2012 and that the minimum value is likely to be a slight under-estimate as comprehensive surveys have not been completed during the reporting period. It should be remembered that population extinctions for this species are to be expected as part of its metapopulation dynamics (Warren 1994) and a six-year reporting period may not accurately reflect the long-term position'. Since the last reporting round, a major surveillance and monitoring programme has been initiated, led by Butterfly Conservation, such that we have much more accurate information on the number of populations and trends There has been some recovery over the last ten years, in part due to conservation efforts, but the recovery is fragile and from a very low base and is tempered by population declines and losses on key sites including SACs and SSSI. The most reliable data is for long-term trend, and the most recent UK BMS data for Wales (up to 2017) shows a 71% decline since 1990.
6.12 Long term trend; Direction	The most recent UK BMS data for Wales (up to 2017) shows a 71% decline since 1990, and Tordoff & Williams (2018) confirm a long-term decline between 1993 and 2017.
6.13 Long term trend; Magnitude	See 6.12

7.1 Sufficiency of area and quality of occupied habitat	Fowles (2013) states that 'Up to 2011 18.98 square kilometres of suitable breeding habitat have been mapped (Fowles & Smith 2006). The landscape surrounding 111 post 1990 populations has been surveyed, representing 55.2% of the recorded colonies. The figure above has been obtained by assuming a similar proportion of habitat for the unsurveyed locations, although this may be an over-estimate as there is a higher proportion of small, isolated populations in the remainder.' The landscapes of additional colonies have been mapped during the current reporting round e.g Amman Valley, Castlemartin Range (80ha of Good, Suitable & Potential habitat), Cors Erddreiniog (60ha), Gweunydd Blaencleddau (28ha), or re-mapped (Aberbargoed Grasslands [7.36ha]), but the habitat statistics have not been collated. The master Wales GIS layer for habitat assessments is no longer held in a single repository. Functioning as metapopulations, the butterfly requires between 76 and 104ha of suitable habitat within a defined landscape for its long-term survival. The current NRW Marsh Fritillary landscape model considers 50ha of Good and Suitable Condition habitat, of which 10ha is in Good Condition, within a 2km radius as an appropriate target for achieving Favourable Condition. Fowles (2013) states that '11.81% of the land surveyed up to 2012 that was classed as suitable habitat for marsh fritillaries was found to be in Good Condition. In the 2006 analysis of land surveyed for habitat quality (Fowles & Smith 2006), 33% of the habitat area not in Good Condition was found to be inappropriately or excessively managed, and 67% was suffering from neglect. Neglect leads to vegetation succession and after 15 or so years without management breeding patches succumb to scrub invasion.' Up to 2011 3.39 square kilometres of potential habitat that is too rank to support marsh fritillaries has been mapped (Fowles & Smith 2006). The concept of habitat thought to be suitable but from which species may be absent isn't really appropriate for this species as metapopulation dynamics imply that such habitat patches are part of a functioning landscape. For this reason suitable but unoccupied habitat has been included in the value given for 2.5.1 (area of habitat for the species) and the value reported here applies only to patches that are no longer suitable because of neglect, but which could become occupied if appropriate management was restored.'
7.4 Short term trend; Direction	Whilst there is some variability with each marsh fritillary landscape, with a few supporting strong populations and large areas of suitable habitat (e.g. Castlemartin Range), most populations are small and in fragmented habitats with insufficient or declining habitat condition. This is supported by reporting of 10 of the 13 SACs being in unfavourable condition in 2007-2012, and two of the remaining three are now likely to be in unfavourable condition.

8.1 Characterisation of pressures/ threats	Pressures: Inappropriate grazing management (A06, A09, A10 & L02) and drainage for agriculture (A31) remain the most significant pressures faced by marsh fritillaries in Wales. In the 2006 analysis of land surveyed for habitat quality (Fowles & Smith 2006) 33% of the habitat area not in Good Condition was found to be inappropriately or excessively managed and 67% was suffering from neglect. Neglect leads to vegetation succession and after 15 or so years without management breeding patches succumb to scrub invasion. Many Welsh populations occur in urbanised areas of south Wales that are under great demand for residential and industrial development and associated road infrastructure (E01 & F03). Planning applications are continually submitted for new developments and whilst every effort it made to ensure the best outcome for marsh fritillaries with suitable mitigation where relevant, inevitably there is increasing fragmentation of the occupied landscapes. Fragmentation is the hidden pressure/threat underpinning the landscape changes identified above, as many Welsh populations are isolated and opportunities for successful colonisation of adjacent patches are limited. Research has indicated (Bulman et al., 2007) that most Welsh populations occur within landscapes that contain insufficient habitat to ensure long-term viability and the prediction is that perhaps 4 or 5 large metapopulations might survive in the medium to long-term period if landscapes are not restored. The other issues listed here reflect the continuing significance of existing pressures as there is no indication currently that the impact of these pressures will reduce. Threats: As with Pressures, but with the additional threats of drought (N02) and changes in habitat size and quality (N05) as a consequence of climate change.
10.1 Future prospects of parameters	See 10.2
12.1 Population size inside the pSCIs, SCIs and SACs network	During the 2010-2017 reporting period, marsh fritillary has been recorded from 17 hectads and 59 1km squares in 12 SACs. There have been no records on Glaswelltiroedd Cefn Cribwr SAC since 2007. This is based on records supplied by NRW SAC Monitoring Officers and Butterfly Conservation Wales. Fowles (2013) reported that 'Although marsh fritillaries have been reported from just twenty-three 1km squares on the sixteen SACs with populations at the time of designation during the reporting period ...., this is likely to be an under-estimate. 38 1km squares on the designated SACs were occupied by marsh fritillaries in the period 2001-06 and although populations have been lost from some 1km squares in the intervening years, it is also the case that some squares have not been revisited (or data has not been submitted) that would still be expected to support populations. The true figure is probably in the region of 28-30 squares.'
12.4 Short term trend of the population size within the network; Direction	There have been no records on Glaswelltiroedd Cefn Cribwr SAC since 2007. In addition, during the 2007-12 Article 17 reporting round, ten of the thirteen SAC populations were classed as Unfavourable with just two (Corsydd Eifionydd; Preseli) as Favourable and one (Corsydd Mon) not assessed. Both Corsydd Eifionydd and Corsydd Mon would be classed as Unfavourable at the moment. The condition of all sites during the current reporting round will have at best stayed the same or more likely to have deteriorated further e.g. Aberbargoed Grasslands.