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

Conservation status assessment for the species:

S1065 - Marsh fritillary butterfly (*Euphydryas aurinia*)

UNITED KINGDOM

IMPORTANT NOTE - PLEASE READ

- The information in this document represents 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.
- It is based on supporting information provided by the geographically-relevant Statutory Nature Conservation Bodies, which is documented separately.
- The 2019 Article 17 UK Approach document provides details on how this supporting information contributed to the UK Report and the fields that were completed for each parameter.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Maps showing the distribution and range of the species are included (where available).
- Explanatory notes (where provided) are included at the end. These provide additional audit trail information to that included within the UK assessments. Further underpinning explanatory notes are available in the related country-level reports.
- 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; and/or (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species).
- The UK-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**
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	1994-2018
2.3 Distribution map	Yes
2.4 Distribution map Method used	Based mainly on expert opinion with very limited 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

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

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

England
United Kingdom Buttlerfly Monitoring Scheme Annual Report 2016, Botham et al, CEH 2016. http://www.ukbms.org/docs/reports/2016/Butterfly Ann Report 2016.pdf
The State of Britain's Butterflies 2015, Butterfly Conservation 2016. https://butterfly-conservation.org/files/soukb-2015.pdf
Scotland
Marsh Fritillary Site Review 2018: Butterfly Conservation Scotland report to SNH. Unpublished document.
Natura Plans for Scotland, Feature Assessment Paper. Unpublished document.
SAC Feature Assessment Datasheet. SNH internal document.
Brereton, T.M., Botham, M.S., Middlebrook, I., Randle, Z., Noble D. & Roy, D.B. 2017. United Kingdom Butterfly Monitoring Scheme report for 2016. Centre for Ecology & Hydrology & Butterfly Conservation.
Biodiversity Action Reporting System (BARS) data - http://ukbars.defra.gov.uk/archive/plans/targets.asp?HAP=&SAP=%7B1C1352D3%2D0BCA%2D4BE0%2DB2B0%2DE1E5AF28930B%7D&M=1
Butterfly Conservation trend analysis - www.ukbms.org/docs/reports/2011/UKBMS summary tables 2011.pdf.
Butterflies for the New Millennium webpage - http://butterfly-conservation.org/text/64/butterfly_distribution.html.
Littlewood, N.A. & Stockan, J.A. 2012. Surveillance of priority terrestrial invertebrates in Scotland. SNH report.
UK Butterfly Monitoring Scheme data for Marsh Fritillary - www.ukbms.org/SpeciesFactsheets.aspx?speciesId=50

Botham, M.S., Ash, D., Aspey, N., Bourn, N.A.D., Bulman, C.R., Roy, D.B., Swain, J., Zannese, A. & Pywell, R.F. 2011. The effects of habitat fragmentation on niche requirements of the marsh fritillary, Euphydryas aurinia, (Rottemburg, 1775) on calcareous grasslands in southern UK. Journal of Insect Conservation 15: 269-277.
Buglife - Invertebrate records from sites that are mainly across Scotland (dr1363) - Records provided by Invertebrate records from sites that are mainly across Scotland, accessed through NBN Atlas website.
Highland Biological Recording Group (dp7) - Records provided by Highland Biological Recording Group, accessed through NBN Atlas website.
Caledonian Conservation (dp4) - Records provided by Caledonian Conservation, accessed through NBN Atlas website.
Butterfly Conservation (dr481) - Butterfly distribution data from the Butterflies for the New Millennium recording scheme, courtesy of Butterfly Conservation and the Biological Records Centre.
NBN Atlas website at http://www.nbnatlas.org Accessed 27 June 2018.
Biological Records Centre (dp77) - Records provided by Biological Records Centre, accessed through NBN Atlas website.
Buglife (dp1) - Records provided by Buglife, accessed through NBN Atlas website.
Butterfly Conservation (dp71) - Records provided by Butterfly Conservation, accessed through NBN Atlas website.
Scottish Natural Heritage (dp9) - Records provided by Scottish Natural Heritage, accessed through NBN Atlas website.
UK Butterfly Monitoring Scheme (UKBMS) (dr1206) - Records provided by UK Butterfly Monitoring Scheme (UKBMS), accessed through NBN Atlas website.
HBRG Insects Dataset (dr965) - Records provided by HBRG Insects Dataset, accessed through NBN Atlas website.
Lorn Natural History Group (dp59) - Records provided by Lorn Natural History Group, accessed through NBN Atlas website.
Wider Countryside Butterfly Scheme (WCBS) (dr1383) - Records provided by Wider Countryside Butterfly Scheme (WCBS), accessed through NBN Atlas website.
MIDAS - Management Information on Designated Areas in Scotland (SNH)
van Swaay, C., Wynhoff, I., Verovnik, R., Wiemers, M., Lopez Munguira, M., Maes, D., Sasic, M., Verstrael, T., Warren, M. & Settele, J. 2010. Euphydryas aurinia. The IUCN Red List of Threatened Species 2010: e.T174182A7024283
Hula, V., M. Konvicka, A. Pavlicko & Z. Fric. 2004. Marsh fritillary (Euphydryas aurinia) in the Czech Republic:
monitoring, metapopulation structure, and conservation of an endangered butterfly. Entomologica Fennica 15:231-241.
Schtickzelle, N., J. Choutt, P. Goffart, V. Fichefet & M. Baguette. 2005. Metapopulation dynamics and conservation
of the marsh fritillary butterfly: population viability analysis and management options for a critically endangered species in Western Europe. Biological Conservation 126:569-581.
The UK Butterfly Monitoring Scheme (UKBMS) - http://www.ukbms.org/speciesfactsheets.aspx?speciesId=50
Zimmermann, K. et al. 2011. Demography of adults of the Marsh fritillary butterfly, Euphydryas aurinia
(Lepidoptera: Nymphalidae) in the Czech Republic: Patterns across sites and seasons. Eur. J. Entomol. 108: 243-254.
LNHG Biological Records Dataset (dr819) - Records provided by LNHG Biological Records Dataset, accessed through NBN Atlas website.
Site Condition Monitoring of Marsh Fritillary on designated sites in west Scotland

2014-15 (dr850) - Records provided by Site Condition Monitoring of Marsh Fritillary on designated sites in west Scotland 2014-15, accessed through NBN Atlas website.
SNH Invertebrate Site Condition Monitoring 2013/14: Lismore Lochs SSSI (dr356) - Records provided by Caledonian Conservation Ltd, accessed through NBN Atlas website.
Wales
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.
Caerphilly County Borough Council 2017. Aberbargoed Grasslands Ecosystem Restoration Project. Caerphilly County Borough Council, unpublished report.
Coker, S. 2014. Pembrokeshire Marsh Fritillary Survey 2013. Unpublished report by the Pembrokeshire Marsh Fritillary Recording Group.
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Fowles, A.P. 2011. Metapopulation studies of the marsh fritillary Euphydryas aurinia: the need for interconnected grassland landscapes. In: Proceedings of a Memorial Conference for Dr David Paul Stevens, 1958-2007. Grassland Ecologist and Conservationist. CCW Staff Science Report No. 10/03/05. Eds. T.H. Blackstock, E.A. Howe, J.P. Rothwell, C.A. Duigan, & P.S. Jones, pp. 43-50. Bangor, Countryside Council for Wales.
Fowles, A.P. 2013. European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora
(92/43/EEC) Supporting documentation for the Third Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2007 to December 2012 Conservation status assessment for Species: S1065 - Marsh Fritillary (Euphydryas aurinia).
Fowles, A.P. & Smith, R.G. 2006. Mapping the habitat quality of patch networks for the marsh fritillary Euphydryas aurinia (Rottemburg, 1775) (Lepidoptera, Nymphalidae) in Wales. Journal of Insect Conservation. 10: 161-177.
Graham, A. 2005. Marsh fritillary Euphydryas aurinia habitat & larval web survey in the Harlech area. CCW Regional Report No. CCW/NW/05/1. Countryside Council for Wales.
Graham, A.N. 2013. Marsh fritillary Euphydryas aurinia habitat & larval web survey around Llwyn-iarth, Dolgellau, 2013. Unpublished report.
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Sazer, D. 2014. Assessment of Marsh Fritillary Habitat Quality around Cors Erddreiniog SAC, Anglesey. NRW Evidence Report No. 09. Natural Resources Wales, Bangor.
Sazer, D. 2014. Assessment of Marsh Fritillary Habitat Quality around Gweunydd Blaencleddau SAC, Pembrokeshire. NRW Evidence Report No. 46. Natural Resources Wales, Bangor.
Sazer, D. 2016. Assessment of Marsh Fritillary Habitat Quality on Castlemartin Range, Pembrokeshire in 2015. NRW Evidence Report No. 152. Natural Resources Wales, Bangor.
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Smith, R.G. 2014. Marsh Fritillary Habitat Connectivity Project - Contract for habitat assessment in the Amman Valley. Second year. Unpublished report for NPT & Carmarthenshire Councils.

Smith, R.G. 2016. Re: Marsh Fritillary Habitat Connectivity Project - Amman Valley and north NPT. Report of three year's activity, 2013 to 2015. Unpublished report for NPT & Carmarthenshire Councils.
Smith, R.G. 2017. Marsh Fritillary - further work to establish strength and habitat extent and quality in Carmarthenshire 2016 - Report of Findings. Unpublished report for Carmarthenshire County Council.
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Tordoff, G. & Pschera, J. 2016. The status of the marsh fritillary in Wales: 2016. Butterfly Conservation Wales, unpublished report.
Tordoff, G. & Williams, C. 2013. Marsh fritillary colony update surveys in 2012 and 2013 Butterfly Conservation Wales, unpublished report.
Tordoff, G. & Williams, C. 2015. Marsh Fritillary Population Status in Wales: 2014 update. Butterfly Conservation Wales, unpublished report.
Tordoff, G. & Williams, C. 2018. The status of the marsh fritillary in Wales: 2017 Butterfly Conservation Wales, unpublished report.
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Wilkinson, K. unpublished Marsh Fritillary SAC monitoring data. Natural Resources Wales.
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N.Ireland
ASHER, J., WARREN, M.S., FOX, R., HARDING, P., JEFFCOATE, G. & JEFFCOATE, S., 2001. The Millennium Atlas of Butterflies in Britain and Ireland. Oxford: Oxford University Press.
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FOWLES, A.P. & SMITH, R.G. 2006. Mapping the habitat quality of patch

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THOMAS, J.A. TELFER, M.G., ROY, D.B., PRESTON, C.D., GREENWOOD, J.J.D., ASHER, J., FOX, R., CLARKE, R.T., LAWTON, J.H., 2004. Comparative Losses of British Butterflies, Birds, and Plants and the Global Extinction Crisis. Science, 303, 1879-1880.
THOMAS, C.D. & ABERY, J. C. G., 1995. Estimating rates of butterfly decline from distribution maps: the effect of scale. Biological Conservation, 73, 59-65.
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5. Range

5.1 Surface area (km²)	47514.49
5.2 Short-term trend Period	2007-2018
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	Based mainly on expert opinion with very limited data
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: Approximately equal to (≈) c) Unknown d) Method: The FRR has changed since 2013. An FRR operator has been used because it has not been possible to calculate the exact FRR. The FRR is considered to be sufficient to maintain a viable population and is no less that when the Habitats Directive came into force in the UK. For further details see the 2019 Article 17 UK Approach document.
5.11 Change and reason for change in surface area of range	Use of different method The change is mainly due to: Use of different method
5.12 Additional information	The current range surface area calculation does not represent the real range surface area. Change in availability of underpinning mapping data has resulted in an apparent decrease in range area compared to 2013, but this is not due to genuine change. Expert opinion considers the trend in range to be stable. The real range surface area is considered to be the range in 2013 - 62,933km2. The FRR in 2013 was 60,833km2. The FRR has been changed to an operator 'approximately equal to current' to reflect this. For further information see the 2019 Article 17 UK Approach document.

6. Population

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

6.1 Year or period	1994-2018	
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	1352
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	2007-2018	
6.8 Short-term trend Direction	Stable (0)	
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		
6.12 Long-term trend Direction		
6.13 Long-term trend Magnitude	a) Minimum	
	b) Maximum	
	c) Confidence interval	
6.14 Long-term trend Method used		
6.15 Favourable reference population (using the unit in 6.2 or 6.4)	a) Population size	
	b) Operator	Less than (<)
	c) Unknown	
	d) Method	The FRP has changed since 2013. An FRP operator has been used because it has not been possible to calculate the exact FRP value. The FRP is considered to be less than the current population. For further information see the 2019 Article 17 UK Approach document.
6.16 Change and reason for change in population size	Genuine change Improved knowledge/more accurate data	
	The change is mainly due to:	Genuine change
6.17 Additional information	The FRP has been set as 'Less than' for this species as there have been increases over the short-term trend period in Wales and Northern Ireland. This species experiences substantial variations among years within single populations and among multiple populations in a single year (Zimmermann et al. 2011). Large	

variations are expected over time due to metapopulation dynamics. In some cases, rates of population turnover are so great that small, fragmented habitats may not be viable in the long term (Hula et al. 2004, Schtickzelle et al. 2005).

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (for long-term survival)?	No
	b) Is there a sufficiently large area of unoccupied habitat of suitable quality (for long-term survival)?	No
7.2 Sufficiency of area and quality of occupied habitat Method used	Based mainly on extrapolation from a limited amount of data	
7.3 Short-term trend Period	2007-2018	
7.4 Short-term trend Direction	Stable (0)	
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	The sufficiency of the quantity and quality of habitat for the species varies across its distribution, with insufficiency reported in Wales and England.	

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Conversion into agricultural land (excluding drainage and burning) (A01)	M
Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	M
Mowing or cutting of grasslands (A08)	M
Intensive grazing or overgrazing by livestock (A09)	M
Drainage for use as agricultural land (A31)	M
Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (L02)	M

Threat	Ranking
Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (L02)	M
Conversion into agricultural land (excluding drainage and burning) (A01)	M
Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	M
Mowing or cutting of grasslands (A08)	M

Intensive grazing or overgrazing by livestock (A09)	M
Extensive grazing or undergrazing by livestock (A10)	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)
Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation (CB01)
Reduce impact of transport operation and infrastructure (CE01)
Improvement of habitat of species from the directives (CS03)

9.6 Additional information

10. Future prospects

10.1 Future prospects of parameters	a) Range	Poor
	b) Population	Poor
	c) Habitat of the species	Poor
10.2 Additional information		Future trend of Range is Negative - decreasing <=1% (one percent or less) per year on average; Future trend of Population is Negative - decreasing <=1% (one percent or less) per year on average; and Future trend of Habitat for the species is Negative - decreasing <=1% (one percent or less) per year on average. For further information on how future trends inform the Future prospects conclusion see the 2019 Article 17 UK Approach document.

11. Conclusions

11.1. Range	Favourable (FV)
11.2. Population	Favourable (FV)

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

11.3. Habitat for the species	Unfavourable - Inadequate (U1)
11.4. Future prospects	Unfavourable - Inadequate (U1)
11.5 Overall assessment of Conservation Status	Unfavourable - Inadequate (U1)
11.6 Overall trend in Conservation Status	Stable (=)
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	Conclusion on Range reached because: (i) the short-term trend direction in Range surface area is stable; and (ii) the current Range surface area is approximately equal to the Favourable Reference Range. Conclusion on Population reached because: (i) the short-term trend direction in Population size is increasing; and (ii) the current Population size is not less than the Favourable Reference Population. Conclusion on Habitat for the species reached because the sufficiency: (i) of the area of occupied and unoccupied habitat is unknown and (ii) of the habitat quality is unknown for the long-term survival of the species; and (iii) the short-term trend in area of habitat is stable. Conclusion on Future prospects reached because: (i) the Future prospects for Range are poor; (ii) the Future prospects for Population are poor; and (iii) the Future prospects for Habitat for the species are poor. Overall assessment of Conservation Status is Unfavourable-inadequate because two of the conclusions are Unfavourable-inadequate. Overall trend in Conservation Status is based on the combination of the short-term trends for Range – stable, Population – stable, and Habitat for the species – stable. Overall assessment of Conservation Status has not changed since 2013. Overall trend in Conservation Status has not changed since 2013.

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	828
12.2 Type of estimate	Best estimate	
12.3 Population size inside the network Method used	Based mainly on expert opinion with very limited data	
12.4 Short-term trend of population size within the network Direction	Stable (0)	

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

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

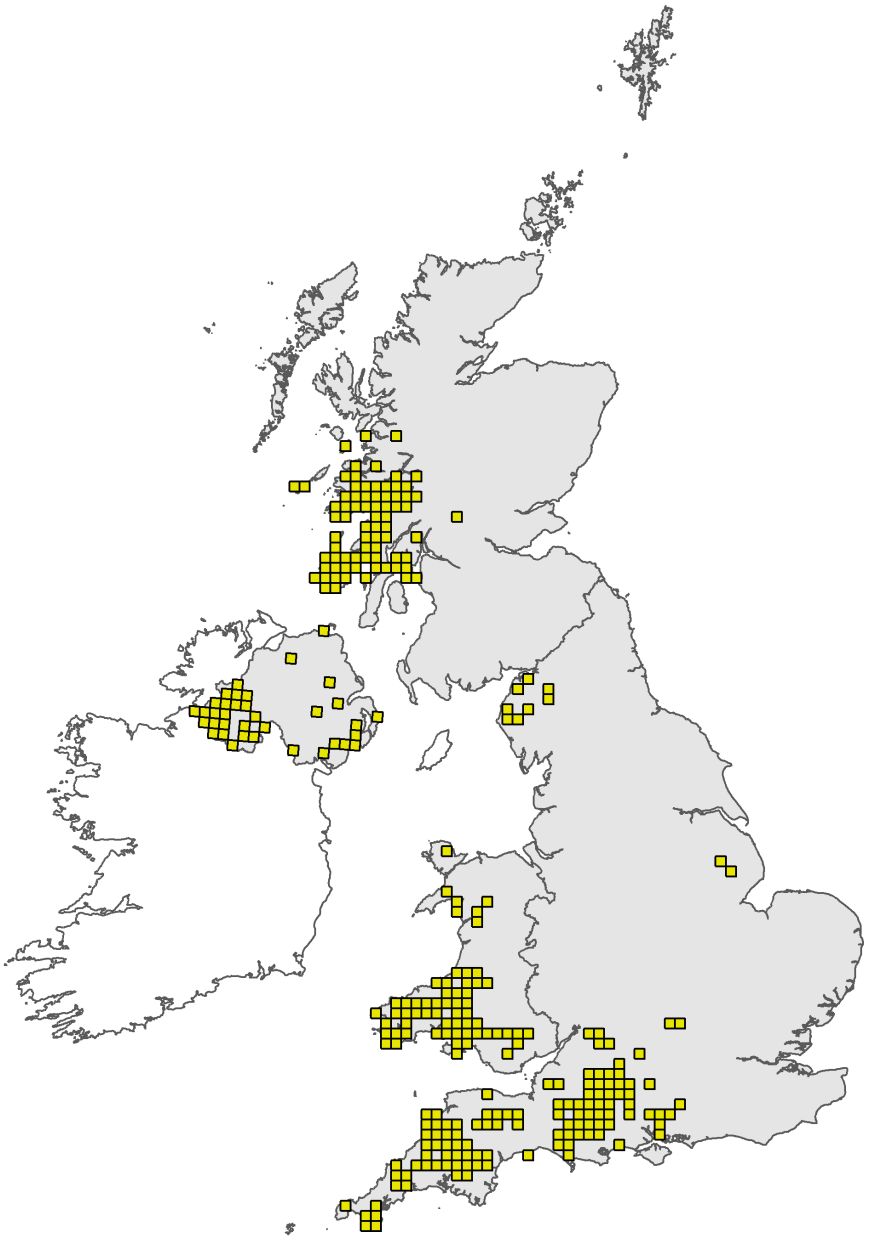

Figure 1: UK distribution map for S1065 - Marsh fritillary butterfly (*Euphydryas aurinia*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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

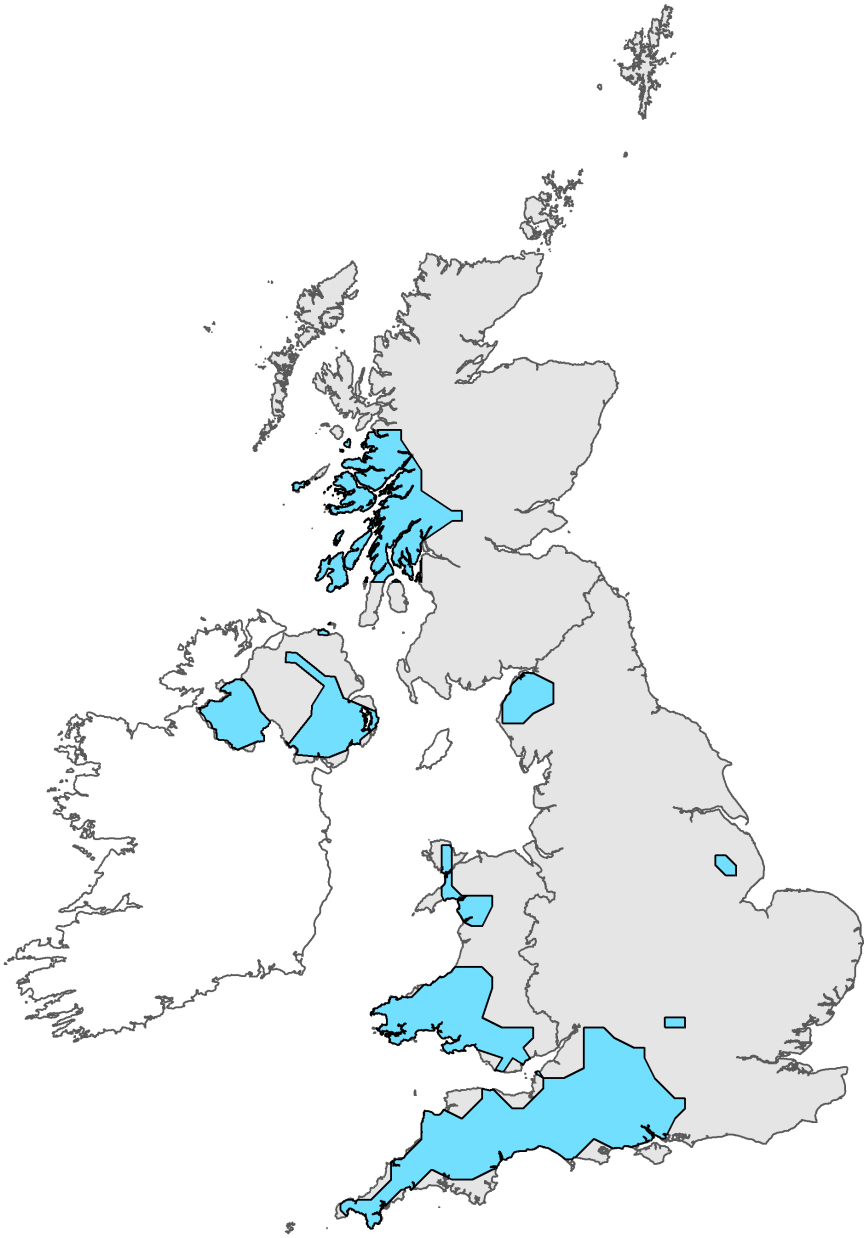

Figure 2: UK range map for S1065 - Marsh fritillary butterfly (*Euphydryas aurinia*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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.