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*)

NORTHERN IRELAND

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 (Northern Ireland 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	1994-2018
2.3 Distribution map	Yes
2.4 Distribution map Method used	Complete survey or a statistically robust estimate
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

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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Cooper, A., McCann, T. and Rogers, D. (2009) Northern Ireland Countryside Survey 2007: Broad Habitat Change 1998-2007. Northern Ireland Environment Agency. Research and Development Series No. 09/06. Web address; https://www.daera-ni.gov.uk/sites/default/files/publications/doe/natural-report-broad-habitat-change-1998-2007.pdf
COWLEY, M., THOMAS, C., THOMAS, J. & WARREN, M. 1999. Flight areas of British butterflies: assessing species status and decline. Proceedings of the Royal Society of London (Series B), 266: 1587-1592.
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HOBSON, R., BOURN, N.A.D., WARREN, M.S. & BRERETON, T.M. 2001. The marsh fritillary in England: a review of status and habitat condition. S01-31. Butterfly Conservation.
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.
http://www.ukbms.org/resources.aspx

5. Range

5.1 Surface area (km²)		
5.2 Short-term trend Period		
5.3 Short-term trend Direction	Uncertain (u)	
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	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	110
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	Complete survey or a statistically robust estimate	
6.7 Short-term trend Period	2007-2018	
6.8 Short-term trend Direction	Increasing (+)	

6.9 Short-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval
6.10 Short-term trend Method used	Complete survey or a statistically robust estimate
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 c) Unknown d) Method
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	

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)?	Yes
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	
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	2007-2018	
7.4 Short-term trend Direction	Decreasing (-)	
7.5 Short-term trend Method used	Complete survey or a statistically robust estimate	
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
Conversion into agricultural land (excluding drainage and burning) (A01)	H

Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	H
Mowing or cutting of grasslands (A08)	H
Intensive grazing or overgrazing by livestock (A09)	H
Burning for agriculture (A11)	M
Application of synthetic (mineral) fertilisers on agricultural land (A20)	M
Agricultural activities generating air pollution (A27)	M
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	M
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	M
Increases or changes in precipitation due to climate change (N03)	M

Threat	Ranking
Conversion into agricultural land (excluding drainage and burning) (A01)	H
Abandonment of grassland management (e.g. cessation of grazing or mowing) (A06)	H
Mowing or cutting of grasslands (A08)	H
Intensive grazing or overgrazing by livestock (A09)	H
Burning for agriculture (A11)	M
Application of synthetic (mineral) fertilisers on agricultural land (A20)	M
Agricultural activities generating air pollution (A27)	M
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	M
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	M
Increases or changes in precipitation due to climate change (N03)	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

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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)
Adapt mowing, grazing and other equivalent agricultural activities (CA05)
Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production (CA09)
Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures (CA04)
Reduce/eliminate air pollution from agricultural activities (CA12)
Reduce impact of outdoor sports, leisure and recreational activities (CF03)
Reduce impact of transport operation and infrastructure (CE01)
Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes (CL01)
Implement climate change adaptation measures (CN02)

9.6 Additional information	Environmental Farming Scheme funding should help to target conservation action in key habitats for the Marsh frtillary butterfly.

10. Future prospects

10.1 Future prospects of parameters	a) Range b) Population c) Habitat of the species
10.2 Additional information	Environmental Farming Scheme funding should help to target conservation action in key habitats for the Marsh fritillary butterfly.

11. Conclusions

11.1. Range	
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	

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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	24
12.2 Type of estimate		Minimum
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		Stable (0)
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

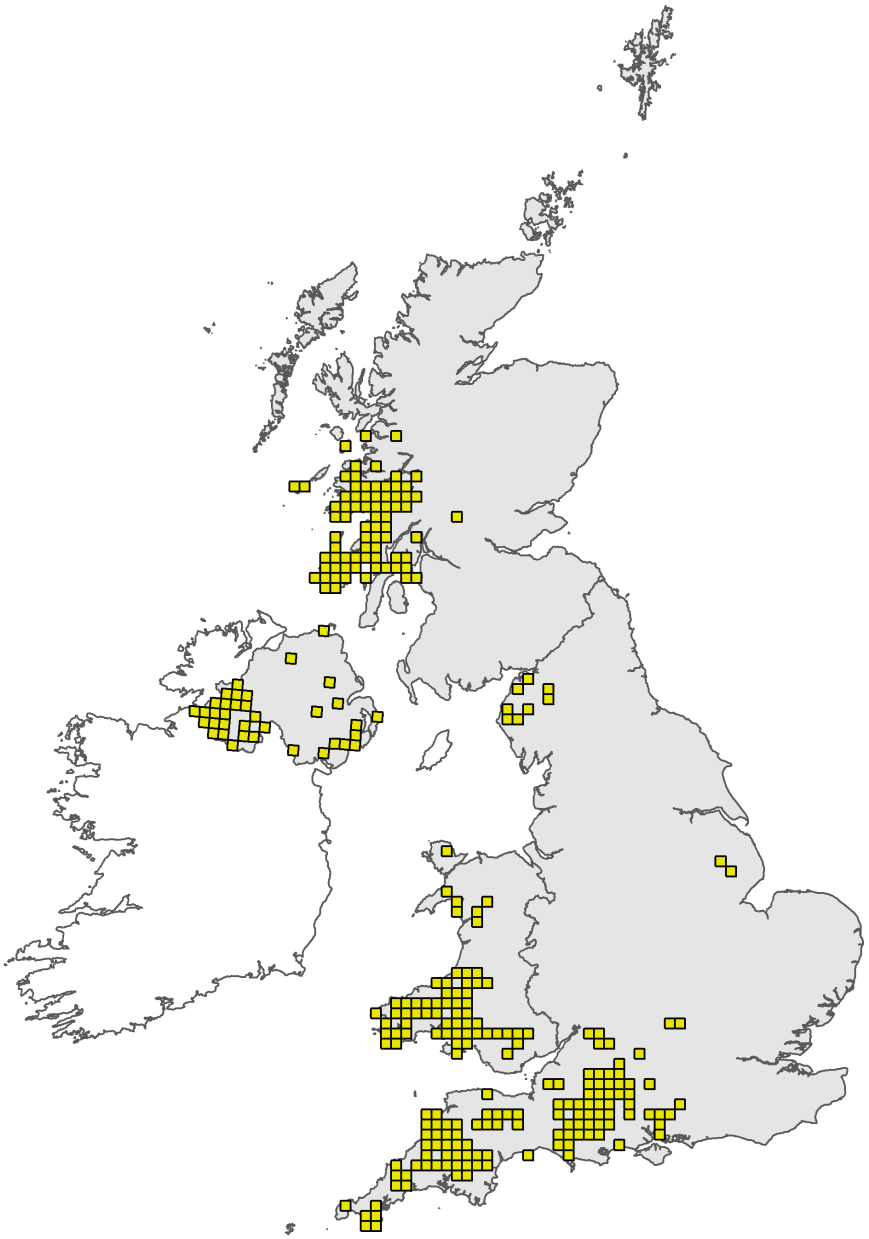

Figure 1: UK distribution map for S1065 - Marsh fritillary butterfly (*Euphydryas aurinia*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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

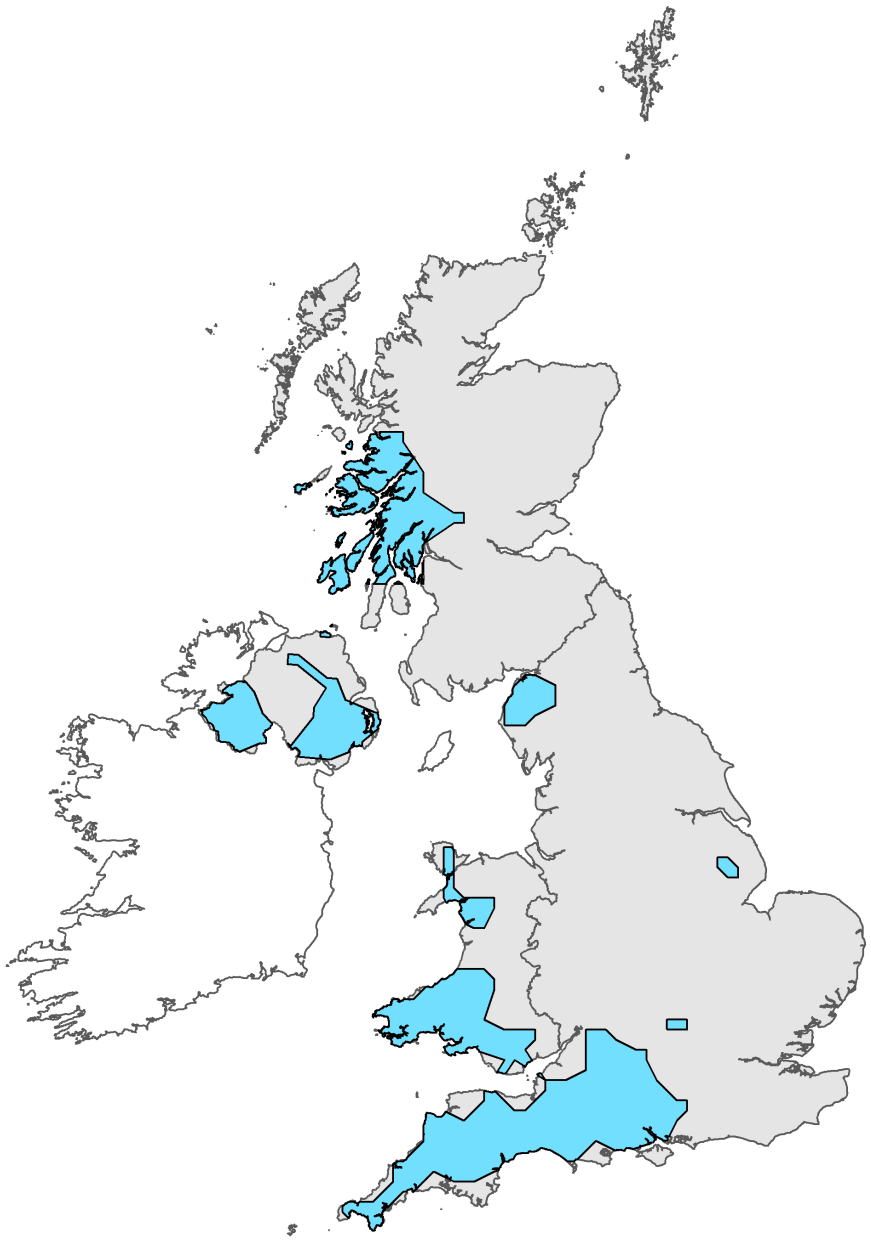

Figure 2: UK range map for S1065 - Marsh fritillary butterfly (*Euphydryas aurinia*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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)

Field label	Note
2.4 Distribution map; Method used	Distribution map based upon records of breeding (i.e. egg, larvae, larval webs, newly emerged adults) from 1994-2018.

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

Field label	Note
5.3 Short term trend; Direction	Short term trend in range reported as uncertain. Since 1994 there appears to have been an increase in range, particularly in the west of NI, but it is difficult to know whether this is the result of a genuine change in the species' distribution, or due to improved recording.
5.11 Change and reason for change in surface area of range	Historically (i.e. before 1994), it appears that the species has declined from parts of the east of NI due to factors such as habitat loss, parasitism contributing to extinction of isolated metapopulations, etc. Although the short term trend in range has been reported as uncertain, since 1994 there appears to have been an increase in range, particularly in the west of NI, but it is difficult to know whether this is the result of a genuine change in the species' distribution, or due to improved recording. Ceratainly over the last 12 years, there have been increased efforts to intensify recording efforts across NI. Hence reported as No change.
6.1 Year or Period	All breeding records from 1994 included (see 6.2 below).
6.2 Population size	Recorded as 1x1km records of breeding Marsh Fritillary (i.e. eggs, larvae, larval webs and pre-adults , but NOT flying adults).
6.8 Short term trend; Direction	Recorded as increasing. Although survey efforts have intensified over the last 12 years, the number of records for the period 2007-2018 are so much greater than the previous 12 year period, that it is highly probable that the population has experienced an increase - i.e. 1201 records compared to 181 records. A similar increase when individual records are converted to 1x1km grid squares - i.e. 52 in the period 2013-2018 and 61 in the period 2007-2012; compared to 13 in the period 2001-2006, and 18 in the period 1994-2000.
6.16 Change and reason for change in population size	The 6x-7x-fold increase in records for the recent 12 year period has undoubtedly been influenced by intensified recording efforts, but it also highly likely that the species has experienced a real increase in population as well.
7.1 Sufficiency of area and quality of occupied habitat	The marsh fritillary butterfly E. aurinia is found in a range of habitats in which its larval food plant, devil's-bit scabious Succisa pratensis, occurs. In NI, most colonies are found in wet grasslands - often associated with the Annex 1 type H6410 Molinia meadows on calcareous, peaty or clayey-siltladen soils (Molinion caeruleae) - or on dry calcareous grasslands associated with sand dune systems. However, the species is also present in fens and on wet heath and bog margins. NI contains a relatively large area of such habitats, and particularly H6410, which it holds a significant proportion of the UK resource of. Hence there is believed to be sufficient habitat for the species.
7.2 Sufficiency of area and quality of occupied habitat; Method used	Assessment at 7.1 based upon Condition Assessment of SACs and ASSIs that hold populations of Marsh Fritillary or suitable habitat, in addition to data on suitable habitats in the wider countryside, taken from the NI Countryside Survey.
7.4 Short term trend; Direction	Short-term trend believed to be decreasing - largely based upon data for the Purple Moor-grass and rush pasture habitat that the species is most closely associated with in NI.

7.5 Short term trend; Method used	Data taken from NI Countryside Survey.
8.1 Characterisation of pressures/ threats	The Marsh Fritillary exists in metapopulations, with individual colonies prone to very wide fluctuations in size from year to year, that are believed to be largely driven by parasitic wasps. As suitable habitat becomes more fragmented, small and isolated colonies are very susceptible to extinctions. At some wetland sites, flood events have been observed to decimate populations. However, the major threats to the marsh fritillary are the destruction or modification of its habitat caused by factors such as development and agricultural intensification; and inappropriate management of sites, including abandonment of grazing (undergrazing leading to scrub encroachment will reduce the availability of the food plant Succisa pratensis and impact populations). The Marsh Fritillary depends especially on extensive farming systems, and appropriate light grazing by cattle in its unimproved grassland habitats. Hence, many of the threats and pressures identified are applicable to the habitats on which it occurs - i.e. A01: Conversion into agricultural land (excluding drainage and burning); A06: Abandonment of grassland management (e.g. cessation of grazing or of mowing); A08: Mowing or cutting of grasslands; A09: Intensive grazing or overgrazing by livestock; A11: Burning for agriculture; A20: Application of synthetic (mineral) fertilisers on agricultural land; A27: Agricultural activities generating air pollution; E01: Roads, paths railroads and related infrastructure (e.g. bridges, viaducts, tunnels); N03: Increases or changes in precipitation due to climate change. Note that aerial deposition of Nitrogen has been listed as a pressure and threat because both of the main habitats for the species in NI (wet grassland and sand dune) are sensitive to this. Monitoring and survey of new ASSIs has confirmed that the population fluctuations appear to be dependent upon weather, food supply and the proportion of caterpillars killed by parasitic braconid wasps of the genus Cotesia.
8.2 Sources of information	Sources: Condition assessment of Marsh Fritillary SACs/ASSIs and habitats assocaited with the species (e.g Purple Moor-grass and rsuh pastures), in addition to expert opinion.
9.5 List of main conservation measures	Most measures aimed at maintaining the low intensity cattle grazing which the species largely depends upon within the habitats in which it occurs. These measures being implemented by NIEA at its own properties (e.g Montiaghs Moss SAC), by partners (e.g. National Trust at Murlough SAC, and through co-operative working with private landowners within NIEA's MOSS scheme. In addition, Environmental Farming Scheme funding should help to target conservation action in key habitats for the Marsh frtillary butterfly, both inside and outside designated sites.
10.1 Future prospects of parameters	After very large historical declines in the range of the species, Marsh Fritillary appears to be currently maintaining its range within NI - and may even be extending it in the west of the Province - although this may be due to intensified recording efforts. Similarly, the population appears to be stable. However, it will require more data collected on a systematic basis from the All-Ireland Marsh Fritillary survey to clarify trends in range and population. NI contains a large amount of suitable habitat for the species, although NI Countryside Survey suggest that the main grassland type favoured by the species - Purple Moor-grass and Rush pasture - may be declining in extent. Perhaps the greatest threat is not habitat loss per se, but habitat fragmentation and colony isolation, leading to colony extinctions. It is hoped that current and future conservation measures will safeguard metapopulation ranges - e.g. Environmental Farming Scheme funding should help to target conservation action in key habitats for the Marsh fritillary butterfly.

12.1 Population size inside the pSCIs, SCIs and SACs network	Marsh Fritillary is currently listed as an SAC selection feature on 5 SACs: Murlough; Aughnadarragh Lough; Ballykilbeg; Montiaghs Moss; Magilligan - however, the species has not been recorded at Magilligan since 1993. From 1994 to 2018, the species has been recorded from 24 occupied 1x1km squares within these SACs. Note that 2013 Report recorded a value of 251 occupied 1x1 km squares, but this was estimated in a completely different way - i.e. assumed that the butterfly was present over the whole of the SAC, rather than where there were specific records of breeding (i.e. larval webs, eggs or newly emerged adults).
12.4 Short term trend of the population size within the network; Direction	Assessed as stable - although note numbers in coloines are prone to very wide fluctuations from year to year.