Appendix 6D

Marsh Fritillary Report

MWP

Marsh Fritillary Habitat Condition Assessment and Larval Web Survey Report

Ballycar Wind Farm

Ballycar Green Energy Ltd.

January 2024

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22156	6010	A	February 2023	MaK, HD, ÚW	-	-	DRAFT
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1. Introduction

Ecologists from Malachy Walsh and Partners (MWP), Engineering and Environmental Consultants were commissioned to produce an assessment of the potential impacts of the proposed Ballycar Wind Farm on the flora and fauna of the receiving environment as part of an Environmental Impact Assessment Report (EIAR). As part of this assessment, surveys for marsh fritillary (*Euphydras aurinia*) were completed. The aims of these surveys were to:

- Record suitable habitat for this species within the study area.
- Confirm presence/absence of this species within the study area via the recording of larval webs and/or adult butterflies on the wing.

2. Species Ecology

2.1 Life Cycle

Adult marsh fritillary butterflies fly from May to June. Mature females lay their eggs on the underside of the leaves of the larval food plant Devil's bit scabious (*Succisa pratensis*). Eggs are laid in single large batches of up to 350 eggs. The larvae hatch roughly 30 days later in early to mid-June and, as soon as they hatch, they spin a web close to the ground around the plant's basal leaves. The larvae live in large groups creating small areas of dense webs feeding mainly on the undersides of the leaves to which the web is attached. During the larval stage they cluster together, basking in sunlight to increase their body temperature to aid food digestion. By late September these dense webs and the black coloured larvae are very conspicuous and can be seen attached to basal leaves and, in some circumstances, to other surrounding vegetation.

The larvae stay together in colonies until March when they disperse and pupate, after which they emerge as adults in early April to May, when the cycle begins again.

2.2 Habitat Requirements

Although it is widely recorded in Ireland, the species generally exists in extremely localised colonies where it is only found in areas of low intensity land use, typically where grazing by cattle at low stock density occurs, or areas not mown too short or too frequently. The species requires a low (ideally 25 cm or less), open sward with at least a 25% density of devil's-bit scabious (Harding, 2009). Because the feeding larvae will abandon the initial plant once it has been consumed, females never lay on isolated plants. There must be adjoining plants to which the feeding larvae can move quickly and easily. The distribution of the food plant, and therefore the species itself, is influenced by its preference for moist soil and a patchwork of short and long vegetation (8 – 25 cm). Availability of the food plant is, also, strongly correlated with elevation (Botham *et al*., 2011).

Vegetation structure within the sward has been shown to be important; the height of the surrounding vegetation is likely to be important in creating and maintaining the optimal microclimatic conditions necessary for larval survival (Porter, 1981; Konvicka *et al*. 2003; Fowles & Smith 2006) and there must be a patchwork of open areas within the sward where larvae can receive sufficient sunlight close to ground level in which to bask.

In addition to the constraints outlined in the preceding paragraphs, slope aspect is an important factor influencing the selection of egg laying locations. Because the larvae need sunlight that penetrates close to ground level the female selects plants that face south, southwest or south east, that are sheltered, but not overshadowed or obstructed, by a tussock of sheltering grass or scrub e.g. gorse (*Ulex* spp.), heather or bog myrtle (*Myrica gale*).

On exposed west facing slopes the eggs are placed on sheltered plants near the base of the slopes. North facing slopes are never used.[1]

Colonies have been recorded on sand dunes, fens, cutover raised bogs, blanket bogs, wet heaths, unimproved wet, neutral or calcareous grasslands, and calcareous and coastal heaths. The sites that support these colonies are maintained by a variety of management, accidental or deliberate, including grazing and burning. Most sites are in lowland situations below 200 m but the species has been recorded up to 350 m elevation and perhaps higher in recent years. Suitable habitat conditions typically occur on the edges of bogs and fens, sand dunes, limestone pavement and tracksides but not on improved grassland, intact bogs, deeply flooded sites or woodland[2].

Marsh fritillary populations occupy the landscape in a meta-population structure, *i.e.* a central population with outlying colonies occupying habitat patches connected via migration. Negative impacts to suitable habitat patches may result in meta-populations becoming more fragmented and isolated, reducing meta-population function.

3. Legislation and Conservation Status

Marsh fritillary (*Euphydras aurinia*) is listed under Annex II of the EU Habitats Directive meaning that the conservation of such a species requires the designation of Special Areas of Conservation (SACs). This species is currently listed as a qualifying interest of 12 SACs in Ireland[3] the closest of which is 32km to the south west of the Ballycar project site across the Shannon estuary in County Limerick (Barrigone SAC (000432)). Under the Red List of Irish Butterflies (Regan *et* al. 2010), this species has been most-recently assessed as 'Vulnerable'. The overall assessment of the conservation status of this species is currently 'Inadequate' but 'Improving' (NPWS, 2019).

4. Site Overview

The study area for the proposed development covers 407 hectares and is situated approximately 3 km north of Limerick City and suburbs in south-east County Clare. Moving west to east, the site encompasses the townlands of Glennagross, Ballycar North, Cappateemore East, Ballycannan West, Ballycannan East and Ballycar South. The topography of the study area primarily slopes southwards, with lands typically less intensively managed for agriculture in the upland areas, which is also where the most commercial forestry is located.

The condition and ecological importance of habitats within the study area is varied. Remnant areas of upland blanket bog and wet heath occur but these areas are fragmented likely due to the expansion of commercial forestry and intensive agricultural practices. Wet grassland and dry-humid acid grassland habitats also occur and while the majority of these areas show signs of extensive cattle activity (trampling, over-grazing, exposed peat/soils), some areas are species-rich and not as intensively grazed.

[1] Content in this paragraph adapted from Harding (2009)
[2] Content in this paragraph derived from NPWS (2019)
[3] https://www.npws.ie/protected-sites/sac Accessed: 28th February 2023

5. Methodology

5.1 Desk Study

A search of species records held by the National Biodiversity data centre (NBDC) for the hectad R56 which encompasses the study area was carried out. Also, information received from the NPWS data request for rare and protected species was reviewed with regard to this species. The NPWS Article 17 spatial dataset for marsh fritillary distribution[4] was reviewed. Additionally, a review of SAC sites where this species is listed as a qualifying interest was carried out.

It is noted that this species is under-recorded in Ireland and the distribution datasets for this species are not complete (NPWS, 2019).

5.2 Field Survey

5.2.1 Survey Areas

As described in **Section 4**, above, the majority of the study area comprises commercial forestry and intensively managed agricultural lands, both of which do not provide suitable habitat for marsh fritillary. Several upland areas were chosen as survey areas for the following reasons:

- Semi-natural habitats with reduced agricultural land management in the context of the study area.
- The presence of devil's-bit scabious, which was noted during previous ecological field surveys.

Table 1, below, lists the survey areas and indicates the range of elevation, the slope aspect and the broad habitat category of each. The location of these survey areas is shown in **Figure 1,** below.

Table 1. Description of topographical and habitat characteristics of the survey areas. Habitats classified according to Fossitt (2000).

Survey Area Name	Elevation Range (metres)	Slope	Habitat Type
Field A	180 – 240	South/Southwest	Dry-humid acid grassland, with areas to the south in mosaic with Improved agricultural grassland
Field B	200 – 245	South/Southwest	Wet heath, Dry-humid acid grassland, Wet grassland
Field C	180 – 200	South	Wet grassland
Field D	200 – 240	East/Southeast and West	Dry-humid acid grassland with elements of Improved agricultural grassland to the east, upland blanket bog, Wet grassland
Field E	170 – 200	Southeast	Dry-humid acid grassland in mosaic with Improved agricultural grassland

[4] https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17/2019/species/arthropods Accessed: 28th February 2023

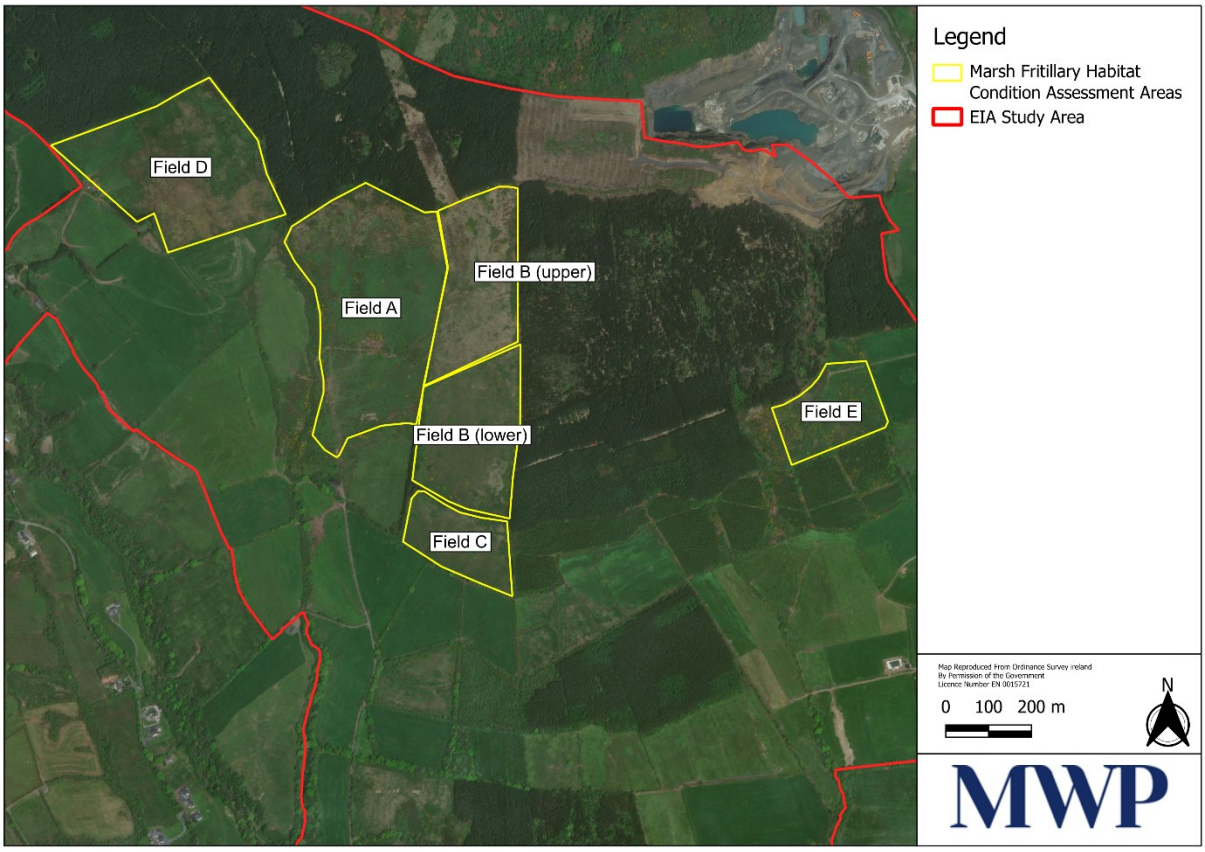

Figure 1: Map of the marsh fritillary habitat condition assessment survey areas within the study area.

5.2.2 Survey Design

Surveying comprised two main elements; a Habitat Condition Assessment (HCA) survey and a larval web survey, both based on the methodology outlined in the National Biodiversity Data Centre's (NBDC) Habitat Condition Assessment for Marsh Fritillary and the NBDC's Marsh Fritillary Larval Web Survey[5]. Field data sheets from both surveys are included as Appendices to this document.

5.2.2.1 Habitat Condition Assessment Survey

Habitat condition assessment surveys were carried out at the Survey Areas outlined in **Table 1,** above. These surveys were carried out by staff ecologists from MWP on the 20th and 22nd of July, and on the 19th of August 2021.

The Habitat Condition Survey involved the collection of data on the following criteria for each sample location:

- Vegetation height recorded by the average band into which the sample fell (i.e., A = <12 cm, B = 12-25 cm, C = 25-50 cm, and D = >50 cm);
- Devil's bit scabious abundance (i.e., A = 1-2 plants /m^2, B = 3-9 plants /m^2, C = 10+ plants /m^2, and D = no plants);
- Presence of structured vegetation, tussocks/dominant tussock-forming species;
- Presence of low invading scrub;

[5] Available at: Marsh Fritillary Monitoring Scheme - National Biodiversity Data Centre (biodiversityireland.ie) Accessed: 28th February 2023

- Evidence of stock grazing (poaching, dung etc.);
- Grid-co-ordinates.

Details of other characteristics including slope aspect, exposure and information on the extent of management, if any, such as enclosure, grazing, burning etc, were also recorded.

Based on the results of the assessment each survey area was assigned to one of the following categories:

- Good Condition Habitat (GC): >20% frequency of Scabious of category B/C abundance growing in 12-25 cm tall swards and <10% cover of tall scrub (>0.5 m tall);
- Suitable (Under-grazed) Habitat (SU): >20% frequency of Scabious of category B/C abundance growing in >25 cm tall swards and <20% frequency of Scabious of category B/C abundance growing in 12-25 cm tall swards;
- Suitable (Over-grazed) Habitat (SO): >20% frequency of Scabious of category B/C abundance growing in <12cm tall swards and <20% frequency of Scabious of category B/C abundance growing in 12-25 cm tall swards;
- Unsuitable habitat (US): <5% frequency of Scabious of category B/C abundance growing in >25 cm tall swards.

5.2.2.2 Larval Web Survey

Based on the results of the habitat condition assessment surveys, larval web surveys were only carried out in Survey Areas Field B and Field C. These surveys were carried out by MWP ecologists and a Lepidoptera specialist, Dr Ken Bond, on the 3rd and the 6th of September 2021.

This survey comprised a plotted zigzag walking transect, covering as much of the suitable habitat (identified during the habitat condition assessment surveys) as possible, recording the number of occupied webs encountered. Unoccupied webs were also recorded, in order to collect more data of the study area.

6. Results

6.1 Desk Study

Nine records of marsh fritillary are held by the NBDC for this hectad, the most recent record being from 2017. The closest mapped record occurs approximately 3 km west of the study area. Of the 12 SAC sites which are designated for marsh fritillary in Ireland, Barrigone SAC (000432) was found to be the nearest to the study area, *c*. 32 km to the southwest, across the River Shannon Estuary in County Limerick. A review of Article 17 distribution mapping for this species determined that the hectad R56 is encompassed within the species known range but is not included in the known distribution.

6.2 Habitat Condition Assessment

A total of 49.7 ha were surveyed for marsh fritillary within the study area. Using the guidance set out in the NBDC's Habitat Condition Assessment for Marsh Fritillary information sheets, it was determined that only two of the survey areas, Field B and Field C, contained suitable habitat for marsh fritillary (See **Plate 1** below). This accounted

for 18.5 ha (14.5 ha in Field B, and 4 ha in Field C) of suitable habitat, 37.2% of the total of the survey sites. See **Table 2,** below for survey results, refer to **Appendix A** for copies of the field data sheets.

Plate 1. Suitable habitat for Marsh Fritillary with an abundance of the food plant, devil's-bit scabious, present, identified in Field B (top) and Field C (bottom).

Table 2. Habitat Condition Assessment Survey Results

Assessment	Field A (east)	Field A (west)	Field B (upper)	Field B (lower)	Field C	Field D	Field E
% frequency of scabious	16.7	32	66.7	92.6	85	30.8	14.3
% frequency of scabious (A)	16.7	32	9.1	0	5	11.5	14.3
% frequency of scabious (B)	0	0	27.3	14.8	40	17.3	0
% frequency of scabious (C)	0	0	30.3	77.8	40	0	0
% frequency of 12-25 cm swards	25	40	66.7	66.7	45	44.2	21.4

Assessment	Field A (east)	Field A (west)	Field B (upper)	Field B (lower)	Field C	Field D	Field E
% frequency of (B/C) in 12-25 cm swards	0	0	48.4	59.3	35	9.6	0
% frequency of (B/C) in <12 cm swards	0	0	0	33.3	35	5.8	0
% frequency of (B/C) in >25 cm swards	0	0	9.1	0	10	1.9	0
% frequency of structured vegetation	58.3	64	78.1	66.7	65	65.3	25
% frequency of low invading scrub	33.4	40	18	26	30	15.4	25
% frequency of stock grazing signs	52	50	63.6	59.3	75	73.1	21.4
Tall (0.5m) scrub cover (%)	25	25	<10	<10	<10	<10	15
Habitat Condition Category	US	US	GC	GC	GC/SO	US	US

6.3 Larval Web Survey

During the larval web surveys, occupied webs were only recorded in Field B. Six occupied larval webs were recorded there within 'Dry-humid acid grassland (GS3)' habitat which occurs in mosaic with 'Wet grassland (GS4)' further south. An example of larval webs recorded within Field B is shown in **Plate 2,** below. No larval webs were recorded in the 'Wet heath (HH3)' habitat further north. A further 13 unoccupied webs were recorded in Field B. At locations where the larval webs were recorded, structured vegetation was present and devil's-bit scabious was abundant. Cattle grazing was evident within Field B at the time of survey.

Field B is predominantly surrounded by habitats that are not in suitable condition for marsh fritillary, apart from Field C, which is located directly south, and while over-grazed in places, contains suitable habitat. No larval webs were recorded in Field C.

Using the guidance set out in the NBDC's Marsh Fritillary Larval Web Survey information sheets, it was determined that Field B had an estimated population size of 11 webs per hectare. See **Appendix B** for data sheets and transect map.

Plate 2. Examples of occupied webs recorded in Field B during larval web surveys

7. Discussion

Suitable habitat for marsh fritillary, as per habitat criteria as set out by the NBDC as 'Good Condition Habitat', was identified within the study area, however not within the planning boundary for the proposed Ballycar Wind Farm. As outlined in **Section 2.2,** above, this species has a meta-population structure. The extent and magnitude of these populations is dependent on the suitability of habitat patches and the topography of the landscape. Therefore, if suitable habitat is present, but the species is not recorded during larval web surveys, it is recommended that such suitable habitat is conserved/improved as there is potential for this habitat to be occupied/re-occupied in future. In this case, 'Good Condition Habitat' was identified in Field B and Field C, while larval webs were recorded in Field B only.

The remaining surveyed areas were determined to be 'Unsuitable Habitat'. The reason for this is likely the sparse distribution of devil's-bit scabious within these survey areas in comparison to the devil's-bit scabious abundance recorded in Field B and Field C (**Table 2**).

There will be no loss of 'Good Condition Habitat', as recorded during these surveys, as a result of the proposed wind farm development as both Field B and Field C are outside the proposed works area/planning boundary. Up to one third of the remaining survey areas (Fields A, D and E), determined to be 'Unsuitable Habitat', will be removed as a result of the proposed development to facilitate the construction of the turbines and access tracks.

8. References

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Porter, K. (1981). *The Population Dynamics of Small Colonies of the Butterfly* Euphydryas Aurinia*: A Thesis.* (Doctoral dissertation, Faculty of Biological and Agricultural Sciences, Oxford).

Regan, E.C., Nelson, B., Aldwell, B., Bertrand, C., Bond, K., Harding, J., Nash, D., Nixon, D. and Wilson, C.J. (2010) *Ireland Red List No. 4 – Butterflies*. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Ireland.

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Appendix A

Marsh Fritillary Habitat Condition Assessment Field Sheets

National Biodiversity Data Centre
Documenting Ireland's Wildlife

FIELD A (WEST) + (east.)

An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

HABITAT CONDITION ASSESSMENT FOR MARSH FRITILLARY

HCA = (WS)

Habitat condition monitoring for the Marsh Fritillary involves fixed point habitat recording on a structured walk across a site, from which an assessment can be made. A separate survey and assessment should be completed for each sub-site.

METHOD

- Establish a W shape (zigzag) route that will cross thoroughly and evenly the whole site/sub-site.
- Decide stopping distances along this route where recordings of habitat condition will be made e.g. every 10 or 20 paces. Aim to have at least 20 stopping points for a small site (<1 ha) more than 40 stopping points for a medium-sized site (1-5 ha) and more than 50 stopping points for a large site (>5 ha).
- Follow your route and at each stopping point measure (in cm) the vegetation height at the point you stop (measure to the top of the leaves i.e. ignore the flowers of grasses and plants). Then, using an imaginary box with sides of 1 m in front of you, record the presence of Devil's-bit Scabious in one of these abundance categories (A = 1-2 plants, B = 3-9 plants, C = 10+ plants, D = No plants). Using the same area, record (mark with an 'X') the presence or absence of these three habitat attributes: structured vegetation, low (<25 cm tall) invading scrub with a cover of >10% and stock grazing signs (e.g. tracks, poach marks, dung).
- At the end of the assessment, then provide an estimate the cover (%) of tall (>0.5 m) scrub for the whole site/sub-site.

MARSH FRITILLARY HABITAT CONDITION SURVEY FORM

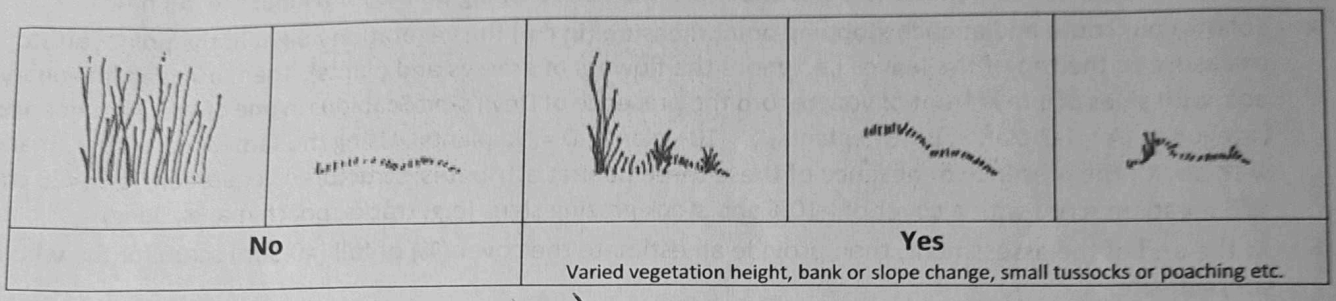
SITE NAME	Ballycar	**SUB-SITE**	Field A (west) + (east)
OS GRID REF	R 55006 63933.	**RECORDER(S)**	MdK, HD
SURVEY DATE	20/07/2021	**TALL SCRUB COVER (%)**	25%.
MANAGEMENT OBSERVATIONS (e.g. enclosed, recently grazed or cut, peat cutting, burning, etc.)	grazed ag grassland / acid grassland GS4 / GS3 + areas of scrub. (gorse + bramble)		
ASPECT AND SLOPE DESCRIPTION The main aspect and a brief description of whether the site has suitable habitat covering a variety of aspects (including variation at a micro scale such as banks)	sloping South. + hummocky areas.		
EXPOSURE (e.g. high exposure sites would be open coastal sites)	Not exposed.		

STRUCTURED WALK RECORDS

Key for recording attributes:

1. Vegetation Height:	A = <12 cm	B = 12-25 cm	C = 25-50 cm	D = >50 cm
2. Devil's bit scabious:	A = 1-2 plants/m^2	B = 3-9 plants/m^2	C = 10+ plants/m^2	D = None
3. Structured vegetation:	Mark with an 'X' if there is presence of any steps in vegetation or ground that provide localised protection from elements at ground level. See figure below for guidance.			
4. Low invading scrub:	Tick if low invading scrub (e.g. birch, gorse, bog myrtle) <25 cm tall and >10% cover present. The word 'invading' is important here. Do not include scrub that is an integral part of the habitat (e.g. Juniper in Juniper heath systems).			
5. Evidence of stock grazing:	Tick if localised evidence present (e.g. poaching, dung, etc.)			

Example of Structured Vegetation:



No	Yes
	Varied vegetation height, bank or slope change, small tussocks or poaching etc.

West (start) ITM 554805 664029

Stop number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Vegetation Height	A	B	A	B	A	B	A	A	A	C	A	A	B	B	A	A	A	B	B	A
2. Devil's-bit Scabious abundance	A	D	D	D	A	A	D	D	D	D	D	D	D	D	D	D	A	A	D	D
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation	X	X	X	X	X	X	X					X	X	X	X	X		X	X	X
4. Low invading scrub	X	X	X	X									X	X	X	X				
5. Evidence of stock grazing			X	X					X					X	X		X	X	X	X

East → [redacted] 555116 664004

Stop number	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1. Vegetation Height	A	B	B	B	A	A	B	C	A	A	C	C	C	C	A	A	B	A	B	A
2. Devil's-bit Scabious abundance	D	D	A	A	A	D	A	D	D	A	D	D	D	A	D	D	D	A	D	D
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation				X			X		X			X	X	X	X		X	X	X	
4. Low invading scrub		X	X						X	X	X			X	X	X				
5. Evidence of stock grazing	X	X	X		X	X		X		X	X		X	X		X				

Stop number	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
1. Vegetation Height	A	B	A	A	A	B	B	C	A											
2. Devil's-bit Scabious abundance	D	D	D	D	D	D	D	D	D											
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation		X				X	X	X	X											
4. Low invading scrub							X	X												
5. Evidence of stock grazing	X	X	X	X	X															

D = >50 cm
D = None
r ground
ee figure

ATA ANALYSIS (Optional)

FIELD A

At the end of the field survey, calculate the following for each area sampled:

	W	E		W	E
MEAN VEG. HEIGHT (cm)	<12cm [14]	<12cm [12]	% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS	0	
% FREQUENCY OF SCABIOUS	32%	16.7%	% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS	0	
% FREQUENCY OF SCABIOUS CATEGORY A	32%	16.7%	% FREQUENCY OF SRUCTURED VEGETATION	64%	58.3%
% FREQUENCY OF SCABIOUS CATEGORY B	0%		% FREQUENCY OF LOW INVADING SCRUB	40%	33.4%
% FREQUENCY OF SCABIOUS CATEGORY C	0%		% FREQUENCY OF STOCK GRAZING SIGNS	52%	50%
% FREQUENCY OF 12-25 cm SWARDS	40%	25%	TALL (>0.5 m) SCRUB COVER (%)	25%	
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	0				

HABITAT CONDITION ASSESSMENT

Assess the condition to one of the following categories:

Good Condition Habitat (**GC**): >20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards and <10% cover of tall scrub (>0.5 m tall)

Suitable (Under-grazed) Habitat (**SU**): >20% freq. of Scabious of category B/C abundance growing in >25 cm tall swards and <20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards

Suitable (Over-grazed) Habitat (**SO**): >20% freq. of Scabious of category B/C abundance growing in <12cm tall swards and <20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards

Unsuitable habitat (**US**): <5% freq. of Scabious of category B/C abundance growing in >25 cm tall swards

MANAGEMENT ALERTS

Undergrazing indicators	Overgrazing indicators
>10% cover of tall scrub (>0.5 m tall)	<25% frequency of structured vegetation
>75% frequency of structured vegetation	>80% frequency of evidence of stock grazing
>10% frequency of low invading scrub with >10% cover	Mean vegetation height <12 cm
<20% frequency of evidence of stock grazing	
Mean vegetation height >25cm	

SUMMARY DATA ANALYSIS

CONDITION CATEGORY		NOTES
MANAGEMENT ISSUES	↑ scrub ↑ cattle activity	Given that no category B/C DB abundance was recorded both west + east of Field A are considered unsuitable habitat.

FIELD B. - UPPER

National Biodiversity Data Centre
Documenting Ireland's Wildlife

An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

HABITAT CONDITION ASSESSMENT FOR MARSH FRITILLARY

HCA = GC

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- Decide stopping distances along this route where recordings of habitat condition will be made e.g. every 10 or 20 paces. Aim to have at least 20 stopping points for a small site (<1 ha) more than 40 stopping points for a medium-sized site (1-5 ha) and more than 50 stopping points for a large site (>5 ha).
- Follow your route and at each stopping point measure (in cm) the vegetation height at the point you stop (measure to the top of the leaves i.e. ignore the flowers of grasses and plants). Then, using an imaginary box with sides of 1 m in front of you, record the presence of Devil's-bit Scabious in one of these abundance categories (A = 1-2 plants, B = 3-9 plants, C = 10+ plants, D = No plants). Using the same area, record (mark with an 'X') the presence or absence of these three habitat attributes: structured vegetation, low (<25 cm tall) invading scrub with a cover of >10% and stock grazing signs (e.g. tracks, poach marks, dung).
- At the end of the assessment, then provide an estimate the cover (%) of tall (>0.5 m) scrub for the whole site/sub-site.

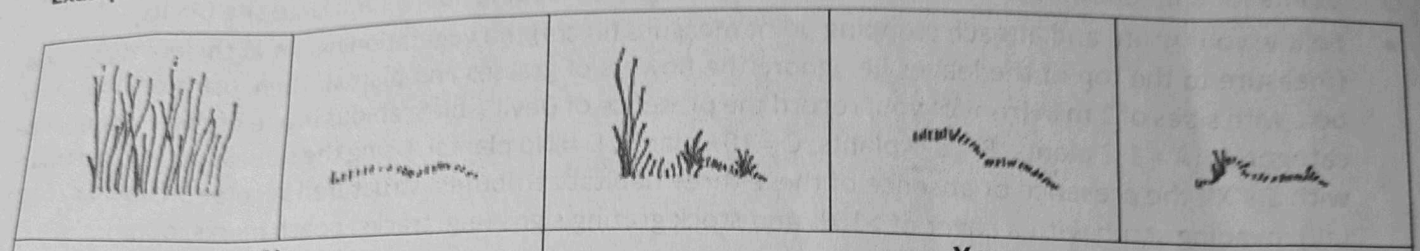
MARSH FRITILLARY HABITAT CONDITION SURVEY FORM

SITE NAME	Ballycor	**SUB-SITE**	field B - Upper
OS GRID REF	R 55241 63744	**RECORDER(S)**	Mak + HD
SURVEY DATE	19/08/2021	**TALL SCRUB COVER (%)**	< 10%
MANAGEMENT OBSERVATIONS (e.g. enclosed, recently grazed or cut, peat cutting, burning, etc.)	comprising elements of wet heath habitat, scrub, + GS3. evidence of cattle activity		
ASPECT AND SLOPE DESCRIPTION The main aspect and a brief description of whether the site has suitable habitat covering a variety of aspects (including variation at a micro scale such as banks)	Sloping south hummocky areas		
EXPOSURE (e.g. high exposure sites would be open coastal sites)	Low		

Key for ...				
1. Vegetation Height:	A = <12 cm			
2. Devil's bit scabious:	A = 1-2 plants/m²	B = 3-9 plants/m²	C = 10+ plants/m²	D = ... (Optional)
3. Structured vegetation:	Mark with an 'X' if there is presence of any steps in vegetation or ... that provide localised protection from elements at ground level. See ... below for guidance.			
4. Low invading scrub:	Tick if low invading scrub (e.g. birch, gorse, bog myrtle) <25 cm tall and >10% cover present. The word 'invading' is important here. Do not include scrub that is an integral part of the habitat (e.g. Juniper in Juniper heath systems).			
5. Evidence of stock grazing:	Tick if localised evidence present (e.g. poaching, dung, etc.)			

... survey, calculate th... ...m) ...ous ...us ...s

Example of Structured Vegetation:



No	Yes
	Varied vegetation height, bank or slope change, small tussocks or poaching etc.

FIELD B - UPPER ITM 555198 664077

Stop number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Vegetation Height	B	C	B	B	B	B	B	B	B	B	C	C	C	C	B	B	B	B	B	C
2. Devil's-bit Scabious abundance	D	D	B	B	C	B	C	D	D	C	D	D	B	C	C	C	C	C	C	B
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation	X	X	X	X	X	X	X	X	X	X		X	X	X	X			X	X	X
4. Low invading scrub	X	X			X			X				X		X						
5. Evidence of stock grazing	X	X	X	X	X			X	X	X		X		X	X	X	X	X	X	X

Stop number	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1. Vegetation Height	B	B	B	B	A	A	A	C	B	A	B	B	B							
2. Devil's-bit Scabious abundance	D	B	D	B	D	D	D	A	A	A	C	B	B							
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation	X	X	X	X			X	X		X	X		X							
4. Low invading scrub																				
5. Evidence of stock grazing						X	X			X		X	X							

Stop number	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
. Vegetation Height																				
Devil's-bit Scabious abundance																				
ark with an 'X' if attributes below are present at each stop																				
Structured vegetation																				
Low invading scrub																				
Evidence of stock grazing																				

FIELD B-UPPER

ALYSIS (Optional)

of the field survey, calculate the following for each area sampled:

EG. HEIGHT (cm)	12-25 (B) [22]	% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS	0%
UENCY OF SCABIOUS	66.7%	% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS	9.1%
QUENCY OF SCABIOUS GORY A	9.1%	% FREQUENCY OF SRUCTURED VEGETATION	78.1%
EQUENCY OF SCABIOUS ATEGORY B	27.3%	% FREQUENCY OF LOW INVADING SCRUB	18%
% FREQUENCY OF SCABIOUS CATEGORY C	30.3%	% FREQUENCY OF STOCK GRAZING SIGNS	63.6%
% FREQUENCY OF 12-25 cm SWARDS	66.7%	TALL (>0.5 m) SCRUB COVER (%)	<10%
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	48.4%		

HABITAT CONDITION ASSESSMENT

Assess the condition to one of the following categories:

Good Condition Habitat (**GC**): >20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards and <10% cover of tall scrub (>0.5 m tall)

Suitable (Under-grazed) Habitat (**SU**): >20% freq. of Scabious of category B/C abundance growing in >25 cm tall swards and <20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards

Suitable (Over-grazed) Habitat (**SO**): >20% freq. of Scabious of category B/C abundance growing in <12cm tall swards and <20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards

Unsuitable habitat (**US**): <5% freq. of Scabious of category B/C abundance growing in >25 cm tall swards

MANAGEMENT ALERTS

Undergrazing indicators	Overgrazing indicators
>10% cover of tall scrub (>0.5 m tall)	<25% frequency of structured vegetation
>75% frequency of structured vegetation	>80% frequency of evidence of stock grazing
>10% frequency of low invading scrub with >10% cover	Mean vegetation height <12 cm
<20% frequency of evidence of stock grazing	
Mean vegetation height >25cm	

SUMMARY DATA ANALYSIS

CONDITION CATEGORY		NOTES
MANAGEMENT ISSUES	↑ cattle activity	Good condition habitat.

National Biodiversity Data Centre
Documenting Ireland's Wildlife

Field B - Lower ~~+ Field C~~.

An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

HABITAT CONDITION ASSESSMENT FOR MARSH FRITILLARY

HCA = GC.

Habitat condition monitoring for the Marsh Fritillary involves fixed point habitat recording on a structured walk across a site, from which an assessment can be made. A separate survey and assessment should be completed for each sub-site.

METHOD

- Establish a W shape (zigzag) route that will cross thoroughly and evenly the whole site/sub-site.
- Decide stopping distances along this route where recordings of habitat condition will be made e.g. every 10 or 20 paces. Aim to have at least 20 stopping points for a small site (<1 ha) more than 40 stopping points for a medium-sized site (1-5 ha) and more than 50 stopping points for a large site (>5 ha).
- Follow your route and at each stopping point measure (in cm) the vegetation height at the point you stop (measure to the top of the leaves i.e. ignore the flowers of grasses and plants). Then, using an imaginary box with sides of 1 m in front of you, record the presence of Devil's-bit Scabious in one of these abundance categories (A = 1-2 plants, B = 3-9 plants, C = 10+ plants, D = No plants). Using the same area, record (mark with an 'X') the presence or absence of these three habitat attributes: structured vegetation, low (<25 cm tall) invading scrub with a cover of >10% and stock grazing signs (e.g. tracks, poach marks, dung).
- At the end of the assessment, then provide an estimate the cover (%) of tall (>0.5 m) scrub for the whole site/sub-site.

MARSH FRITILLARY HABITAT CONDITION SURVEY FORM

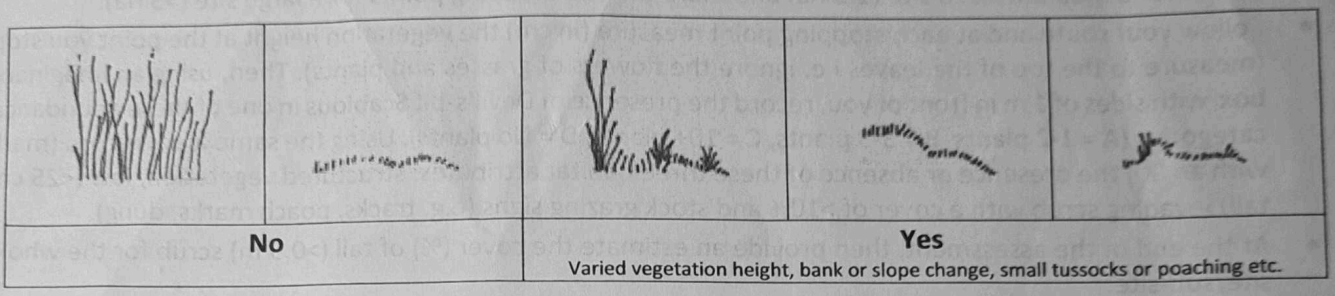
SITE NAME	BALLYCAR	**SUB-SITE**	Field B - Lower ~~+ Field C~~
OS GRID REF	~~R 55~~ R 55205 63474	**RECORDER(S)**	Mak + HD
SURVEY DATE	19/08/2021	**TALL SCRUB COVER (%)**	<10%
MANAGEMENT OBSERVATIONS (e.g. enclosed, recently grazed or cut, peat cutting, burning, etc.)	Mix of GS3 + GS4. Signs of cattle activity - hummocky areas		
ASPECT AND SLOPE DESCRIPTION The main aspect and a brief description of whether the site has suitable habitat covering a variety of aspects (including variation at a micro scale such as banks)	Sloping South.		
EXPOSURE (e.g. high exposure sites would be open coastal sites)	low		

STRUCTURED WALK RECORDS

Key for recording attributes:

1. Vegetation Height:	A = <12 cm	B = 12-25 cm	C = 25-50 cm	D = >50 cm
2. Devil's bit scabious:	A = 1-2 plants/m^2	B = 3-9 plants/m^2	C = 10+ plants/m^2	D = None
3. Structured vegetation:	Mark with an 'X' if there is presence of any steps in vegetation or ground that provide localised protection from elements at ground level. See figure below for guidance.			
4. Low invading scrub:	Tick if low invading scrub (e.g. birch, gorse, bog myrtle) <25 cm tall and >10% cover present. The word 'invading' is important here. Do not include scrub that is an integral part of the habitat (e.g. Juniper in Juniper heath systems).			
5. Evidence of stock grazing:	Tick if localised evidence present (e.g. poaching, dung, etc.)			

Example of Structured Vegetation:



No | **Yes**

Varied vegetation height, bank or slope change, small tussocks or poaching etc.

Stop number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Vegetation Height	B	B	A	A	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A	B
2. Devil's-bit Scabious abundance	D	C	C	C	B	C	C	C	B	D	C	C	C	C	C	C	C	C	B	B
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation	X	X	X	X	X			X							X	X	X	X	X	X
4. Low invading scrub																				X
5. Evidence of stock grazing	X	X		X	X		X	X	X							X	X	X	X	X

Stop number	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1. Vegetation Height	B	A	B	A	B	B	B													
2. Devil's-bit Scabious abundance	C	C	C	C	C	C	C													
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation	X	X	X	X	X	X														
4. Low invading scrub		X	X	X	X	X	X													
5. Evidence of stock grazing	X	X	X	X			X													

Stop number	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
1. Vegetation Height																				
2. Devil's-bit Scabious abundance																				
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation																				
4. Low invading scrub																				
5. Evidence of stock grazing																				

Field B - Lower

DATA ANALYSIS (Optional)

At the end of the field survey, calculate the following for each area sampled:

MEAN VEG. HEIGHT (cm)	12-25cm (B) [18]	% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS	33.3%
% FREQUENCY OF SCABIOUS	92.6%	% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS	0%
% FREQUENCY OF SCABIOUS CATEGORY A	0	% FREQUENCY OF SRUCTURED VEGETATION	66.7%
% FREQUENCY OF SCABIOUS CATEGORY B	14.8%	% FREQUENCY OF LOW INVADING SCRUB	26%
% FREQUENCY OF SCABIOUS CATEGORY C	77.8%	% FREQUENCY OF STOCK GRAZING SIGNS	59.3%
% FREQUENCY OF 12-25 cm SWARDS	66.7%	TALL (>0.5 m) SCRUB COVER (%)	<10%
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	59.3%		

HABITAT CONDITION ASSESSMENT

Assess the condition to one of the following categories:

Good Condition Habitat (**GC**): >20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards and <10% cover of tall scrub (>0.5 m tall)

Suitable (Under-grazed) Habitat (**SU**): >20% freq. of Scabious of category B/C abundance growing in >25 cm tall swards and <20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards

Suitable (Over-grazed) Habitat (**SO**): >20% freq. of Scabious of category B/C abundance growing in <12cm tall swards and <20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards

Unsuitable habitat (**US**): <5% freq. of Scabious of category B/C abundance growing in >25 cm tall swards

MANAGEMENT ALERTS

Undergrazing indicators	Overgrazing indicators
>10% cover of tall scrub (>0.5 m tall)	<25% frequency of structured vegetation
>75% frequency of structured vegetation	>80% frequency of evidence of stock grazing
>10% frequency of low invading scrub with >10% cover	Mean vegetation height <12 cm
<20% frequency of evidence of stock grazing	
Mean vegetation height >25cm	

SUMMARY DATA ANALYSIS

CONDITION CATEGORY		NOTES
MANAGEMENT ISSUES		Areas of GC (overall) + areas of SO in places

National Biodiversity Data Centre
Documenting Ireland's Wildlife

FIELD C.

An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

HABITAT CONDITION ASSESSMENT FOR MARSH FRITILLARY

HCA = GC/SO.

Habitat condition monitoring for the Marsh Fritillary involves fixed point habitat recording on a structured walk across a site, from which an assessment can be made. A separate survey and assessment should be completed for each sub-site.

METHOD

- Establish a W shape (zigzag) route that will cross thoroughly and evenly the whole site/sub-site.
- Decide stopping distances along this route where recordings of habitat condition will be made e.g. every 10 or 20 paces. Aim to have at least 20 stopping points for a small site (<1 ha) more than 40 stopping points for a medium-sized site (1-5 ha) and more than 50 stopping points for a large site (>5 ha).
- Follow your route and at each stopping point measure (in cm) the vegetation height at the point you stop (measure to the top of the leaves i.e. ignore the flowers of grasses and plants). Then, using an imaginary box with sides of 1 m in front of you, record the presence of Devil's-bit Scabious in one of these abundance categories (A = 1-2 plants, B = 3-9 plants, C = 10+ plants, D = No plants). Using the same area, record (mark with an 'X') the presence or absence of these three habitat attributes: structured vegetation, low (<25 cm tall) invading scrub with a cover of >10% and stock grazing signs (e.g. tracks, poach marks, dung).
- At the end of the assessment, then provide an estimate the cover (%) of tall (>0.5 m) scrub for the whole site/sub-site.

MARSH FRITILLARY HABITAT CONDITION SURVEY FORM

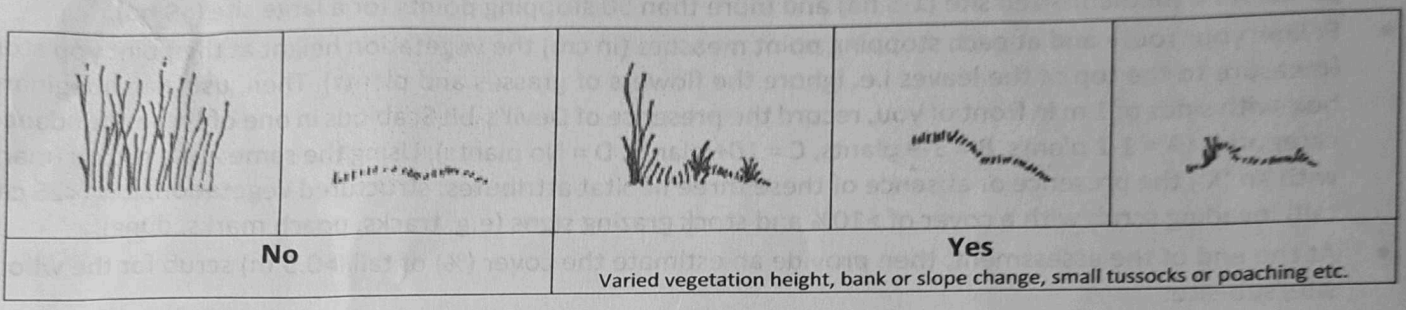
SITE NAME	Ballycar	**SUB-SITE**	Field C.
OS GRID REF	R 55192 63342	**RECORDER(S)**	Mak + HD
SURVEY DATE	19/08/2021	**TALL SCRUB COVER (%)**	<10%
MANAGEMENT OBSERVATIONS (e.g. enclosed, recently grazed or cut, peat cutting, burning, etc.)	Agricultural grassland + GS3/GS4		
ASPECT AND SLOPE DESCRIPTION The main aspect and a brief description of whether the site has suitable habitat covering a variety of aspects (including variation at a micro scale such as banks)	very slight South slope.		
EXPOSURE (e.g. high exposure sites would be open coastal sites)	low.		

STRUCTURED WALK RECORDS

Key for recording attributes:

1. Vegetation Height:	A = <12 cm	B = 12-25 cm	C = 25-50 cm	D = >50 cm
2. Devil's bit scabious:	A = 1-2 plants/m^2	B = 3-9 plants/m^2	C = 10+ plants/m^2	D = None
3. Structured vegetation:	Mark with an 'X' if there is presence of any steps in vegetation or ground that provide localised protection from elements at ground level. See figure below for guidance.			
4. Low invading scrub:	Tick if low invading scrub (e.g. birch, gorse, bog myrtle) <25 cm tall and >10% cover present. The word 'invading' is important here. Do not include scrub that is an integral part of the habitat (e.g. Juniper in Juniper heath systems).			
5. Evidence of stock grazing:	Tick if localised evidence present (e.g. poaching, dung, etc.)			

Example of Structured Vegetation:



No | **Yes** — Varied vegetation height, bank or slope change, small tussocks or poaching etc.

Stop number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Vegetation Height	A	B	B	B	B	C	C	B	B	A	A	B	A	A	A	A	B	B	A	A
2. Devil's-bit Scabious abundance	C	C	B	C	C	C	C	B	B	B	B	A	D	B	B	B	C	D	D	C
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation	X	X	X	X	X			X	X			X			X	X	X	X	X	
4. Low invading scrub						X	X	X										X	X	X
5. Evidence of stock grazing	X	X	X	X	X	X		X	X	X	X		X	X	X	X	X			

Stop number	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1. Vegetation Height																				
2. Devil's-bit Scabious abundance																				
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation																				
4. Low invading scrub																				
5. Evidence of stock grazing																				

Stop number	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
1. Vegetation Height																				
2. Devil's-bit Scabious abundance																				
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation																				
4. Low invading scrub																				
5. Evidence of stock grazing																				

DATA ANALYSIS (Optional)

FIELD C

At the end of the field survey, calculate the following for each area sampled:

MEAN VEG. HEIGHT (cm)		**% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS**	35%
% FREQUENCY OF SCABIOUS	85%	**% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS**	10%
% FREQUENCY OF SCABIOUS CATEGORY A	5%	**% FREQUENCY OF SRUCTURED VEGETATION**	65%
% FREQUENCY OF SCABIOUS CATEGORY B	40%	**% FREQUENCY OF LOW INVADING SCRUB**	30%
% FREQUENCY OF SCABIOUS CATEGORY C	40%	**% FREQUENCY OF STOCK GRAZING SIGNS**	75%
% FREQUENCY OF 12-25 cm SWARDS	45%	**TALL (>0.5 m) SCRUB COVER (%)**	<10%
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	35%		

HABITAT CONDITION ASSESSMENT

Assess the condition to one of the following categories:

Good Condition Habitat (**GC**): >20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards and <10% cover of tall scrub (>0.5 m tall)

Suitable (Under-grazed) Habitat (**SU**): >20% freq. of Scabious of category B/C abundance growing in >25 cm tall swards and <20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards

Suitable (Over-grazed) Habitat (**SO**): >20% freq. of Scabious of category B/C abundance growing in <12cm tall swards and <20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards

Unsuitable habitat (**US**): <5% freq. of Scabious of category B/C abundance growing in >25 cm tall swards

MANAGEMENT ALERTS

Undergrazing indicators	Overgrazing indicators
>10% cover of tall scrub (>0.5 m tall)	<25% frequency of structured vegetation
>75% frequency of structured vegetation	>80% frequency of evidence of stock grazing
>10% frequency of low invading scrub with >10% cover	Mean vegetation height <12 cm
<20% frequency of evidence of stock grazing	
Mean vegetation height >25cm	

SUMMARY DATA ANALYSIS

CONDITION CATEGORY		**NOTES**
MANAGEMENT ISSUES		

National Biodiversity Data Centre
Documenting Ireland's Wildlife

Field E
(NO FIELD D)

An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

HABITAT CONDITION ASSESSMENT FOR MARSH FRITILLARY

[HCA. = US]

Habitat condition monitoring for the Marsh Fritillary involves fixed point habitat recording on a structured walk across a site, from which an assessment can be made. A separate survey and assessment should be completed for each sub-site.

METHOD

- Establish a W shape (zigzag) route that will cross thoroughly and evenly the whole site/sub-site.
- Decide stopping distances along this route where recordings of habitat condition will be made e.g. every 10 or 20 paces. Aim to have at least 20 stopping points for a small site (<1 ha) more than 40 stopping points for a medium-sized site (1-5 ha) and more than 50 stopping points for a large site (>5 ha).
- Follow your route and at each stopping point measure (in cm) the vegetation height at the point you stop (measure to the top of the leaves i.e. ignore the flowers of grasses and plants). Then, using an imaginary box with sides of 1 m in front of you, record the presence of Devil's-bit Scabious in one of these abundance categories (A = 1-2 plants, B = 3-9 plants, C = 10+ plants, D = No plants). Using the same area, record (mark with an 'X') the presence or absence of these three habitat attributes: structured vegetation, low (<25 cm tall) invading scrub with a cover of >10% and stock grazing signs (e.g. tracks, poach marks, dung).
- At the end of the assessment, then provide an estimate the cover (%) of tall (>0.5 m) scrub for the whole site/sub-site.

MARSH FRITILLARY HABITAT CONDITION SURVEY FORM

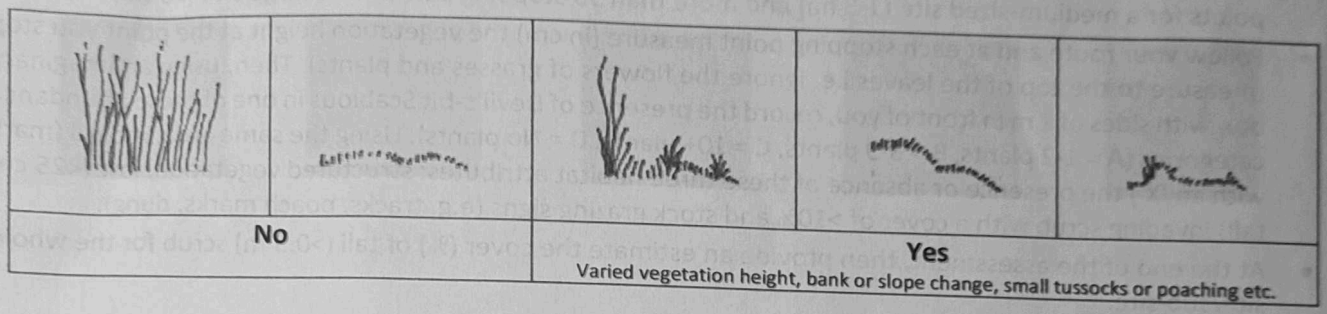
SITE NAME	Ballycar	**SUB-SITE**	field E
OS GRID REF	R 54611 64175	**RECORDER(S)**	Mak + HD.
SURVEY DATE	19.08.2021	**TALL SCRUB COVER (%)**	<10%.
MANAGEMENT OBSERVATIONS (e.g. enclosed, recently grazed or cut, peat cutting, burning, etc.)	Heavily grazed ~~by sheep~~ overall. GS3 + ag grassland. patch of bog habitat to the south		
ASPECT AND SLOPE DESCRIPTION The main aspect and a brief description of whether the site has suitable habitat covering a variety of aspects (including variation at a micro scale such as banks)	Slopes south west + south east with ~~areas of flat~~ flat areas throughout		
EXPOSURE (e.g. high exposure sites would be open coastal sites)	No.		

STRUCTURED WALK RECORDS

Key for recording attributes:

1. Vegetation Height:	A = <12 cm	B = 12-25 cm	C = 25-50 cm	D = >50 cm
2. Devil's bit scabious:	A = 1-2 plants/m²	B = 3-9 plants/m²	C = 10+ plants/m²	D = None
3. Structured vegetation:	Mark with an 'X' if there is presence of any steps in vegetation or ground that provide localised protection from elements at ground level. See figure below for guidance.			
4. Low invading scrub:	Tick if low invading scrub (e.g. birch, gorse, bog myrtle) <25 cm tall and >10% cover present. The word 'invading' is important here. Do not include scrub that is an integral part of the habitat (e.g. Juniper in Juniper heath systems).			
5. Evidence of stock grazing:	Tick if localised evidence present (e.g. poaching, dung, etc.)			

Example of Structured Vegetation:



No | **Yes** — Varied vegetation height, bank or slope change, small tussocks or poaching etc.

Stop number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Vegetation Height	C	C	B	C	B	B	B	C	B	A	A	A	A	B	B	B	C	B	C	A
2. Devil's-bit Scabious abundance	A	C	B	D	D	B	D	D	D	D	D	D	D	D	D	B	B	D	D	B
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation	X	X	X		X	X	X	X	X					X	X	X		X		
4. Low invading scrub		X	X							X			X		X	X				
5. Evidence of stock grazing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Stop number	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1. Vegetation Height	A	A	A	A	B	B	B	B	B	A	A	B	A	B	A	B	B	B	C	B
2. Devil's-bit Scabious abundance	D	B	B	A	D	D	B	D	D	A	D	D	D	D	D	D	D	B	A	A
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation		X	X		X	X	X	X	X					X	X	X	X	X	X	X
4. Low invading scrub																X				
5. Evidence of stock grazing	X	X	X		X	X	X		X			X		X	X			X	X	

Stop number	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
1. Vegetation Height	B	C	B	C	C	B	A	A	A	A	A	A								
2. Devil's-bit Scabious abundance	D	D	D	D	D	A	D	D	D	D	D	D								
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation	X	X	X	X		X	X	X	X											
4. Low invading scrub	X																			
5. Evidence of stock grazing						X	X	X	X		X	X								

ATA ANALYSIS (Optional)

At the end of the field survey, calculate the following for each area sampled:

MEAN VEG. HEIGHT (cm)	12-25cm (B) [23]	**% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS**	5.8%
% FREQUENCY OF SCABIOUS	30.8%	**% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS**	1.9%
% FREQUENCY OF SCABIOUS CATEGORY A	11.5%	**% FREQUENCY OF SRUCTURED VEGETATION**	65.3%
% FREQUENCY OF SCABIOUS CATEGORY B	17.3%	**% FREQUENCY OF LOW INVADING SCRUB**	15.4%
% FREQUENCY OF SCABIOUS CATEGORY C	0%	**% FREQUENCY OF STOCK GRAZING SIGNS**	73.1%
% FREQUENCY OF 12-25 cm SWARDS	44.2%	**TALL (>0.5 m) SCRUB COVER (%)**	<10%
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	9.6%		

HABITAT CONDITION ASSESSMENT

Assess the condition to one of the following categories:

Good Condition Habitat (**GC**): >20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards and <10% cover of tall scrub (>0.5 m tall)

Suitable (Under-grazed) Habitat (**SU**): >20% freq. of Scabious of category B/C abundance growing in >25 cm tall swards and <20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards

Suitable (Over-grazed) Habitat (**SO**): >20% freq. of Scabious of category B/C abundance growing in <12cm tall swards and <20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards

Unsuitable habitat (**US**): <5% freq. of Scabious of category B/C abundance growing in >25 cm tall swards

MANAGEMENT ALERTS

Undergrazing indicators	Overgrazing indicators
>10% cover of tall scrub (>0.5 m tall)	<25% frequency of structured vegetation
>75% frequency of structured vegetation	>80% frequency of evidence of stock grazing
>10% frequency of low invading scrub with >10% cover	Mean vegetation height <12 cm
<20% frequency of evidence of stock grazing	
Mean vegetation height >25cm	

SUMMARY DATA ANALYSIS

CONDITION CATEGORY		NOTES
MANAGEMENT ISSUES		

National Biodiversity Data Centre
Documenting Ireland's Wildlife

FIELD F.

An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

HABITAT CONDITION ASSESSMENT FOR MARSH FRITILLARY

[HCA = VS]

Habitat condition monitoring for the Marsh Fritillary involves fixed point habitat recording on a structured walk across a site, from which an assessment can be made. A separate survey and assessment should be completed for each sub-site.

METHOD

- Establish a W shape (zigzag) route that will cross thoroughly and evenly the whole site/sub-site.
- Decide stopping distances along this route where recordings of habitat condition will be made e.g. every 10 or 20 paces. Aim to have at least 20 stopping points for a small site (<1 ha) more than 40 stopping points for a medium-sized site (1-5 ha) and more than 50 stopping points for a large site (>5 ha).
- Follow your route and at each stopping point measure (in cm) the vegetation height at the point you stop (measure to the top of the leaves i.e. ignore the flowers of grasses and plants). Then, using an imaginary box with sides of 1 m in front of you, record the presence of Devil's-bit Scabious in one of these abundance categories (A = 1-2 plants, B = 3-9 plants, C = 10+ plants, D = No plants). Using the same area, record (mark with an 'X') the presence or absence of these three habitat attributes: structured vegetation, low (<25 cm tall) invading scrub with a cover of >10% and stock grazing signs (e.g. tracks, poach marks, dung).
- At the end of the assessment, then provide an estimate the cover (%) of tall (>0.5 m) scrub for the whole site/sub-site.

MARSH FRITILLARY HABITAT CONDITION SURVEY FORM

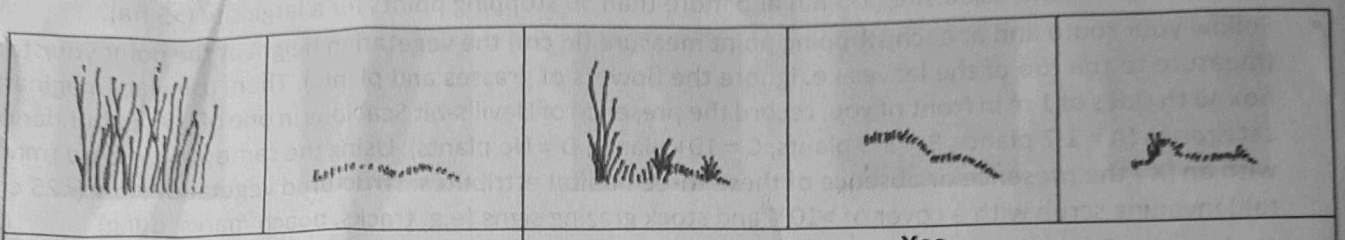
SITE NAME	Ballycar	**SUB-SITE**	field F
OS GRID REF	R 56044 63621	**RECORDER(S)**	Mak + CBH
SURVEY DATE	22.07.2021	**TALL SCRUB COVER (%)**	15%.
MANAGEMENT OBSERVATIONS (e.g. enclosed, recently grazed or cut, peat cutting, burning, etc.)	Rank grassland ag grass+ GS3.		
ASPECT AND SLOPE DESCRIPTION The main aspect and a brief description of whether the site has suitable habitat covering a variety of aspects (including variation at a micro scale such as banks)	South slope		
EXPOSURE (e.g. high exposure sites would be open coastal sites)	No.		

STRUCTURED WALK

Key for recording attributes:

1. Vegetation Height:	A = <12 cm	B = 12-25 cm	C = 25-50 cm	D = >50 cm
2. Devil's bit scabious:	A = 1-2 plants/m²	B = 3-9 plants/m²	C = 10+ plants/m²	D = None
3. Structured vegetation:	Mark with an 'X' if there is presence of any steps in vegetation or ground that provide localised protection from elements at ground level. See figure below for guidance.			
4. Low invading scrub:	Tick if low invading scrub (e.g. birch, gorse, bog myrtle) <25 cm tall and >10% cover present. The word 'invading' is important here. Do not include scrub that is an integral part of the habitat (e.g. Juniper in Juniper heath systems).			
5. Evidence of stock grazing:	Tick if localised evidence present (e.g. poaching, dung, etc.)			

Example of Structured Vegetation:



No	Yes
	Varied vegetation height, bank or slope change, small tussocks or poaching etc.

Stop number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Vegetation Height	C	B	A	C	D	D	D	D	D	D	D	C	C	B	D	D	B	B	C	D
2. Devil's-bit Scabious abundance	A	A	D	D	D	D	D	A	D	D	D	D	A	D	D	D	D	D	D	D
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation	X	X		X				X				X						X		
4. Low invading scrub			X		X		X				X				X					X
5. Evidence of stock grazing				X										X						

Stop number	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1. Vegetation Height	A	A	A	B	C	D	A	B												
2. Devil's-bit Scabious abundance	D	D	D	D	D	D	D	D												
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation				X																
4. Low invading scrub		X																		
5. Evidence of stock grazing				X	X		X	X												

Stop number	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
1. Vegetation Height																				
2. Devil's-bit Scabious abundance																				
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation																				
4. Low invading scrub																				
5. Evidence of stock grazing																				

A ANALYSIS (Optional)

the end of the field survey, calculate the following for each area sampled:

MEAN VEG. HEIGHT (cm)	50 cm	**% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS**	0
% FREQUENCY OF SCABIOUS	14.3%	**% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS**	0
% FREQUENCY OF SCABIOUS CATEGORY A	14.3%	**% FREQUENCY OF SRUCTURED VEGETATION**	25%
% FREQUENCY OF SCABIOUS CATEGORY B	0%	**% FREQUENCY OF LOW INVADING SCRUB**	25%
% FREQUENCY OF SCABIOUS CATEGORY C	0%	**% FREQUENCY OF STOCK GRAZING SIGNS**	21.4%
% FREQUENCY OF 12-25 cm SWARDS	21.4%	**TALL (>0.5 m) SCRUB COVER (%)**	15%
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	0		

HABITAT CONDITION ASSESSMENT

Assess the condition to one of the following categories:

Good Condition Habitat (**GC**): >20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards and <10% cover of tall scrub (>0.5 m tall)

Suitable (Under-grazed) Habitat (**SU**): >20% freq. of Scabious of category B/C abundance growing in >25 cm tall swards and <20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards

Suitable (Over-grazed) Habitat (**SO**): >20% freq. of Scabious of category B/C abundance growing in <12cm tall swards and <20% freq. of Scabious of category B/C abundance growing in 12-25 cm tall swards

Unsuitable habitat (**US**): <5% freq. of Scabious of category B/C abundance growing in >25 cm tall swards

MANAGEMENT ALERTS

Undergrazing indicators	Overgrazing indicators
>10% cover of tall scrub (>0.5 m tall)	<25% frequency of structured vegetation
>75% frequency of structured vegetation	>80% frequency of evidence of stock grazing
>10% frequency of low invading scrub with >10% cover	Mean vegetation height <12 cm
<20% frequency of evidence of stock grazing	
Mean vegetation height >25cm	

SUMMARY DATA ANALYSIS

CONDITION CATEGORY		**NOTES**
MANAGEMENT ISSUES		

Appendix B

Larval Web Survey Field Sheets and Transect Map

MARSH FRITILLARY LARVAL WEB

RECORDING FORM

SITE DETAILS

SITE NAME:	BALLYCAR	NETWORK/ LARGER SITE:	FIELD B + FIELD C
COUNTY:	CLARE	PRINCIPAL HABITAT:	Grassland (GS3+GS4)
VICE COUNTY:		SECONDARY HABITAT:	Wet heath (HH3)
CENTRAL GRID REF.: (e.g.S215502)	R 55212 63643		
RECORDER NAME & CONTACT DETAILS:	Marie K + Deirdre OB. + Ken B.		
SITE OWNER & CONTACT FOR ACCESS:	NA		

SITE MAP

Copy/Attach an OS map at 1:10 000 or equivalent showing scale, 1 km gridlines and boundary of suitable and/or occupied habitat marked by thick black line (use a separate sheet if necessary). Please mark the route of your transect and indicate the location of occupied larval webs with a cross (x).

Map Attached.

- Transect was continuous through B (upper) → B (lower).
- Field C - new transect.

PREVIOUS RECORDS

Are there previous records of Marsh Fritillary adults or larvae at this site?
(Please include dates, numbers of adults or larvae recorded and recorder if known)

Previous records on the NBDC.

RVAL WEB SURVEY/ MONITORING

Note: field B = 6 occupied webs, 13 unoccupied webs.
field C = no webs recorded.

DATE OF VISIT:	SITE/SUB-SITE (if applicable):	NUMBER OF OCCUPIED WEBS FOUND:	LENGTH OF TRANSECT (metres):	AREA OF SUITABLE HABITAT (hectares):	POPULATION SIZE/ ESTIMATED POP. SIZE (webs):
03.09.21	Field C.	0	700m.	4ha.	0.
06.09.21	Field B.	6	2700m.	14.5ha.	11 webs per ha.

N.B.: Estimated population size if sample survey, not full search, is given by multiplying up the proportion of webs found in the sample area given in ha (length of transect in m x 2m width/ 10,000) to the total area of suitable habitat (1 ha = = 100 m x 100 m = 10,000 m²).

2700 x 2 = 5400m.
6 ÷ 5400 = 0.0011.
0.0011 x 10,000 = 11.11 webs per hectare.

HABITAT OBSERVATIONS

(N.B.: Complete a separate HABITAT CONDITION ASSESSMENT FORM if conducting a detailed survey)

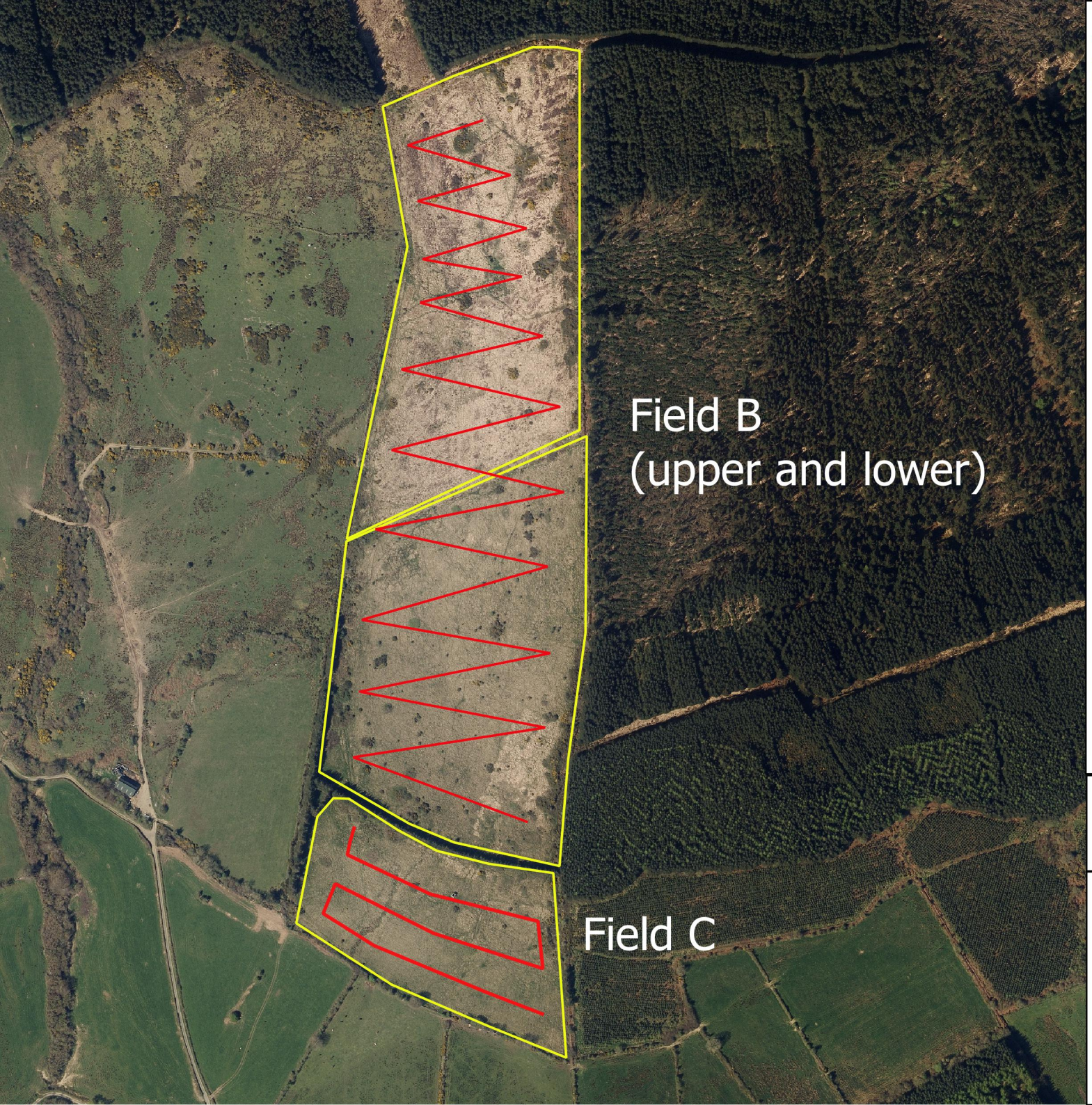
Please indicate the abundance of Devil's-bit Scabious over the site surveyed (circle one category)	Average vegetation height (circle one category)	Animal poaching (circle one category)
Widespread and abundant	<5cm	No livestock hoof marks
Frequent	5 to 12cm	Hoof marks confined to tracks
Patchy (locally abundant)	12 to 25cm	Some poaching of wetter areas
Patchy Sparse	>25cm	Majority of site poached
Rare		

Additional notes on present habitat condition and management – such as types of animals grazing, any burning or mowing; and suggested management needs.

- Larval web survey not carried out in Field A, E or F due to unsuitable HCA result.
- Larva web survey carried out on the 6th Sept 2021 by MK+DOB. in Field B. and on the 3rd September 2021 by MK+ KB in Field C.
- North Area of field B ↑ Scrub + Devil's-bit Scabious.
- Signs of cattle activity throughout B+C.

The information supplied here is sent to the National Biodiversity Data Centre on the understanding that the data provided by the recorder will be entered into a computerised database and will be used for nature conservation, research, education and public information.

Please send the completed form to:
National Biodiversity Data Centre,
WIT West Campus,
Carriganore,
Waterford,
X91 PE03



Larval Web Survey Transect

Area of Suitable Habitat

0 150 300 m

MWP