GREENSOURCE SUSTAINABLE LIMITED

MOANMORE WIND FARM

CO. CLARE

MARSH FRITILLARY REPORT

DECEMBER 2023

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Date December 2023	Signature	Signature

MARSH FRITILLARY SURVEY REPORT

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1 INTRODUCTION

1.1 BACKGROUND

Jennings O'Donovan & Partners Limited have been commissioned by GREENSOURCE SUSTAINABLE LIMITED to carry out a preliminary Marsh Fritillary larval web survey and habitat condition assessment report. This work was carried out by two experienced ecologists, namely Dr. Monica Sullivan MCIEEM CEnv and also Ryan Mitchell BSc who specialises in entomology.

A site visit was carried out on the 27th of September 2023 to survey for Marsh Fritillary and any other lepidoptera species present on site. Survey objectives included the mapping of suitable Marsh Fritillary habitat onsite, larval webs and habitat condition assessments in accordance with the National Biodiversity Data Centre (NDBC) Guidelines[1]. This report will detail the results of a desktop survey and the survey work carried out during the site visit. It will also propose any remedial measures required to address any potential issues negatively impacting on the marsh fritillary and its' associated habitat.

1.2 SITE LOCATION

The Site is located 2km north-west of Kilrush, Co. Clare (Figure 1.1) and 7.0km north of the county boundary between Clare and Kerry. The is on relatively low-lying ground, at elevations ranging from 30m AOD in the northern side of the site (where the site access track is proposed) to 20m AOD towards the middle of the site. The redline boundary of the Site is outlined in Figure 1.1.

Figure 1.1 Location of the proposed Moanmore Wind Farm development in Co. Clare.

[1] https://biodiversityireland.ie/surveys/marsh-fritillary-monitoring-scheme/ [Accessed: 31st October 2023]

1.3 MARSH FRITILLARY MONITORING SURVEYS

In line with the recommendation from Bioshphere Ecology, a marsh fritillary larval web and habitat assessment was requested at Moanmore Wind Farm. One area (outlined in blue in Figure 1. 2) within the redline boundary was requested to be assessed and is denoted henceforth as 'Block A' (Figure 1.2).

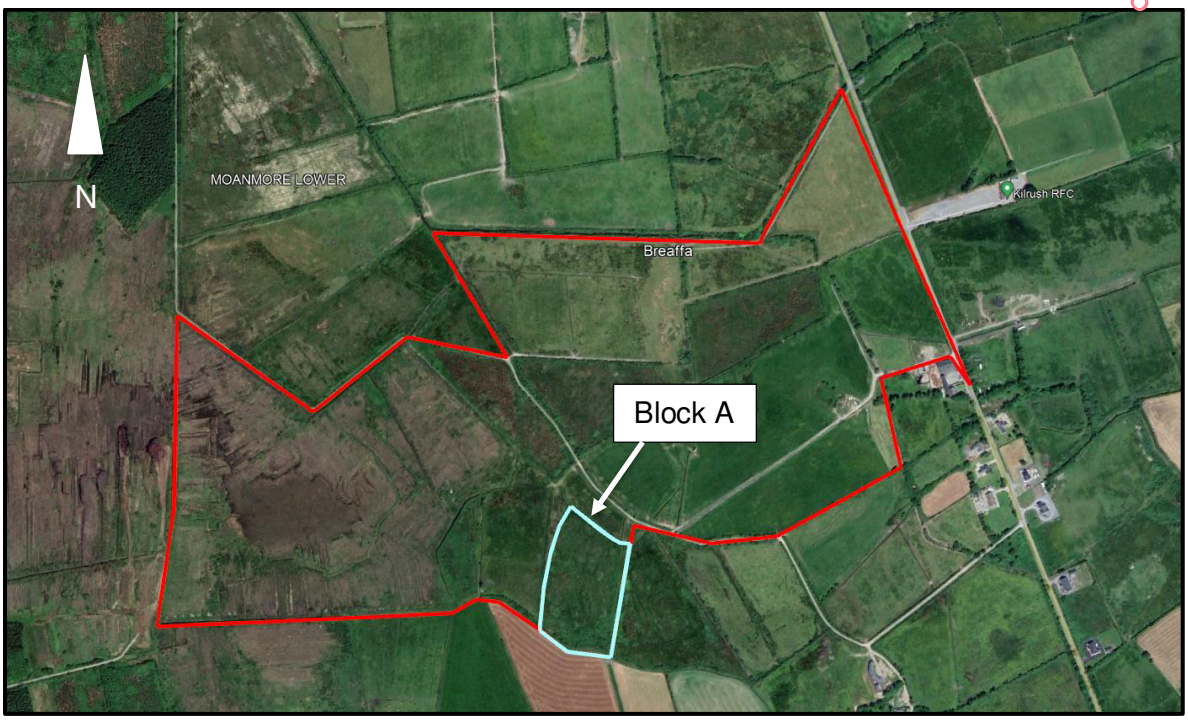


Figure 1.2 Location of Block A (highlighted in light blue) within the Moanmore Wind Farm site.

2 LEGISLATION

The Marsh Fritillary is an Annex II listed species under the EU Habitats Directive. The habitat of the Marsh Fritillary is currently protected within Special Areas of Conservation, where it is listed as a Qualifying Interest (QI).

3 METHODOLOGY

3.1 MARSH FRITILLARY CONDITION ASSESSMENT

The Marsh Fritillary Condition Assessment methodology carried out is outlined below and is in accordance with the Marsh Fritillary National Sampling Framework set out by the National Biodiversity Data Centre (NBDC).

- *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.*

3.2 MARSH FRITILLARY WEB COUNT

The Marsh Fritillary Web Counts methodology is outlined below and is in accordance with the Marsh Fritillary National Sampling framework set out by the NBDC:

- *The best period to survey is when the webs are most conspicuous, during late August or early September. Counts can be done into mid to late September but often by then the larvae will have entered hibernation, or heavy rain may destroy the webs.*
- *A prepared large-scale map of the target site (1:5,000 or enlarged 1:20,000) accompanied by a GPS to locate accurately any occupied larval webs onsite.*
- *The study area will be systematically, recording the number of occupied larval webs which are found on site. The location will be marked and given GPS coordinates of any occupied webs found on site.*
- *On site map will include the boundary of suitable habitat and the path taken if the site was sampled rather than systematically searched. Estimate the area of suitable habitat in hectares, if you can and give an approximate length of your sample path (transect) in metres.*
- *The total number of occupied webs will be monitored per sub-section as the site is divided into a number of areas.*

4 RESULTS

4.1 DESKTOP STUDY

4.2 MARSH FRITILLARY

There are four 10km^2 Hectads (Q96, Q95, R06, R05) which intersect an approximate 5km radius of the wind farm (Figure 4.1). There are a total of 34 NBDC records of marsh fritillary within this 5km radius of the site boundary. Three Hectads contain marsh fritillary records (Q95,

R05 and Q96) and are highlighted in purple; Hectad R06 has no current records for marsh fritillary.

Hectad Q95: A NBDC data search produced a total of four previous marsh fritillary records within the 10km^2 Grid Hectad Q95 (Figure 4.1). This Hectad encompasses the entire redline boundary of the proposed Wind Farm site. Unfortunately, no specified locations are allocated to these records.

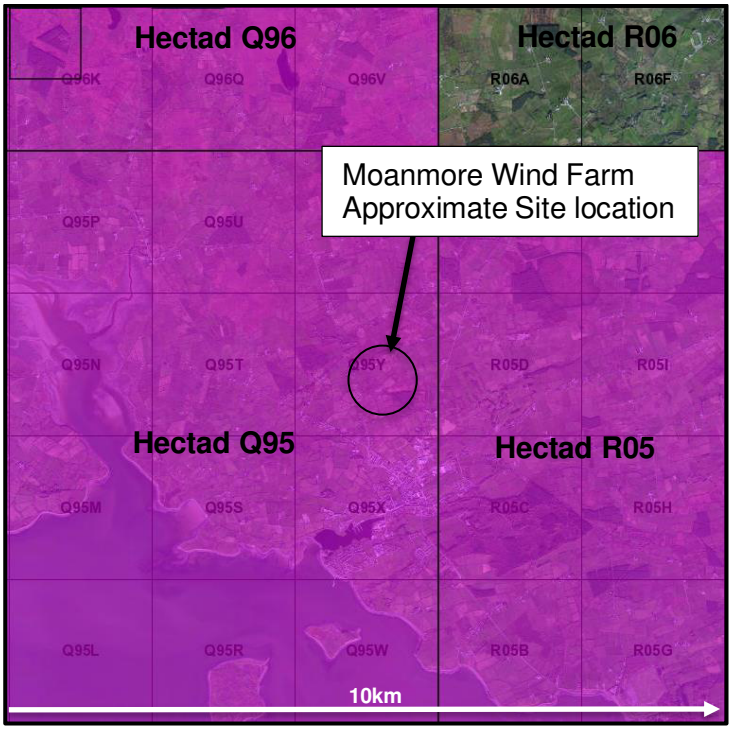


Figure 4.1 National Biodiversity Data Centre (NBDC) Marsh Fritillary records within an approximate 5km radius of the proposed Moanmore wind farm site.

Hectad RO5: The closest documented population is located at Tullabrack, Co Clare within Hectad R05. The resolution of this data is displayed at 10km^2. However, the records contain further information details outlining the site location. This population (two records from 1980 in Tullabrack) is located approximately 2.4km from the site boundary.

There are four records within 10km^2 hectad (R05); these records are displayed at 10km^2 resolution only. None of these records have further supporting location details on the

database. These records were published in the following publications Distribution Atlas of Butterflies in Ireland 1979[2] and The Millennium Atlas of Butterflies in Britain and Ireland[3].

Hectad Q96: There are a total of 18 records recorded from the 10km[2] Hectad (Q96), north of the Wind Farm. Four of these records are located in 0.1km[2] Grid square Q963627 which is located at Carrowmore South Bog, 4.2km northwest of the site. These records range from the years 2017 – 2020. A further four records are also located northwest (approximately 4.4km) of the site, at from Tullaher Bog. The remaining 10 records are undocumented locations; these records were sourced from the following publications: Distribution Atlas of Butterflies in Ireland 1979[4] and The Millennium Atlas of Butterflies in Britain and Ireland[5].

Special Areas of Conservation (SAC)

There are two Special Areas of Conservation (SAC) within 5km of the site boundary. The closest SAC is Lower River Shannon SAC (Site Code: 002165) and is located approximately 1.8km west of the Site. The second SAC is Tullaher Lough and Bog SAC (Site Code:002343) which is situated approximately 4.4km northwest of the site. Neither of these identified European Sites have Marsh Fritillary listed as a QI.

4.3 FIELD SURVEY

4.4 MARSH FRITILLARY LARVAL WEB COUNT

An intensive and focused larval web survey was carried out on Wednesday 27th September 2023 by experienced ecologists in marsh fritillary surveying. No larval webs were discovered onsite.

4.5 MARSH FRITILLARY HABITAT CONDITION ASSESSMENT

Habitat suitability assessments were undertaken during larval web searches within areas of potentially suitable habitat for this butterfly species. The methodology followed NBDC Best Practice Guidance (Section 3.1). During the site visits at Moanmore Wind Farm, one area (Block A) was assessed for potential suitable habitat for marsh fritillary (Figure 1.2). The results outline that Block A contains 'suitable' habitat for marsh fritillary. The Marsh Fritillary habitat

[2] publications *Distribution Atlas of Butterflies in Ireland 1979*[2] (*An Foras Forbartha*) by 'Asher, J., Warren, M., Fox, R., Harding, P., Jeffcoate, G. and Jeffcoate, S. 2001

[3] *The Millennium Atlas of Butterflies in Britain and Ireland*[3]. Oxford University Press' Asher, J., Warren, M., Fox, R., Harding, P., Jeffcoate, G. and Jeffcoate, S. 2007.

[4] publications *Distribution Atlas of Butterflies in Ireland 1979*[4] (*An Foras Forbartha*) by 'Asher, J., Warren, M., Fox, R., Harding, P., Jeffcoate, G. and Jeffcoate, S. 2001

[5] *The Millennium Atlas of Butterflies in Britain and Ireland*[5]. Oxford University Press' Asher, J., Warren, M., Fox, R., Harding, P., Jeffcoate, G. and Jeffcoate, S. 2007.

was mapped (using GPS) within the Block A (Appendix I). The results of the habitat condition assessments are outlined in Table 4.1.

Table 4.1 Habitat condition assessments results

AREA	GRID REFERENCE	HABITAT CONDITION ASSESSMENT
Block A	Q 97890 57708	Suitable (Over-grazed) Habitat

5 DISCUSSION

5.1 BLOCK A: HABITAT OVERVIEW

Block A covers an area of 1.97 ha of Molinia meadow habitat. This area has been assessed as '*Suitable (Over-grazed) Habitat'* for Marsh Fritillary. The overall habitat (Figure 5.1) has a relatively species-rich sward ranging in average height of 25cm tall. There were some small acid flushes scattered across the site which were dominated by *Juncus* spp., *Carex* spp. and *Sphagnum* spp. Bell heather (*Calluna vulgaris*) was one of the dominant scrub species across this Block. There was extensive evidence of heavy grazing across the entire Block.

Figure 5.1 Heavily grazed Mollina meadow habitat in Block A

Gorse (*Ulex europaeus*), bramble (*Rubus* sp.) and willow (*Salix* sp.) were recorded on site and are encroaching the southeastern corner of the Block (Figure 5.2). These scrub habitats are beginning to become quite dominant in some sections of the Site.

Figure 5.2 Bramble, willow and gorse scrub encroachment within Block A

Devil's bit scabious cover is dense in many places (>10 per m^2) (Figure 5.3). The distribution of Devils bit scabious was widespread and reasonably consistent across the Block. Where Devil's bit scabious occurs, the sword height is <12cm (in the vast majority of cases). There are only a few small pockets of '*Good Habitat Condition*' for marsh fritillary throughout the site. i.e. these are located primarily in the scrub margins.

Figure 5.3 High density of Devil's bit scabious (>10 per m^2) in Block A

6 CONCLUSION & RECOMMENDATIONS

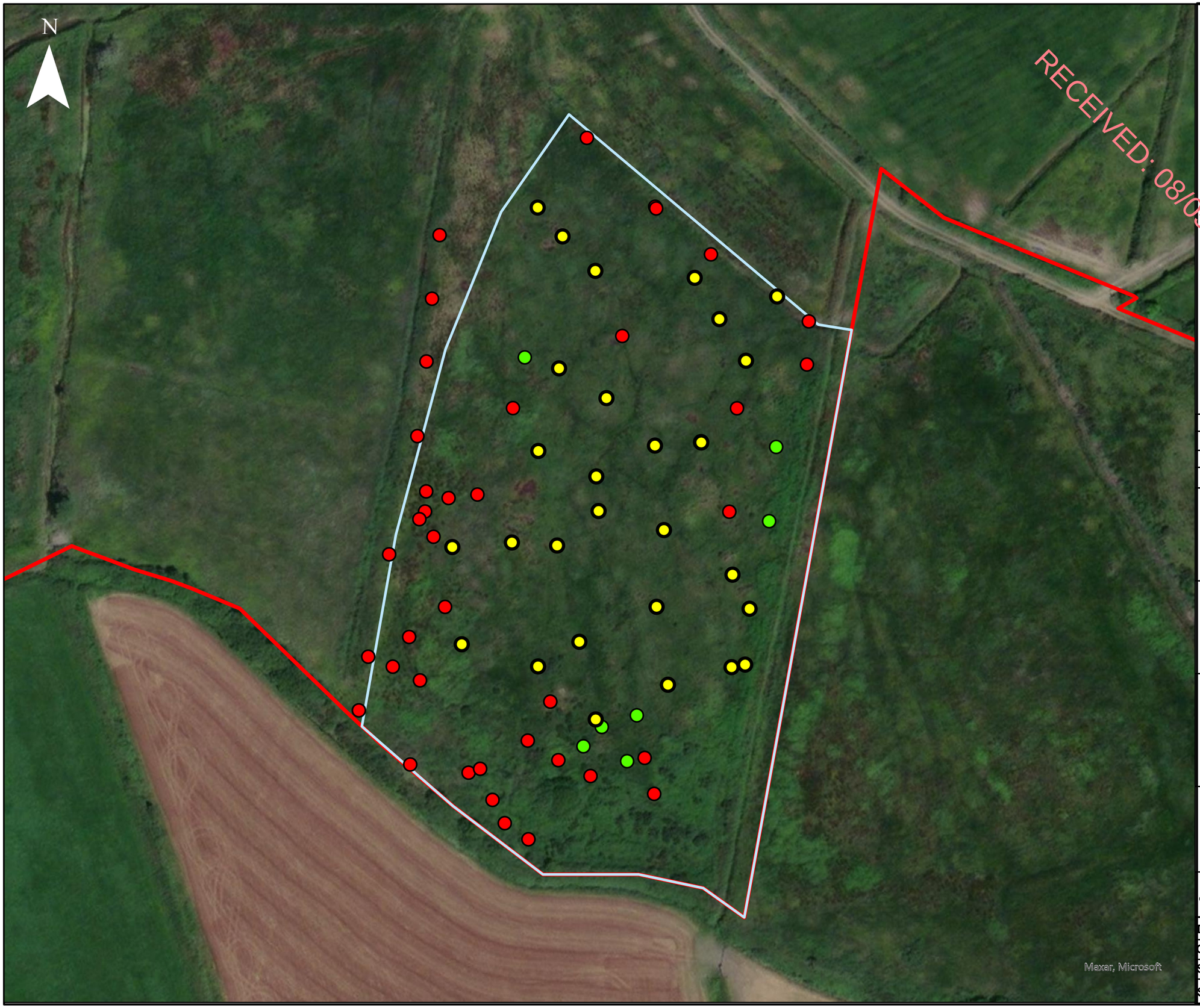
No Marsh Fritillary webs were located on site. The habitat in Block A was assessed as 'Suitable -over-grazed' habitat for Marsh Fritillary. If the site is managed correctly, this site could be improved and 'Good Condition' suitable habitat for Marsh Fritillary achieved.

The following recommendations are advised to enhance the habitat in Block A and increase the likelihood of marsh fritillary butterfly populations establishing onsite:

1. A Habitat Management Plan (HMP) is incorporated into the Environmental Impact Assessment Report
2. Block A is managed appropriately to reduce grazing pressure and improve the suitability of the habitat for Marsh Fritillary.
3. A Habitat Monitoring Plan should be implemented to monitor grazing practices onsite.

APPENDIX I

MOANMORE MARSH FRITILLAY BLOCK A



Legend

- Redline Boundary
- Marsh Fritillary Study Area

2023 - DBS density

- DBS (B/C) - 12-25cm
- No DBS
- DBS (B/C) - <12cm

Rev	Date	By	Comment

Client

Moanmore Green Energy

Client Representative

JENNINGS O'DONOVAN & PARTNERS LIMITED
CONSULTING ENGINEERS

Project

Proposed Moanmore Wind Farm
Co. Clare

Title

Moanmore Wind Farm
Marsh Fritillary Habitat Assessment
Block A

Drg. By	POD	**Project**	6778
Checked By	RM	**Rev**	0
Stage	EIAR	**Date**	Dec 2023
Scale	1:1,000 (A3)	**Figure**	INSERT

APPENDIX II:

MOANMORE MARSH FRITILLAY HABITAT CONDITION ASSESSMENT

National Biodiversity Data Centre
Documenting Ireland's Wildlife

An Roinn Cultúir, Oidhreachta agus Gaeltachta
Department of Culture, Heritage and the Gaeltacht

HABITAT CONDITION ASSESSMENT FOR MARSH FRITILLARY

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

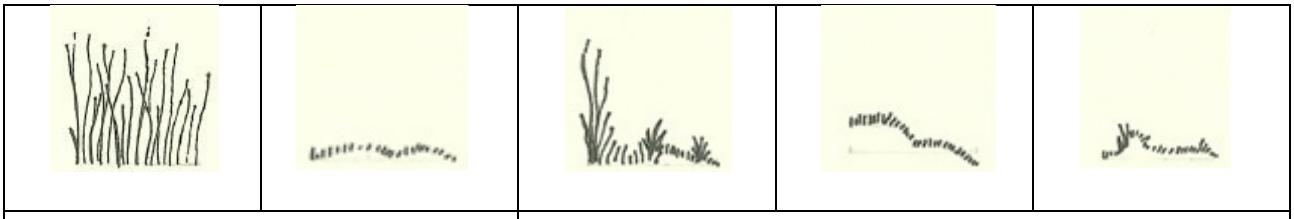
SITE NAME	Moanmore	**SUB-SITE**	Block A
OS GRID REF	Q 97890 57708	**RECORDER(S)**	Ryan Mitchell & Monica Sullivan
SURVEY DATE	27/09/2023	**TALL SCRUB COVER (%)**	15
MANAGEMENT OBSERVATIONS **(e.g. enclosed, recently grazed or cut, peat cutting, burning, etc.)**	This block has had recent extensive grazing by livestock.		
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)**	Generally Flat terrain across the block some Juncus tussocks and drain banks around the perimeter of the Block.		
EXPOSURE **(e.g. high exposure sites would be open coastal sites)**	Generally an exposed area with small areas of srub which provide sheltered spots.		

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	C	A	C	C	C	C	B	B	B	D	D	D	A	B	A	B	B	D	D
2. Devil's-bit Scabious abundance	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	A	C	C	C
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation	–	–	–	–	–	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–
4. Low invading scrub	–	–	–	–	–	–	–	–	–	X	X	X	X	X	–	–	–	–	–	X
5. Evidence of stock grazing	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	D	B	A	A	A	A	B	B	A	A	B	A	B	C	C	A	B	B	B
2. Devil's-bit Scabious abundance	C	D	C	C	C	C	C	B	C	D	D	A	D	D	D	D	C	B	D	D
Mark with an 'X' if attributes below are present at each stop																				
3. Structured vegetation	–	–	–	–	–	–	–	–	X	–	–	–	–	–	X	–	X	–	X	–
4. Low invading scrub	–	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	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	A	D	D	B	D	B	D	D	B	A	A	A	A	A	A	A	B	A	A	A
2. Devil's-bit Scabious abundance	D	D	D	D	D	D	B	D	D	D	D	C	C	B	C	C	A	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	–	–	–	–	–	–	–	–	–	–	–	–
5. Evidence of stock grazing	X	X	X	–	–	X	–	–	–	X	X	X	X	X	X	X	X	X	X	X

DATA ANALYSIS (Optional)

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

MEAN VEG. HEIGHT (cm)	12-25cm	**% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS**	33.3
% FREQUENCY OF SCABIOUS	52	**% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS**	1.3
% FREQUENCY OF SCABIOUS CATEGORY A	4	**% FREQUENCY OF SRUCTURED VEGETATION**	18.6
% FREQUENCY OF SCABIOUS CATEGORY B	10.6	**% FREQUENCY OF LOW INVADING SCRUB**	14.6
% FREQUENCY OF SCABIOUS CATEGORY C	30.6	**% FREQUENCY OF STOCK GRAZING SIGNS**	64
% FREQUENCY OF 12-25 cm SWARDS	29.3	**TALL (>0.5 m) SCRUB COVER (%)**	15
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	14.6		

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	>10% cover of tall scrub (>0.5m tall) High frequency of evidence of Stock grazing Mean vegetation height <12cm	Gorse, Willow and Bramble consisted of 10% cover of tall scrub (>0.5m tall) This block has had recent extensive grazing by livestock. Maninly areas which contained Juncus sp were not grazed.