

Lepidoptera Management Plan

Derrinlough Wind Farm





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1. INTRODUCTION

1.1 Background

This Lepidoptera Species Management Plan provides details of how the project had been designed to avoid areas of suitable habitat for protected, vulnerable and sensitive lepidoptera species, in particular marsh fritillary (*Euphydryas aurinia*), and provides habitat management and enhancement measures to maintain the species and their habitats.

Dedicated surveys were undertaken within the study area to identify areas of suitable marsh fritillary habitat. Marsh fritillary colonies were only recorded within the west ‘Clongowany’ part of the site. This is likely due to the more established scrub and vegetated nature of the eastern ‘Drinagh’ part of the site. Where suitable habitat did occur on site, it predominantly occurred in association with existing railway tracks on site. This is due to the imported calcareous material for the railway construction resulting in more suitable conditions for Deville’s-bit scabious and the likely spread of the species along the tracks associated with the operating railway machinery. An example is provided in Plates 2.1 and 2.2. Subsequently, the below measures ensure that these areas are adequately avoided during the design and construction of the proposed development. The detailed survey methodology for marsh fritillary is provided in full, along with the survey findings, in Chapter 6 of the EIAR.

During dedicated larval web surveys of the study area, a total of 24 webs were recorded within the study area during targeted marsh fritillary surveys undertaken in 2018. Follow-up surveys undertaken in 2019 located a total of 80 webs within the study area. The distribution of marsh fritillary colonies recorded within the study area, as well as the mapped distribution of suitable habitat is provided in Figure 1.1. Although additional smaller fragments of suitable marsh fritillary habitat were recorded in the study area, no larval webs were recorded. Adult marsh fritillary were also recorded within the site on the 6th June 2019. The adults were recorded within the southwestern section of the site in areas identified as providing suitable supporting habitat for the species and in which larval webs had previously been recorded.

In addition, habitat suitability assessments were undertaken during larval web searches within areas of suitable habitat for the species. This followed methods set out in National Biodiversity Data Centre (NBDC) best practice guidance. The results of the condition assessment are provided in Appendix 1 of this LMP and were focused on assessing the quality of the marsh fritillary habitat where webs were recorded on site only¹. The condition assessment indicates that the habitat where the most marsh fritillary colonies were recorded was primarily ‘Good Condition’. However, in some areas, the narrow strips of this suitable habitat are becoming encroached by scrub (generally birch and some birch). Where the species was more sparsely distributed, due to the fragmented and small size nature of the habitat, the suitability assessments indicated that the habitat was ‘unsuitable’. This was largely due to the low occurrence of devils-bit scabious, see Plate 2.3.

Records of other lepidoptera species were also compiled during surveys of the site and the measures outlined in this plan will also benefit these and a wide variety of invertebrate species. Other species recorded include:

- Peacock butterfly (*Inachis io*)
- Speckled wood butterfly (*Pararge aegeria*)
- Small copper butterfly (*Lycaena phlaeas*)
- Painted lady butterfly (*Cynthia cardui*)
- Brimstone butterfly (*Gonepteryx rhamni*)
- Small tortoiseshell butterfly (*Aglais urticae*)

¹ This was due to its limited recorded distribution of suitable habitat within the study area and will allow for a long-term comparison in habitat monitoring and management.

- > Dingy Skipper Butterfly (*Erynnis tages*)
- > Emperor moth (*Saturnia pavonia*)
- > Cinnabar moth (*Tyria jacobaeae*)
- > Garden tiger moth (*Arctia caja*)



Plate 2.1: Marsh fritillary larval web recorded within the study area



Plate 2.2 – Example of narrow strip of suitable marsh fritillary habitat (outlined in red)



Plate 2.3 – Small isolated fragment of suitable marsh fritillary habitat growing along an on-site drainage ditch

2. LEPIDOPTERA SPECIES CONSERVATION MANAGEMENT ACTIONS

2.1 Management measures

As described in Section 1.1, marsh fritillary has been confirmed breeding within the study area during dedicated surveys of the site in both 2018 and 2019.

MKO consulted with Butterfly Conservation Ireland in December 2019 and January 2020 to discuss any concerns around potential impact on lepidoptera species during the construction and operational phase of the proposal. Actions described in this report take account of the consultation undertaken. The following subsections of this report provide avoidance, mitigation and habitat enhancement measures marsh fritillary as well as subsequent benefits for other invertebrates.

Avoidance, enhancement and monitoring measures to avoid impact of construction on marsh fritillary, and subsequent monitoring include:

Avoidance Measures

- The proposed site layout has been designed to completely avoid the recorded marsh fritillary breeding colonies and all suitable supporting habitat on site. In addition, all other elements of the proposed project, including replanting lands, the proposed amenity walking trail, construction compounds etc will also avoid any areas of suitable marsh fritillary habitat.

Pre-construction Measures

- Prior to the commencement of site works, areas of suitable marsh fritillary habitat identified within the study area will be clearly marked out by a suitably qualified ecologist and fenced off. This will avoid damage, loss or disturbance from construction machinery or the storage of materials/machinery.
- Other areas of potentially suitable habitat in close proximity to the development footprint will be surveyed for marsh fritillary prior to the construction phase of the proposal in order to identify any additional areas to those already mapped in Figure 2.2. This will further advise on the extent of areas that may require fencing off.
- Vegetation structure and suitability will be monitored following the NBDC2 survey methodology. This will be used to compare baseline surveys of the vegetation with future survey findings and thus assist in informing the management measures described below. The vegetation assessments undertaken during the surveys are provided in Appendix 1 of the Lepidoptera Management Plan submitted as part of the planning application documentation.

Construction Phase Measures

- Where suitable marsh fritillary habitat occurs in close proximity to the proposed infrastructure, side casting of material will be to the opposite side of the proposed infrastructure to where the suitable habitat occurs. This will ensure that there is no potential for direct or indirect impacts on marsh fritillary habitat. This measure will also protect existing suitable habitat for other Lepidoptera/pollinator species of local importance.
- Where shallow peat occurs along the infrastructure footprint and sub peat material comprises calcareous substrate, such substrate will be used during the site reinstatement, along the infrastructure corridor. Such material will facilitate the establishment of calcareous plant species

² NBDC, 2019, *Habitat Condition Assessment for Marsh Fritillary*, Online, Available at: <http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Marsh-Fritillary-Habitat-Condition-Form.pdf>, Accessed: 13/01/2020

that have been recorded on spoil heaps and sub peat material within the study area. The establishment of such vegetation will benefit pollinator species generally as well as providing a food source for adult marsh fritillary. In addition, such material, in combination with the surrounding peat substrate will also create a suitable substrate for the natural colonisation of devil-bit scabious and thus marsh fritillary breeding habitat.

Tree-planting will avoid areas of suitable marsh fritillary habitat

- The proposed tree planting areas within the study area have been located away from areas of suitable marsh fritillary habitat, see Figure 6-7, Chapter 6 of the EIAR. This will ensure that there is no loss of potentially suitable habitat for the species.

Post-construction Monitoring and Habitat Management

- Marsh fritillary and its habitat will continue to be monitored post construction. Some minor management or scrub clearance may be required if it encroaches/establishes along the infrastructure corridor. If required, future habitat management measures will be undertaken in consultation with Butterfly Conservation Ireland.
- Bord na Móna will consider working with and supporting local stakeholders to enhance the education and amenity potential of the site by erecting signage to increase awareness of local biodiversity, and in relation to supporting the monitoring of biodiversity on site.

3. POST-CONSTRUCTION MANAGEMENT

3.1 Peatland Stabilisation and Pollinator Enhancement Measures

The construction phase of the proposed project will lead to the creation of bare peat areas and verges that will require re-vegetation. This will also ensure peat stabilisation and thus surface water protection. Natural colonisation is the best method in terms of stabilising bare peat surfaces, as species colonise the are adapted to the specific environmental conditions.

However, there will be opportunities to enhance these areas for pollinating insects as part of the facilitated bare peat revegetation. Re-vegetation will be facilitated through the establishment of semi-natural grassland along the infrastructure corridor using a wild flower pollinator-friendly seed mix and/or by using ‘Green Hay’ in combination with fertiliser and/or lime and a nursery crop. The species mix will comprise of a variety of plant species that will grow on peatland habitats found in Derrinlough/Boora Bog Complex and contribute to an enhancement in biodiversity. It is proposed to use a seed mix comprising of red fescue (*Festuca rubra*) and creeping bent, (*Agrostis stolonifera*) that will allow for a rapid revegetation, while not resulting in a cores/dense sward preventing other wildflower species from establishing. The use of wild flower/native species that are also locally common will be incorporated into the seed mixes. The management of the habitat in this way will be beneficial for other wildlife, particularly pollinators (bees, butterflies and other invertebrates) by providing more wildflowers, food and space.

Any management approach needs to be flexible and be tailored to the specific on-site environment where there will be a variety of peat depths, hydrological conditions and nutrient status. Management (e.g. mowing) should not be uniform. Different actions in different places should enhance the natural diversity of habitats already developing on site.

3.2 Habitat enhancement monitoring programme

A habitat and biodiversity monitoring programme will be put into place during both the construction and operational phase of the proposed project. Both the construction and post construction habitat management measures and monitoring will be overseen by a suitably qualified ecologist to ensure the protection of the species. A Derrinlough Wind Farm habitat and biodiversity monitoring report will then be submitted by Bord na Móna to Offaly County Council in years 1, 3 & 5 and every five years thereafter for the lifetime of the proposed project. This report will initially document the establishment of vegetation along the site access track and the distribution of the species at the site. Following this the report will allow remedial action to be taken if specific issues develop in the future i.e. scrub encroachment or the establishment of noxious weeds. Any additional management measures will also be undertaken in consultation with Butterfly Conservation Ireland (BCI).

The Derrinlough Wind Farm habitat and biodiversity monitoring programme will specifically monitor:

- Marsh fritillary butterfly (presence and distribution) using NBDC guidelines.
- Marsh fritillary butterfly habitat condition using NBDC guidelines
- Record any other subsequent rare or threatened species to establish a detailed understanding of the additional biodiversity benefits of the management measures.

3.3 Woodland establishment

As part of the proposed development it is proposed to fell and remove of dry birch woodland within the development footprint. It is proposed to plant new woodland habitat on suitable cutaway bog outside the development footprint but inside the study area boundary in order to replace that lost to the infrastructure footprint. Areas suitable for planting native trees are likely to include areas with shallow remnant peat, steeper slopes and indicators of future dry habitat development. The replanting lands have been surveyed for marsh fritillary and no suitable habitat for the species was identified within the replanting lands.

It is proposed to utilise two options for the establishment of new woodland habitat (1) the encouragement of natural colonisation and (2) planting following Native Woodland Scheme establishment guidelines.

3.3.1 Woodland establishment actions

- Pre-commencement survey of the proposed replanting lands for suitable marsh fritillary habitat. This is due to the possible laps in time between the initial survey work in 2019 and any future commencement of construction.
- Fencing off of suitable marsh fritillary habitat prior to the commencement of replanting works.
- Creation of open areas within any planting areas to increase south-facing verge habitat that butterflies prefer. Species such as alder buckthorn should be planted along the edges of such open spaces.

3.4 Amenity development

The proposed wind farm development includes an amenity aspect. The recreational amenity proposals will require the placement of approximately 6.5 km of a 3m wide gravel path predominantly along a former machine track and the construction access track will be re-purposed to form part of the amenity walkway.

The development of a specific amenity track on the site means amenity use can be managed. Potential wildlife disturbance from amenity use in the rest of the site will be minimised.

3.4.1 Amenity development actions

- The amenity loop identified by Bord na Móna as part of the proposal has been chosen to allow access through the site as well as limiting potential disturbance to wildlife from walkers and dog-walkers. The amenity pathway has been planned to avoid particularly sensitive parts of the study area i.e. avoiding areas of rich fen and the Drinagh wetlands to the east. Where the trail does occur in close proximity to the Drinagh wetlands, it is located on an existing machinery pass.
- Bord na Móna will implement dog control management (dogs on leads) on all signage, in consultation with users and Offaly County Council, as part of the Amenity development action plan.
- The amenity trail will avoid areas identified as suitable for marsh fritillary as construction will be supervised by the project ecologist ensuring minor micro-siting as required.



APPENDIX 1

CONDITION ASSESSMENT RESULTS

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	Derrinlough	SUB-SITE	South-West
OS GRID REF	N07973 12538	RECORDER(S)	DMcN
SURVEY DATE	18/09/2019	TALL SCRUB COVER (%)	15
MANAGEMENT OBSERVATIONS (e.g. enclosed, recently grazed or cut, peat cutting, burning, etc.)	Historic cutover Raised Bog along the road verge.		
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)	N/A – Flat		
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.				

Area A – Grid ref: N07973 12538

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	D	B	A	B	D	C	C	B	B	A	A	B						
2. Devil's-bit Scabious abundance	B	A	B	B	A	D	D	D	A	B	B	B	A	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	Ue				Ue				Ue			Rf/Ue								
5. Evidence of stock grazing																				

Ue: *Ulex europaeus*; Rf: *Rubus fruticosus*; S: *Salix sp.*; Bp: *Betula pendula*

Area B – Grid ref: N07506 12860

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

Ue: *Ulex europaeus*; Rf: *Rubus fruticosus*; S: *Salix sp.*; Bp: *Betula pendula*

Area C – Grid ref: N06987 13535

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

5. Evidence of stock grazing																				
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Ue: Ulex europaeus; Rf: Rubus fruticosus; S: Salix sp.; Bp: Betula pendula

Area D – Northeast of Turbine 3 – Grid ref: N 06865 13624

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

Ue: Ulex europaeus; Rf: Rubus fruticosus; S: Salix sp.; Bp: Betula pendula

Area E – Grid ref: N 07573 12886 (South of Clongown and outside of development footprint)

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

Ue: Ulex europaeus; Rf: Rubus fruticosus; S: Salix sp.; Bp: Betula pendula

Area F – Grid ref: N 07565 12884

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	A	B	B	B	C	B	B	C											
2. Devil's-bit Scabious abundance	B	B	A	D	A	A	B	B	A											
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	Bp			Bp																
5. Evidence of stock grazing																				

Ue: Ulex europaeus; Rf: Rubus fruticosus; S: Salix sp.; Bp: Betula pendula

Area G – West of Turbine 2 (outside development footprint). Grid ref: N 07718 15093

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

Ue: Ulex europaeus; Rf: Rubus fruticosus; S: Salix sp.; Bp: Betula pendula

Area H – Grid ref: N 06936 13581

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

Ue: Ulex europaeus; Rf: Rubus fruticosus; S: Salix sp.; Bp: Betula pendula

Area I – Near Turbine 10, Grid ref: N 05004 14540

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

Ue: *Ulex europaeus*; Rf: *Rubus fruticosus*; S: *Salix sp.*; Bp: *Betula pendula*

DATA ANALYSIS (Optional)

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

Area A - GC

MEAN VEG. HEIGHT (cm)	25-50	% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS	7.1
% FREQUENCY OF SCABIOUS	78.6	% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS	0
% FREQUENCY OF SCABIOUS CATEGORY A	28.6	% FREQUENCY OF STRUCTURED VEGETATION	42.8
% FREQUENCY OF SCABIOUS CATEGORY B	50	% FREQUENCY OF LOW INVADING SCRUB	14.3
% FREQUENCY OF SCABIOUS CATEGORY C	0	% FREQUENCY OF STOCK GRAZING SIGNS	0
% FREQUENCY OF 12-25 cm SWARDS	50	TALL (>0.5 m) SCRUB COVER (%)	14.3
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	35.7		

Area B - GC

MEAN VEG. HEIGHT (cm)	12-25	% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS	9.1
% FREQUENCY OF SCABIOUS	81.9	% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS	9.1
% FREQUENCY OF SCABIOUS CATEGORY A	36.4	% FREQUENCY OF STRUCTURED VEGETATION	54.5
% FREQUENCY OF SCABIOUS CATEGORY B	45.5	% FREQUENCY OF LOW INVADING SCRUB	18.2
% FREQUENCY OF SCABIOUS CATEGORY C	0	% FREQUENCY OF STOCK GRAZING SIGNS	0
% FREQUENCY OF 12-25 cm SWARDS	54.5	TALL (>0.5 m) SCRUB COVER (%)	9.1
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	27.3		

Area C - GC

MEAN VEG. HEIGHT (cm)	12-25	% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS	10
% FREQUENCY OF SCABIOUS	75	% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS	0

% FREQUENCY OF SCABIOUS CATEGORY A	40	% FREQUENCY OF SRUCTURED VEGETATION	35
% FREQUENCY OF SCABIOUS CATEGORY B	35	% FREQUENCY OF LOW INVADING SCRUB	15
% FREQUENCY OF SCABIOUS CATEGORY C	0	% FREQUENCY OF STOCK GRAZING SIGNS	0
% FREQUENCY OF 12-25 cm SWARDS	65	TALL (>0.5 m) SCRUB COVER (%)	5
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	25		

Area D - US

MEAN VEG. HEIGHT (cm)	25-50 [27]	% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS	0
% FREQUENCY OF SCABIOUS	61.5	% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS	0
% FREQUENCY OF SCABIOUS CATEGORY A	46.1	% FREQUENCY OF SRUCTURED VEGETATION	30.8
% FREQUENCY OF SCABIOUS CATEGORY B	15.4	% FREQUENCY OF LOW INVADING SCRUB	23.1
% FREQUENCY OF SCABIOUS CATEGORY C	0	% FREQUENCY OF STOCK GRAZING SIGNS	0
% FREQUENCY OF 12-25 cm SWARDS	53.8	TALL (>0.5 m) SCRUB COVER (%)	0
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	15.4		

Area E - GC

MEAN VEG. HEIGHT (cm)	12-25	% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS	20
% FREQUENCY OF SCABIOUS	80	% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS	20
% FREQUENCY OF SCABIOUS CATEGORY A	20	% FREQUENCY OF SRUCTURED VEGETATION	100
% FREQUENCY OF SCABIOUS CATEGORY B	60	% FREQUENCY OF LOW INVADING SCRUB	60
% FREQUENCY OF SCABIOUS CATEGORY C	0	% FREQUENCY OF STOCK GRAZING SIGNS	0
% FREQUENCY OF 12-25 cm SWARDS	40	TALL (>0.5 m) SCRUB COVER (%)	0
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	20		

Area F - US

MEAN VEG. HEIGHT (cm)	12-25	% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS	11.1
% FREQUENCY OF SCABIOUS	88.9	% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS	0
% FREQUENCY OF SCABIOUS CATEGORY A	44.4	% FREQUENCY OF SRUCTURED VEGETATION	88.9
% FREQUENCY OF SCABIOUS CATEGORY B	44.4	% FREQUENCY OF LOW INVADING SCRUB	22.2

% FREQUENCY OF SCABIOUS CATEGORY C	0	% FREQUENCY OF STOCK GRAZING SIGNS	0
% FREQUENCY OF 12-25 cm SWARDS	66.7	TALL (>0.5 m) SCRUB COVER (%)	22.2
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	33.3		

Area G - US

MEAN VEG. HEIGHT (cm)	12-25	% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS	0
% FREQUENCY OF SCABIOUS	71.5	% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS	0
% FREQUENCY OF SCABIOUS CATEGORY A	42.9	% FREQUENCY OF STRUCTURED VEGETATION	100
% FREQUENCY OF SCABIOUS CATEGORY B	28.6	% FREQUENCY OF LOW INVADING SCRUB	28.6
% FREQUENCY OF SCABIOUS CATEGORY C	0	% FREQUENCY OF STOCK GRAZING SIGNS	0
% FREQUENCY OF 12-25 cm SWARDS	57.1	TALL (>0.5 m) SCRUB COVER (%)	14.3
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	28.6		

Area H - SU

MEAN VEG. HEIGHT (cm)	12-25	% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS	0
% FREQUENCY OF SCABIOUS	62.5	% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS	12.5
% FREQUENCY OF SCABIOUS CATEGORY A	37.5	% FREQUENCY OF STRUCTURED VEGETATION	62.5
% FREQUENCY OF SCABIOUS CATEGORY B	25	% FREQUENCY OF LOW INVADING SCRUB	25
% FREQUENCY OF SCABIOUS CATEGORY C	0	% FREQUENCY OF STOCK GRAZING SIGNS	0
% FREQUENCY OF 12-25 cm SWARDS	50	TALL (>0.5 m) SCRUB COVER (%)	0
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	12.5		

Area I - GC

MEAN VEG. HEIGHT (cm)	12-25	% FREQUENCY OF CATEGORY B/C SCABIOUS IN <12 cm SWARDS	14.3
% FREQUENCY OF SCABIOUS	85.7	% FREQUENCY OF CATEGORY B/C SCABIOUS IN >25 cm SWARDS	0
% FREQUENCY OF SCABIOUS CATEGORY A	42.9	% FREQUENCY OF STRUCTURED VEGETATION	71.4
% FREQUENCY OF SCABIOUS CATEGORY B	28.5	% FREQUENCY OF LOW INVADING SCRUB	42.8
% FREQUENCY OF SCABIOUS CATEGORY C	14.3	% FREQUENCY OF STOCK GRAZING SIGNS	28.6

% FREQUENCY OF 12-25 cm SWARDS	71.4	TALL (>0.5 m) SCRUB COVER (%)	0
% FREQUENCY OF CATEGORY B/C SCABIOUS IN 12-25 cm SWARDS	28.5		

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		All of the areas were in good condition, with some increasing scrub.