

# Our Common Cause: Our Upland Commons

## Holne Common

### Assessment of habitat suitability for fritillary butterflies (2021- 2023)

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## 1. Introduction

The 'Our Common Cause: Our Upland Commons' project aims to conserve and enhance the heritage of Commons and Commoning in the uplands. As part of this Dartmoor-focussed project, restoration work has been carried out over three years (2021-2023) on Holne Common to improve the quality and extent of breeding habitat for rare and declining fritillary butterflies.

Practical management has been delivered at two sites to benefit two of the UK's most threatened and rapidly declining butterflies, the High Brown Fritillary *Fabriciana adippe* and Pearl-bordered Fritillary *Boloria euphrosyne*. Other fritillary butterflies, the Small Pearl-bordered Fritillary *Boloria selene*, Dark Green Fritillary *Speyeria aglaja* and Silver-washed Fritillary *Argynnis paphia* are also found on these sites.

The two sites are located in Great Combe and to the north of Venford Reservoir, both part of Holne Common (see map, Appendix 1). An assessment of the condition of the breeding habitat at the two sites was carried out in each of the three years of the project. This report presents the results of the assessments and highlights changes in condition over the three year period. It includes results of butterfly surveys carried out for the two target species, and details of management works undertaken. Recommendations are provided for further management to improve breeding habitat condition.

## 2. High Brown/Pearl-bordered Fritillary baseline habitat assessment

### 2.1 Methodology

The survey methodology used was developed for the High Brown Fritillary and Pearl-bordered Fritillary sites on Dartmoor and Exmoor (Clarke and Warren, 1997) and Butterfly Conservation's monitoring protocols (Brereton *et al.*, 2005).

The method involves walking an area during April to late May (when bracken is dormant), and visually assessing the suitability of the habitat and dividing the site into sub-sites based on breeding habitat suitability. The sub-division takes into account density of violet plants, aspect and bracken density, and sites are allocated to one of the following categories:

- 1) Suitable. Violet plants growing amongst bracken seen on average every 2 - 5 paces.
- 2) Scattered. Violet plants growing amongst bracken seen on average every 6 -20 paces.
- 3) Occasional. Violet plants growing amongst bracken seen on average every 21-50 paces
- 4) No habitat. Sub-sites have no, or almost no, suitable violet plants (data sheets were completed if the area has future potential as breeding habitat, assuming appropriate management is undertaken).

Sub-sites were numbered and the boundaries marked on field maps. In each sub-site several 100m transect lines were set out across the area (the number of transects in each sub-site depended on the size of the sub-site). Appendix 2, Map 2 shows the location of sub-sites at Great Combe and the single site to the north of Venford Reservoir (Map 3). The following data were collected for each 100m transect line (see sample data collection sheet, Appendix 3):

- Slope
- Aspect
- Metres of bracken dominated habitat along the transect line
- Number of animal paths (temporary and permanent) crossing the transect

A one metre square quadrat was laid at 20m intervals along the line. The following data were collected in each quadrat:

- GPS location reference

- Number and percentage ground cover of violet plants
- Percentage ground cover of litter (bracken, leaf etc), grass, bare ground, bramble, bluebell and scrub (note that the total percentage cover does not add up to 100% where bracken covers the whole of the quadrat, and bramble or grass are also present growing up through the bracken)
- Vegetation/Bracken litter depth at quadrat centre point (drop disc measurement in cms)
- Any feeding damage to violet leaves was noted.

## 2.2 Results

Vegetation data were collected in 2021, 2022 and 2023 between 15<sup>th</sup> and 26<sup>th</sup> April each year. Maps show the locations of sites (Appendix 1), subsites and transect lines (Appendix 2). It should be noted that, although GPS references were taken, the accuracy is not sufficient to allow precisely the same 1m quadrats to be revisited each year. A survey sheet was used to collect data (Appendix 3), and the results from 2021 and 2023 are presented in tables in Appendices 4 and 5 respectively. A comparison between the years to show the changes over time following the management interventions is presented in the table in Appendix 6.

In Great Combe an area of 8 hectares has been identified as having potential for fritillary butterflies, and here four subsites were identified and 12 transect lines were assessed and mapped (Appendix 4) each with 6 quadrat points. A total of 72 sample quadrat points were recorded across the 8 hectares on which management has been targeted. In 2023, 45% of the sample points contained violets (compared with 36% in 2021) with an average of 8 (4.5 in 2021) plants per 1m quadrat. The average grass cover across all quadrats was 27% (31% in 2021). Presence of bracken litter was recorded across all but one quadrats in 2023 (all but two in 2021), with an average cover of 71% (68% in 2021) and an average depth of 21cm (19cm in 2021).

North of Venford Reservoir, an area of 2 hectares has been identified as having potential for fritillary butterflies. The site is smaller and the habitat quality fairly consistent across the slope, and therefore not divided into sub-sites. 3 transect lines were established and mapped (Appendix 2, Map 3) with a total of 18 quadrat points recorded across just under 2 hectares of the Common on which management has been targeted. 28% (44% in 2021) of sample points contained violets, with an average of just under 3 plants per 1m quadrat (2.5 in 2021). The average grass cover across all quadrats was 7% (26% in 2021). Presence of bracken litter was recorded across all quadrats in both years, with an average cover of 81% in 2023 (71% in 2021) and an average depth of 21cm (13.5cm in 2021).

## 2.3 Changes between 2021 and 2023

In Great Combe, the following changes have taken place from 2021 to 2023:

- Violet presence (% of sample points containing violets) has increased by 9%.
- Violet abundance (average number of violets in quadrat) has increased by 3.5 plants per quadrat.
- Grass cover has decreased by 4%.
- Bracken cover has increased by 3%.
- Bracken litter layer depth has increased by 2cm.
- In both 2021 and 2023 subsite 1 was classified as having 'Scattered habitat'.
- In both 2021 and 2023 subsite 2 was classified as having 'Occasional habitat'.
- In both 2021 and 2023 subsite 2 was classified as having 'Occasional habitat'.
- In 2021 subsite 4 was classified as having 'Occasional habitat' and in 2023 it was classified as having 'Scattered habitat' (a slight improvement in suitability).

In the area north of Venford Reservoir, the following changes have taken place from 2021 to 2023:

- Violet presence (% of sample points containing violets) has fallen by 16%.
- Violet abundance (average number of violets in quadrat) has remained the same.
- Grass cover has decreased by 19%.
- Bracken cover has increased by 10%.
- Bracken litter layer depth has increased by 7.5cm.
- In both 2021 and 2023 it was classified as having 'Scattered habitat'.

## 2.4 Butterfly monitoring results for the Holne Common sites from 2021 to 2023

Butterfly surveys were carried out during the peak flight period for Pearl-bordered Fritillary (late April-mid May) and High Brown Fritillary (mid June-early July) to record the number of each species seen during a measured time period. Timed counts involve walking a zigzag route throughout a site and counting the number of butterflies seen over a measured time period. The number seen per person/per hour can be compared between years, and annual trends can be created.

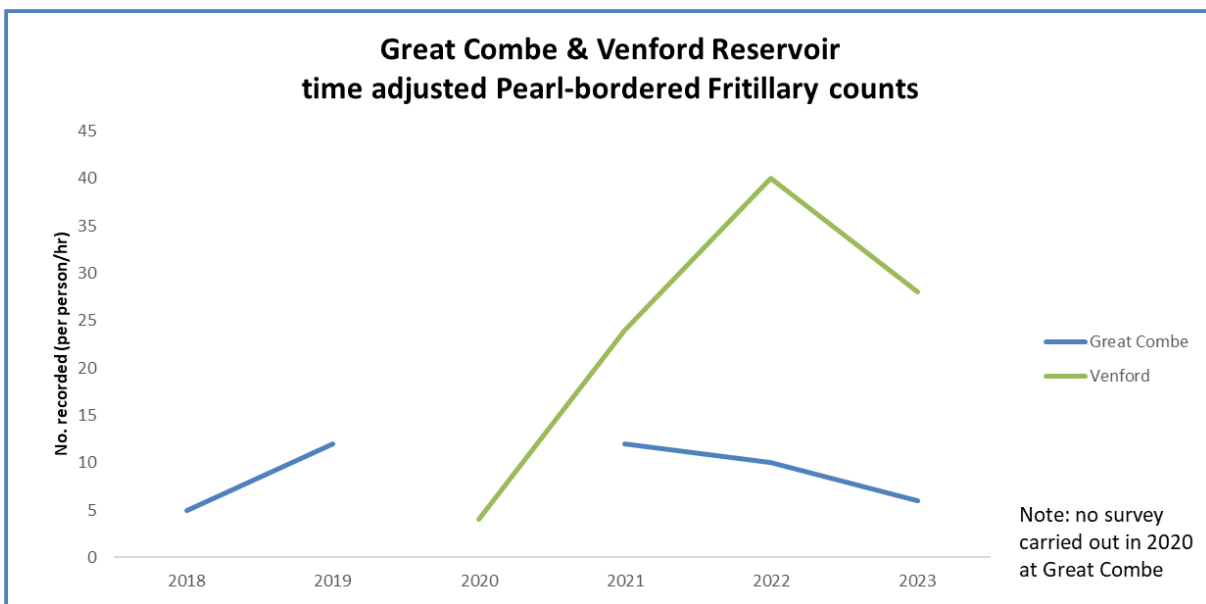


Figure 1. Time adjusted counts for the Pearl-bordered Fritillary 2018-2023

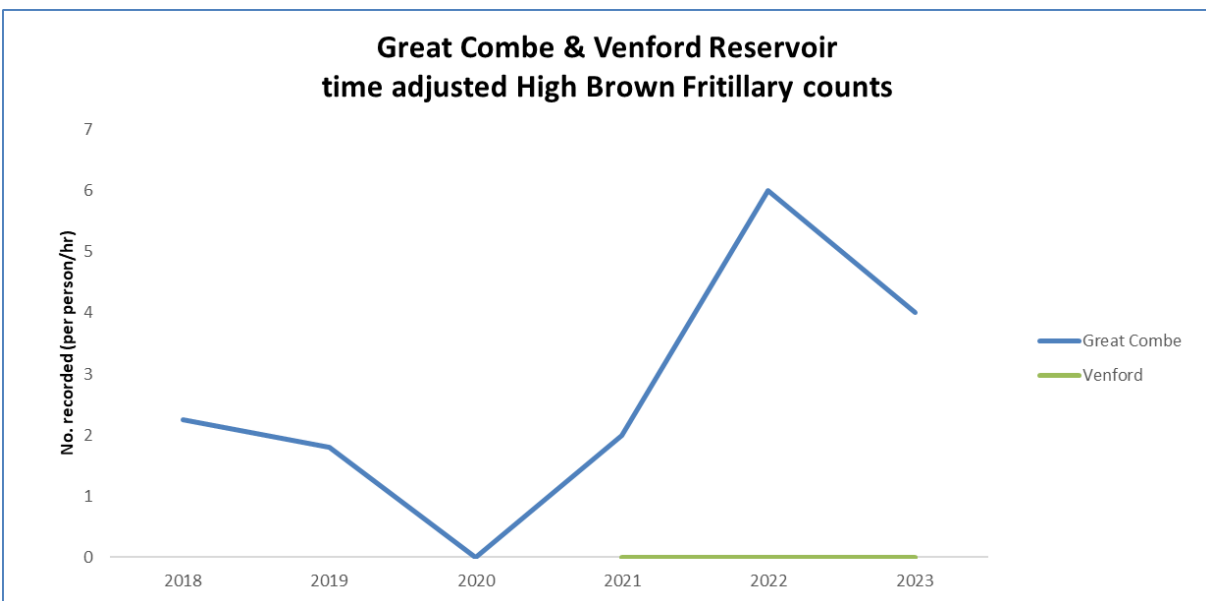


Figure 2. Time adjusted counts for the High Brown Fritillary 2018-2023

The graphs above present the results of timed counts for Pearl-bordered Fritillary (Figure 1) and High Brown Fritillary (Figure 2) at Great Combe and the area to the north of Venford Reservoir. The data on the graph has been adjusted for the time spent searching to ensure that the results from each year are comparable and that search effort is accounted for. (See Appendix 7 for the raw data.) The graphs present data from a period of 6 years for Great Combe, only four years from Venford, which is a relatively short time period, so any conclusions drawn should bear this in mind.

It should also be noted that the spring weather in 2023 during the flight period of the Pearl-bordered Fritillary was very cool and damp. The butterfly emerged around 2 to 3 weeks later than usual, and suffered from cool and breezy conditions during its flight period, hence numbers may have been affected.

The main points to draw from the graphs are:

- The Pearl-bordered Fritillary population is stable and faring reasonably well at the Venford Reservoir site.
- Great Combe Pearl-bordered Fritillary population is small but appears stable.
- Great Combe High Brown Fritillary population is small but appears stable.
- It should be noted that, although no High Brown Fritillary were recorded at the Venford Reservoir site during the survey in 2022, one individual was recorded during a subsequent site visit in July 2022, indicating that they are using the site, although not necessarily breeding there.

## 2.5 Discussion of results

Any changes in the quality of breeding habitat will inevitably take time to show; three years is a relatively short time period over which to assess change. Nevertheless, an improvement in one of the four subsites at Great Combe was recorded, with habitat quality improving from 'occasional' to 'scattered' breeding habitat. Violet presence and abundance increased slightly at Great Combe, although much of the lower half of the east facing slope remains dominated by dense bracken litter. Efforts to encourage stock grazing into the area to trample bracken do not appear to have been successful, but manual management to create tracks through areas of tall, dense bracken in the summertime have been beneficial and a 9% increase in violet frequency was recorded. Higher up the east facing slope, the bracken thins out considerably and the habitat is very grassy. The middle section remains the most suitable breeding habitat, with frequent violets amongst an appropriate depth of bracken litter.

The trial burn carried out in early spring 2022 on the south facing slope (sub-site 2) did not result in the hoped-for flush of violets or the creation of suitable breeding habitat in that area.

At the Venford site, the overall classification of 'scattered habitat' remained unchanged over the assessment period, however the presence and abundance of violets declined slightly, and bracken litter depth increased. Scrub control was carried out, with the removal of some of the young, invading alder buckthorn trees and gorse scrub, which has helped to maintain open conditions and prevent the breeding area becoming too shady. More young seedlings are starting to encroach, however, and will require control.

## 3.0 Management recommendations

Further management is recommended at both sites to improve habitat suitability.

### Great Combe

**Sub-site 1** (see Appendix 2, Map 2) This area is very grassy and bracken growth is sparse, but there are patchy areas where violets and bracken grow in suitable conditions, and could support

fritillary breeding. No bracken management is required here, and management with light grazing with cattle or ponies should maintain suitability.

**Sub-site 2** The top of this sub-site has some suitable habitat with violets frequent amongst appropriate depth of bracken litter. Lower down the slope, violets are absent and bracken litter is very deep. The trial burn did not produce a flush of violets, and resulted only in the acceleration of bracken growth the following season. It is likely that this area will remain unsuitable due to lack of violets, so further bracken management in this area would not be worthwhile.

**Sub-site 3** Some suitable habitat on this slope, although some areas are too grassy. No manual bracken management is required here, and management with light grazing with cattle or ponies should maintain suitability.

**Sub-site 4** This area has greatest potential for fritillaries due to the abundant violets growing beneath the bracken, however bracken density is too high and requires further, and on-going, management to create tracks through the bracken in the summer (June) and to break up and disturb the dead bracken litter layer (in late winter). This could be carried out by targeted grazing by cattle or ponies at these times of the year, but invariably the stock avoid the dense bracken areas and graze around the sides, so additional manual management will likely be required to bruise or cut a network of tracks by hand throughout the very dense areas of bracken.

**Grazing** should continue as previously recommended. The sites should be grazed during the summer (May to August), specifically targeted to the lower half of the east facing slope, (Sub-site 4, see Appendix 2, Map 2). Mineral licks could draw stock into these areas, which have been ignored by grazing cattle/ponies in the past. The aim is to create a network of tracks throughout the tall bracken area.

A further round of grazing is recommended in the winter during January/February (derogation may be required), to break up the dense bracken litter layer and create small areas of open ground where violets can germinate.

**Manual bracken management** should continue as previously recommended in areas where grazing has not created the necessary tracks throughout the bracken stand. Bracken areas should be bashed or bruised (June to August) to create a network of narrow tracks (around 1m wide) across the site. Aim to expose patches of violet plants where possible, as violets exposed to the sun will be sought out by egg-laying females. An inspection of the site should be carried out beforehand, to ensure no nesting birds are present, and the bruising/bashing work should be carried out only with hand tools.

In January/February, dense bracken thatch should be disturbed, again creating a network of tracks. Broken down material should be raked aside; some disturbance of the soil surface is desirable, to open up the area for potential colonisation of violets.



▲ Paths should be made through tall stands of dense bracken to break up the canopy, let light in, and enable butterflies to get down to the violets beneath. Ideally this will be achieved by stock grazing, but can be created manually.

## Venford

Bramble and scrub have both increased significantly over the three year period of this study, in both frequency (number of quadrats with bramble and/or scrub) and coverage (area of quadrats with bramble or scrub). During the project period, the scrub control focussed on removal of larger alder buckthorn trees, however there are now many young alder buckthorn saplings across the site which have germinated from the abundant seed drift, or regrowth from cut stems. This requires continued management to remove up to a third of these young trees annually.

### **Scrub control – to remove encroaching Alder Buckthorn, gorse and other young scrub**

Reduce the extent of Alder Buckthorn, bramble, Silver Birch and gorse scrub to leave approximately 5-10% cover. Remove scrub right down to the woodland edge, leaving a wavy, scalloped edge to the wooded area alongside the river. Aim to increase the extent of open bracken/violet habitat. Focus on removing Alder Buckthorn, ideally pulling young saplings (no regrowth to deal with) by hand or using sapling pullers. If they are too large for pulling, cut at ground level, as close to the ground as possible (to minimise trip hazards and damage to grazing stock). If possible, the stumps should be painted with an appropriate herbicide to reduce regrowth and the cut vegetation should be removed and stacked in the woodland edge at the bottom of the slope. Small clumps of scrub growing in grassy areas can be left; focus on removing scrub from areas where bracken and violets are present.

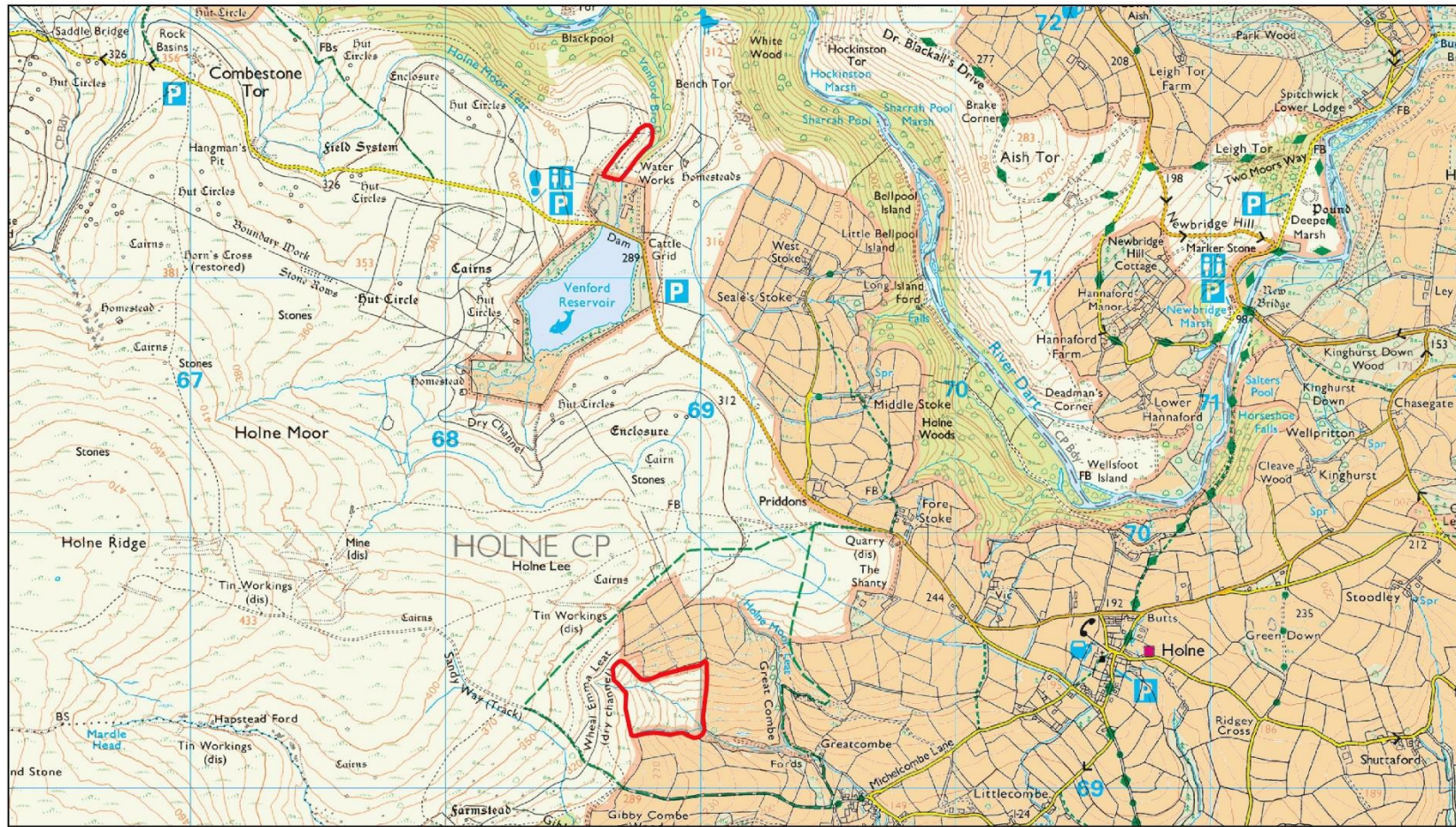
Graze with cattle or ponies lightly in summer to create some tracks throughout the bracken, and during the late winter to break up areas of dense bracken litter (as described above).

### **Summary of annual management required to maintain suitable habitat for the fritillary butterflies:**

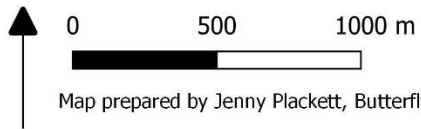
Action	Where	When
<b>Summer grazing with cattle</b> to break up the dense bracken stand and create a network of tracks	Great Combe (all areas, and especially target Sub-site 4); Venford Reservoir site	June-July
<b>Summer bracken management</b> – if cattle grazing cannot be targeted in areas of dense bracken to create a network of tracks, do this manually with scythes	Great Combe; Venford Reservoir site	June-July
<b>Winter grazing with cattle</b> to break down deep bracken litter layer	Great Combe; Venford Reservoir site	Feb
<b>Winter bracken management</b> – if cattle grazing cannot be targeted in areas of dense bracken to break down deep bracken litter layer, do this manually with strimmers or rakes (some disturbance of the soil surface is desirable to support violet germination)	Great Combe; Venford Reservoir site	Feb
<b>Scrub control – Alder Buckthorn, bramble, Silver Birch, gorse</b> see details above	Venford Reservoir site	Sept -March
<b>Monitoring Pearl-bordered Fritillary butterflies</b>	Great Combe; Venford Reservoir site	April-May
<b>Monitoring High Brown Fritillary butterflies</b>	Great Combe; Venford Reservoir site	June-July



# Appendix 1 Map 1 Location of Great Combe and Venford



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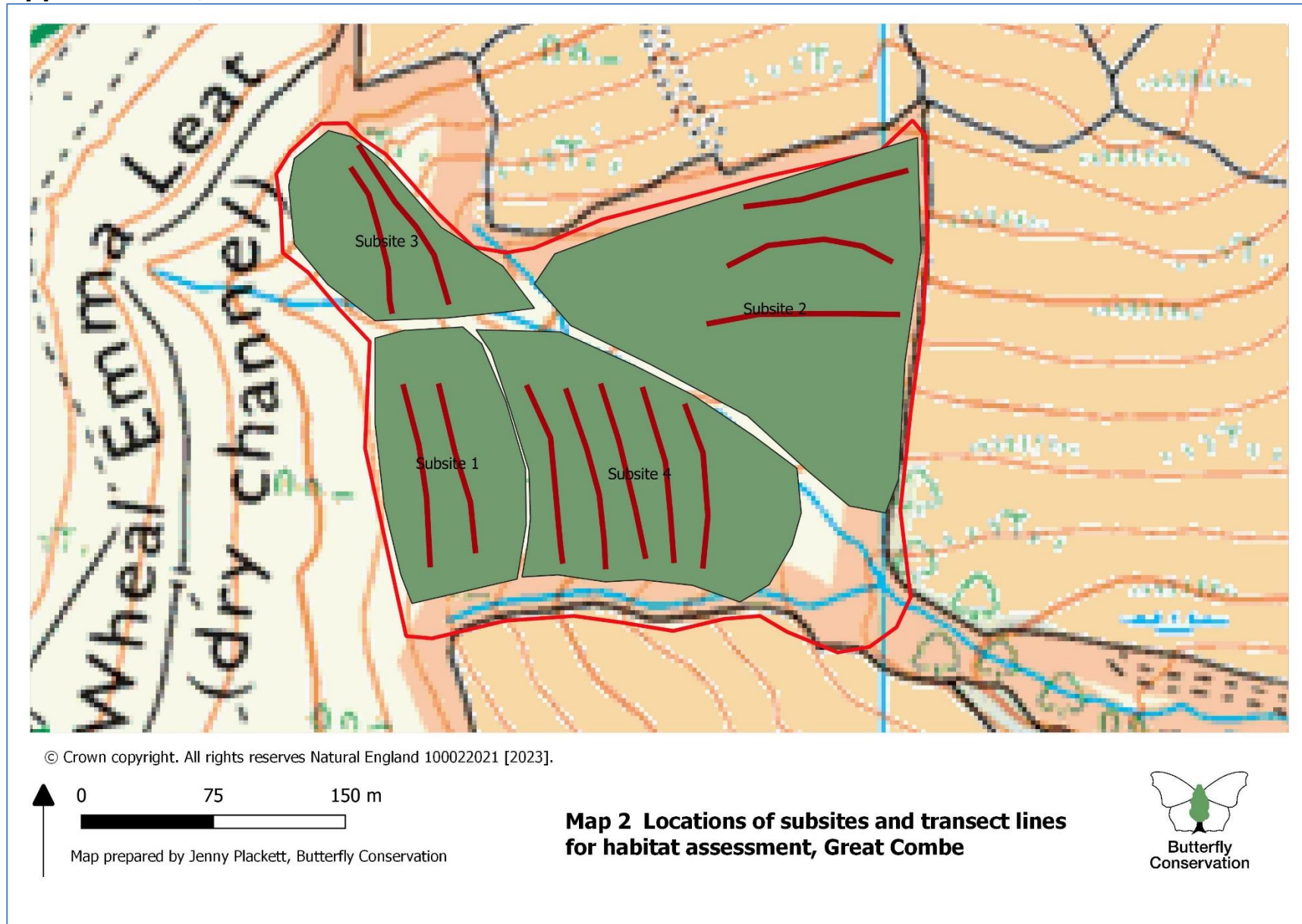


Map prepared by Jenny Plackett, Butterfly Conservation

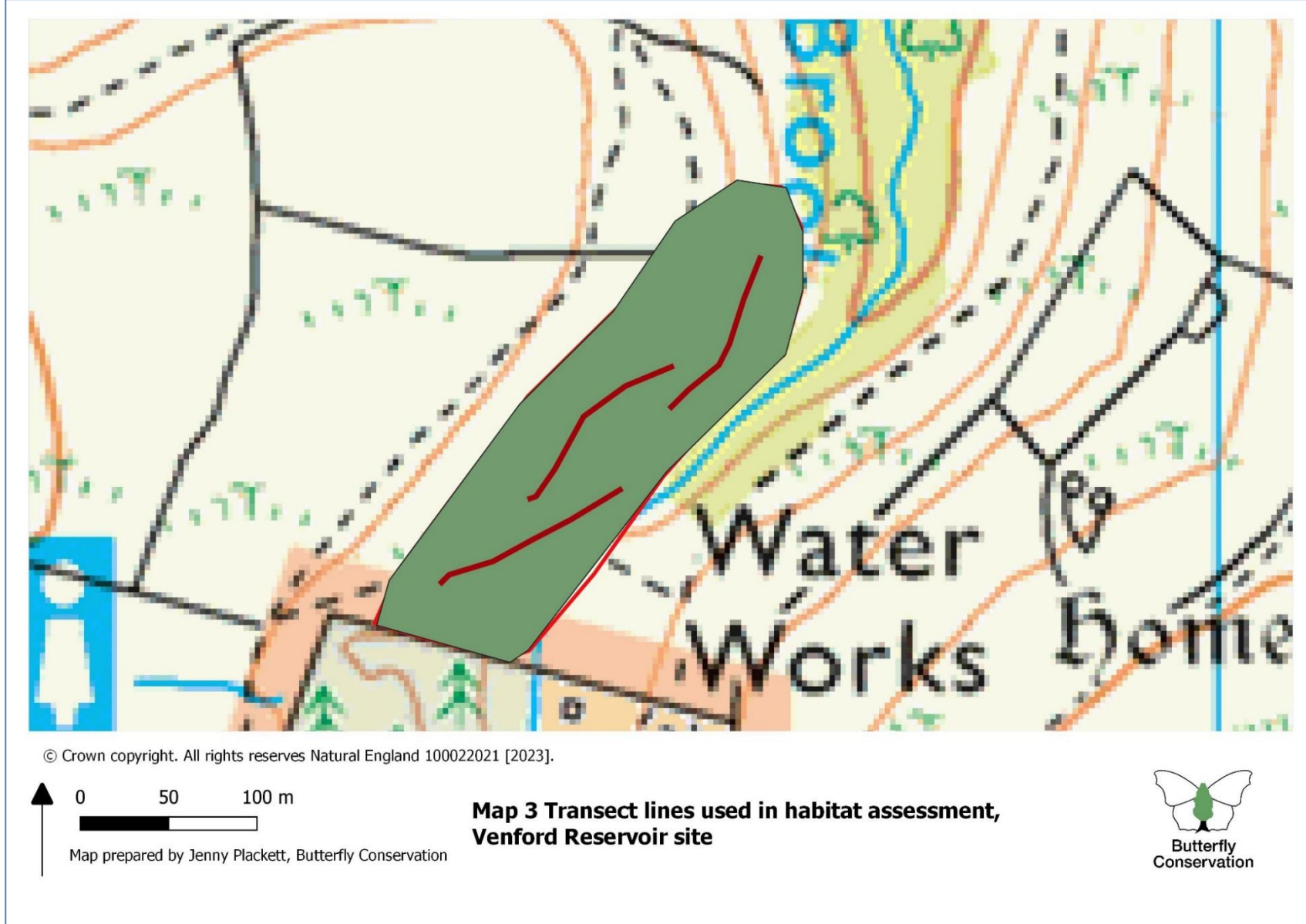
**Map 1**  
**Fritillary breeding habitat on Holne Common**  
**Great Combe and area north of Venford Reservoir**



## Appendix 2 Map 2 Subsites and transect lines used in habitat assessment, Great Combe



**Appendix 2** continued. Map 3 Transect lines used in habitat assessment, area north of Venford Reservoir



**Appendix 3** Sample vegetation data collection sheet

**Site:**                                      **Grid reference:**                                      **Date:**                                      **Surveyor:**

<b>Subsite no.:</b> <b>Habitat: general (slope, aspect, vegetation)</b>
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**Grazing**

Species & number	Dung present (Y/N) & species	Grazing pressure

S-sheep, C-cattle, D-dairy, Dr- deer, R-rabbit, P-pony, H-horse

**Suitability**

Suitable habitat       Scattered habitat       Occasional habitat       No habitat

Mark detailed areas on map if more than one suitability per subsite

<b>Management:</b>

<b>DAFOR</b> <small>Dominance scale</small>	Violet	Bracken	Grass	Bare ground	Common plants
<b>Butterflies seen</b>			<b>Photo (&amp; Grid ref)</b>		

Transect:	Slope: <small>Very steep /steep /slight /flat</small>	Aspect:	Metres of bracken:
Paths: no. small paths (<30cm)	No. temporary paths (>30cm)	No. permanent paths (>30cm) (Surface type)	

<b>Quadrats: (% cover, bracken &amp; grass to nearest 5%, others to 1%)</b>						
	1	2	3	4	5	6
Violet						
Bracken						
Grass/moss						
Bare ground						
Bramble						
Scrub						

**Notes:**  
Note violet density along transect – plants seen every 2-5 paces / 6-20 paces/ 21-50 paces?

<b>Drop disc: (30cm size) (cm)</b>	1	2	3	4	5	6
Feeding damage:						
>10 plants						
<10 plants						
None						
Larvae seen						

Q	Grid ref	WP
1		
2		
3		
4		
5		
6		





## Appendix 6 Assessment of changes in vegetation data between 2021 and 2023

Great Combe		Hectareage of area under management: 8ha		
No. of sample points: 72				
	Year	2021	2022	2023
% of sample points containing violets (violet presence)		36	38	45
Av. No. violets in quadrat (violet abundance)		4.5	5	8
Av. % Grass cover across all quadrats		31	24	27
Av. % Bracken cover across all quadrats		68	68	71
Av. Depth of Bracken litter (cm)		19	14*	21
*Note - burning had been carried out in winter 2022 and removed bracken litter depth, explaining sudden drop in average litter depth that year				
Venford		Hectareage of area under management: 2 ha		
No. of sample points: 18				
	Year	2021	2022	2023
% of sample points containing violets (violet presence)		44	39	28
Av. No. violets in quadrat (violet abundance)		2.5	<1	2.7
Av. Grass cover across all quadrats		26	28	7
Av. Bracken cover across all quadrats		71	65	81
Av. Depth of Bracken litter		13.5	14.5	21

## Appendix 7 Butterfly data

### Survey results for fritillary butterflies 2021, 2022, 2023

Raw counts (not adjusted for time spent searching). Where more than one count was undertaken, only the highest count is shown.

*Note that the early spring weather in 2023 during the flight period of the Small and Pearl-bordered Fritillary was very cool and damp. Emergence was 2 to 3 weeks later than usual, the weather was cool and breezy during the flight period, hence numbers may have been affected.*

Species		Site	Grid reference	2021	2022	2023
<i>Boloria Euphrosyne</i>	Pearl-bordered Fritillary	Great Combe	SX688693	3	5	2
<i>Boloria Selene</i>	Small Pearl-bordered Fritillary	Great Combe	SX689694	4	12	8
<i>Fabriciana adippe</i>	High Brown Fritillary	Great Combe	SX689694	1	2	2
<i>Boloria Euphrosyne</i>	Pearl-bordered Fritillary	Venford Reservoir site	SX686714	6	10	7
<i>Boloria Selene</i>	Small Pearl-bordered Fritillary	Venford Reservoir site	SX686714	1	1	0
<i>Fabriciana adippe</i>	High Brown Fritillary	Venford Reservoir site	SX686714	0	0	0

**Who we are**

Butterfly Conservation is the UK charity dedicated to saving butterflies and moths.

**Why butterflies and moths matter**

Butterflies and moths are important parts of the ecosystem. They are beautiful and inspirational and people enjoy seeing them in their gardens and the countryside. They are sensitive to change and their fortunes help us assess the health of our environment. Two-thirds of butterfly and moth species are in decline. This is a warning that cannot be ignored.

**What we do**

Butterfly Conservation maintains and enhances landscapes for butterflies and moths. We provide advice to landowners and managers on how to conserve and restore habitats. We gather extensive butterfly and moth data and conduct research to provide the scientific evidence that underpins our work. We have an established record of reversing declines. We run programmes for more than 100 threatened species and are involved in conserving hundreds of sites and reserves. We rely on donations, memberships and grants to fund our work.

With your support we can help butterflies and moths thrive.

[www.butterfly-conservation.org](http://www.butterfly-conservation.org)

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