

*Fritillaries for the Future* Timed Count Butterfly Abundance Monitoring and Habitat Condition Survey Guidelines for Pearl-bordered and Small Pearl-bordered Fritillaries

Timed Count Butterfly Abundance Monitoring Guidelines for Pearl-bordered and Small Pearl-bordered Fritillaries

**Definitions**

It is useful to start by considering a few terms, so as to better understand what it is which we are actually recording, and why. Terms such as site, colony, habitat patch, population and metapopulation are sometimes confused and used interchangeably. However, it will not be necessary to fully understand the differences between them in order to help with monitoring butterflies for the *Fritillaries for the Future* project.

Colonies, sites and metapopulations have been defined\* by Butterfly Conservation scientific staff. A **colony** is defined as an aggregation of adults in a discrete **habitat patch**, such as a coppice coupe, clearfell, glade, ride system or area of scrubby grassland. This is separated from other colonies by unsuitable vegetation (which forms a barrier to easy dispersal) extending more than 100 metres in woodland/dense scrub habitats, or by the absence of regularly recorded butterflies over at least 250 metres in more open habitats, such as scrubby downland.

The Pearl-bordered Fritillary may be flying over adjacent coupes, within different stages of the widely used years two and three (sometimes four) of the coppice cycle. As there are no (or only minimal) physical barriers to dispersal, and the fritillaries will often move between these areas, the butterflies are all considered to be part of the same colony. However, for monitoring purposes it is advisable to count the butterflies over each coupe separately; the data can later be added together.

A **site** is defined\* as a hillside or wood with discrete geographical boundaries, which usually has a place name. However, a flexible approach can be taken with this definition in some cases. Rewell Wood in West Sussex has a strong population of Pearl-bordered Fritillary in its southern part, existing within Sweet Chestnut coppice. In its northern part there are a number of recently created clearfells, open spaces and rides, which are separated by a distance of one kilometre from the area of coppice. If colonised, this northern area can be considered a separate site, with the two areas being informally referred to as Rewell Wood North and South.

A **population** of butterflies can be considered as an aggregation of adults at any level of physical distribution. The term population can therefore be applied to a colony (comprising one or more closely connected habitat patches), or a site (comprising one or more discrete colonies), or a county, region, or nationally. A **metapopulation** is a network of colonies which are connected by the occasional dispersal of adults. A large wood may support a metapopulation, comprising several, discrete colonies.

Monitoring the numbers of rare and declining species such as the Pearl-bordered and Small Pearl-bordered Fritillaries, at any of these levels, is vital in assisting conservation efforts. Specific habitat management decisions may be based on the results so obtained.

**Defining the flight area for Timed Count Butterfly Abundance Monitoring**

Walk over the site to determine the main flight area, where an aggregation of adults will be found flying, basking, courting, feeding or egg-laying. This might be a coppice coupe (or a couple of adjacent coupes), a glade or larger clearing, one or more rides, or an area of scrubby grassland.

Larger sites can be subdivided into separate compartments, each of which may be treated individually (e.g. discrete coppice coupes or clearings separated by a barrier of more than 100m of more mature woodland).

Mark each area to be assessed on a map, or create a sketch which can later be translated to an OS map (see Timed Count Butterfly Abundance Monitoring Form). A calculation of the flight area is vital for both Timed Count Butterfly Abundance Monitoring and the Habitat Condition Survey. An area 100m x 100m = 1 hectare (ha); an area 50m x 50m = 0.25ha.

**Methodology**

Counts should be performed between 10.45 hrs and 15:45 hrs in at least warm, bright conditions with no more than moderate wind speed. The minimum criteria are: 13°C with at least 60% sunshine, or 17°C if no sunshine. If larger trees are beginning to sway, it is too windy.

Walk at a slow, steady pace in a wide zigzag pattern, covering the flight area as thoroughly and evenly as possible – do not worry about ‘double-counting’. Record the start and finish times, so that the duration of the count can be calculated to the nearest five minutes. Enter your results on the Timed Count Butterfly Abundance Monitoring Form.

**Statistics**

This section will be of relevance only to those with an interest in statistics, and it is not necessary to understand the mathematics involved when undertaking fritillary monitoring work.

The Timed Count technique\*\* generates data for the number of individual adults seen during a given search period over a specified flight area. This data is then used to calculate an estimate of total colony size at the peak of the species’ flight period (relative population estimate RE), which can be placed into a colony size category as follows:

Large - >1000 individuals

Medium - 100-1000 individuals

Small - <100 individuals

The relative population estimate (RE) is calculated using the formulas\* below.

Population Index (P) of relative adult numbers = Adult density (sightings per hour) x Area of recorded site (in hectares) x Peak flight period adjustment (PFP)

PFP = 4 if the count is made prior to the peak flight week

PFP = 2 if the count is made during the three weeks after the peak flight week

PFP = 4 if the count is made more than three weeks after the peak flight week

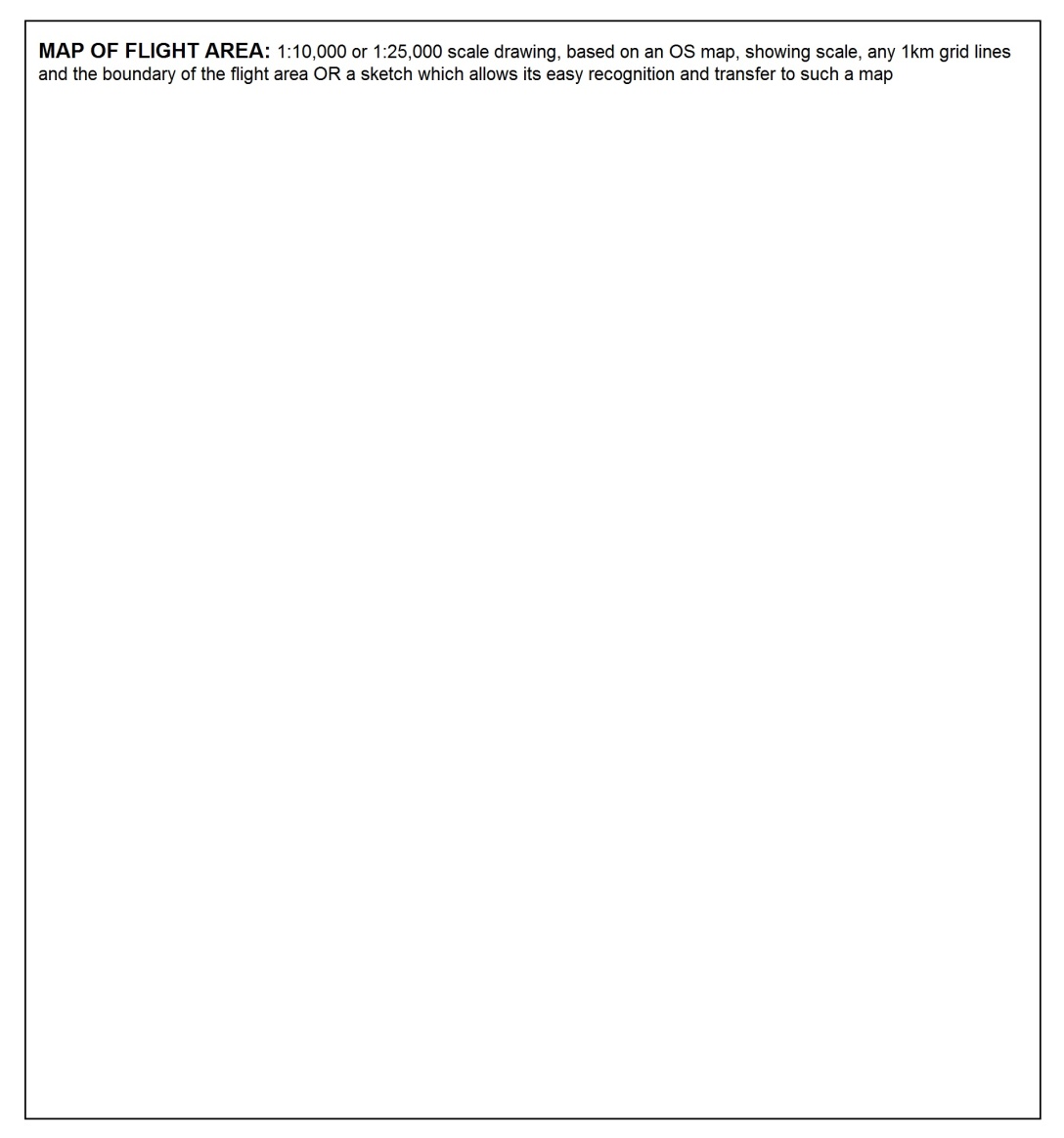
Population index (P) is then converted to relative population estimate (RE), where

RE = 0.9952P – 0.0092

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*FRITILLARIES FOR THE FUTURE* TIMED COUNT BUTTERFLY ABUNDANCE MONITORING FORM FOR PEARL-BORDERED OR SMALL PEARL-BORDERED FRITILLARY

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| --- | --- | --- | --- |
| Site name |  | County |  |
| Central grid reference |  | Recorder |  |



|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date |  |  |  |  |  |
| Time start |  |  |  |  |  |
| Time finish |  |  |  |  |  |
| Duration |  |  |  |  |  |
| Estimate area |  |  |  |  |  |
| Adult count |  |  |  |  |  |

Counts to be performed between 10.45 hrs and 15:45 hrs in at least warm, bright conditions with no more than moderate wind speed

Walk at a slow, steady pace in a wide zigzag, covering the flight area as thoroughly and evenly as possible – do not worry about ‘double-counting’

Habitat Condition Survey Guidelines for Pearl-bordered and Small Pearl-bordered Fritillaries

Habitat condition surveys should be performed within the flight periods for these species; mid April to end May for Pearl-bordered Fritillary, and mid May to late June for Small Pearl-bordered Fritillary. Ideally, they are conducted as close as possible to the peak flight period, which is generally early May for the former species, and early June for the latter.

Surveys are likely to take between one and two hours, depending on the size of the flight area. More time may be required on the larger sites where several colonies are distributed over a wide area.

**Defining the flight area for the Habitat Condition Survey**

Walk over the site to determine the main flight area, where an aggregation of adults will be found flying, basking, courting, feeding or egg-laying. This might be a coppice coupe (or a couple of adjacent coupes), a glade or larger clearing, one or more rides, or an area of scrubby grassland.

Larger sites can be subdivided into separate compartments, each of which may be treated individually (e.g. discrete coppice coupes or clearings separated by a barrier of more than 100m of more mature woodland).

Mark each area to be assessed on a map, or create a sketch which can later be translated to an OS map (see Habitat Condition Survey Form). A calculation of the flight area is vital for both the Habitat Condition Survey and Timed Count Butterfly Abundance Monitoring. An area 100m x 100m = 1 hectare (ha); an area 50m x 50m = 0.25ha.

**Methodology**

1) Outbound walk (point-surveys)

Establish a wide zigzag route which crosses thoroughly and evenly over the flight area. Avoid introducing a bias by focusing the walk on areas of visibly higher violet abundance or where the highest concentration of adults is flying.

Decide on a standard stopping (point-survey) distance (e.g. 20 paces), aiming for approximately 20 point-surveys per hectare. This can be reduced for areas greater than 2 hectares.

At each stopping point record the habitat attributes on the relevant Habitat Condition Survey Form (different form for Pearl-bordered and Small Pearl-bordered Fritillaries) in a one metre radius (i.e. two metre diameter circle).

While doing so, also make a mental note of the attributes listed under Whole Flight Area Attributes, which are more fully recorded during the return (broad assessment) walk.

2) Return walk (broad assessment)

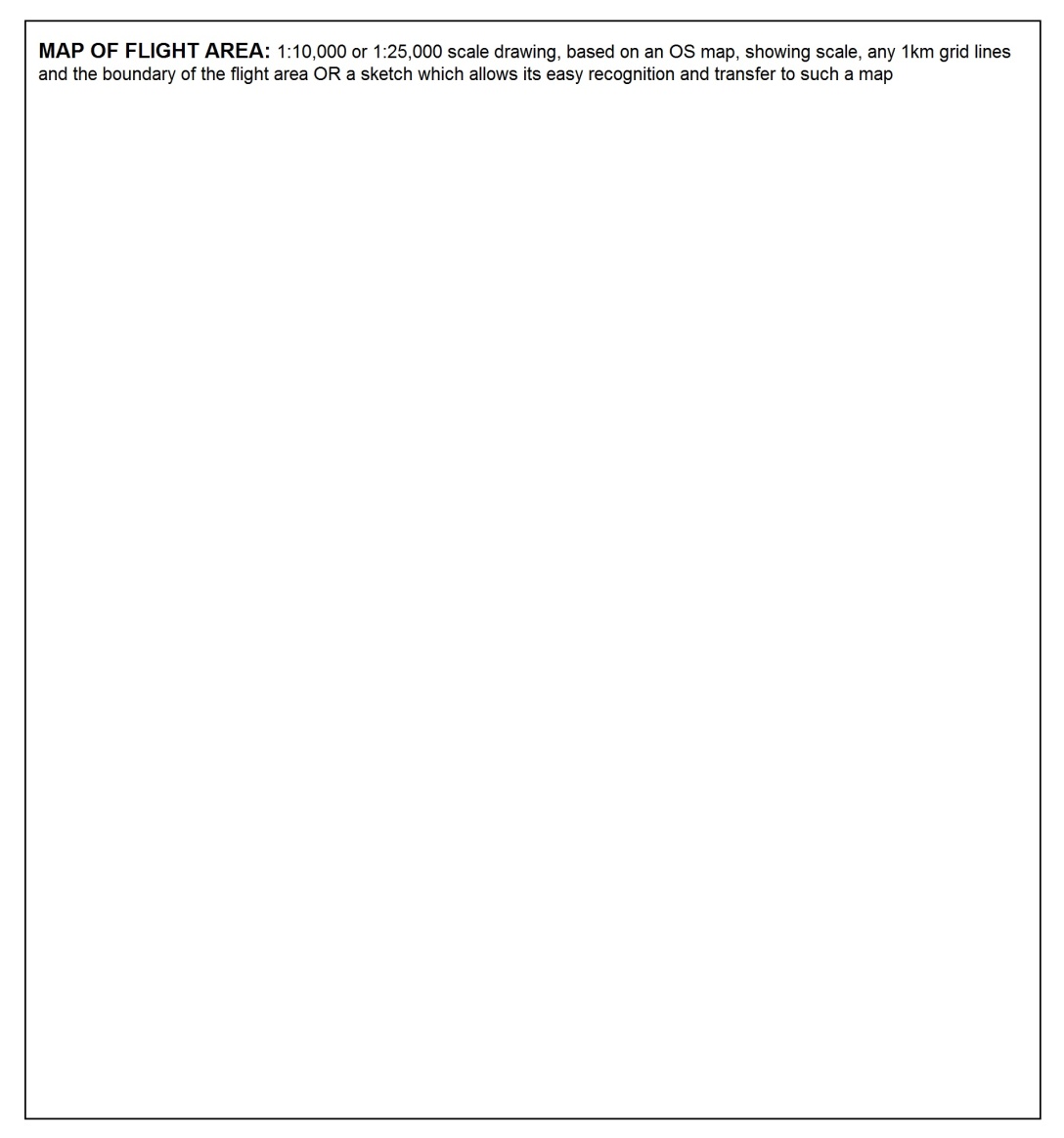
At the end of the zigzag (point-survey) walk, return to the start point following a different route across the defined flight area. Look specifically for those features listed under Whole Flight Area Attributes.

3) Photography – a series of images will provide a useful record of habitat condition.

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*FRITILLARIES FOR THE FUTURE* HABITAT CONDITION SURVEY FORM FOR PEARL-BORDERED FRITILLARY

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Site name |  | County |  | | |
| Central grid reference |  | Recorder |  | Date |  |



**WHOLE FLIGHT AREA ATTRIBUTES** – assessment of habitat attributes based on observations during both outbound (point-survey) and return (broad assessment) walks across the flight area

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| % estimate cover for whole flight area | | | | | | Average height (ruler) of the grass/herb component excluding Bracken (in cm) | Presence nectar plants (e.g. Bugle, Dandelion) over adjacent areas e.g. coupe/glade edges, tracks & rides (tick) | | | |
| Bracken (live) | Dead Bracken blanket where >15cm deep | Bramble | Grass & herbs | Tall (>1.5m) scrub | Dense brash |  | Absent | Rare | Moderately common | Common |
|  |  |  |  |  |  |  |  |  |  |

**OUTBOUND WALK** – point-surveys

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Point-survey number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Approx. number violet plants  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| % cover brown litter (wood, dead Bracken, leaf)  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| % cover green matter (grass, herbs, excl. Bracken)  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| % cover bare ground  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Presence any nectar plants (e.g. Bugle, Dandelion)  within 2 metre diameter circle – Y or N |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Point-survey number | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Approx. number violet plants  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| % cover brown litter (wood, dead Bracken, leaf)  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| % cover green matter (grass, herbs, excl. Bracken)  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| % cover bare ground  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Presence any nectar plants (e.g. Bugle, Dandelion)  within 2 metre diameter circle – Y or N |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

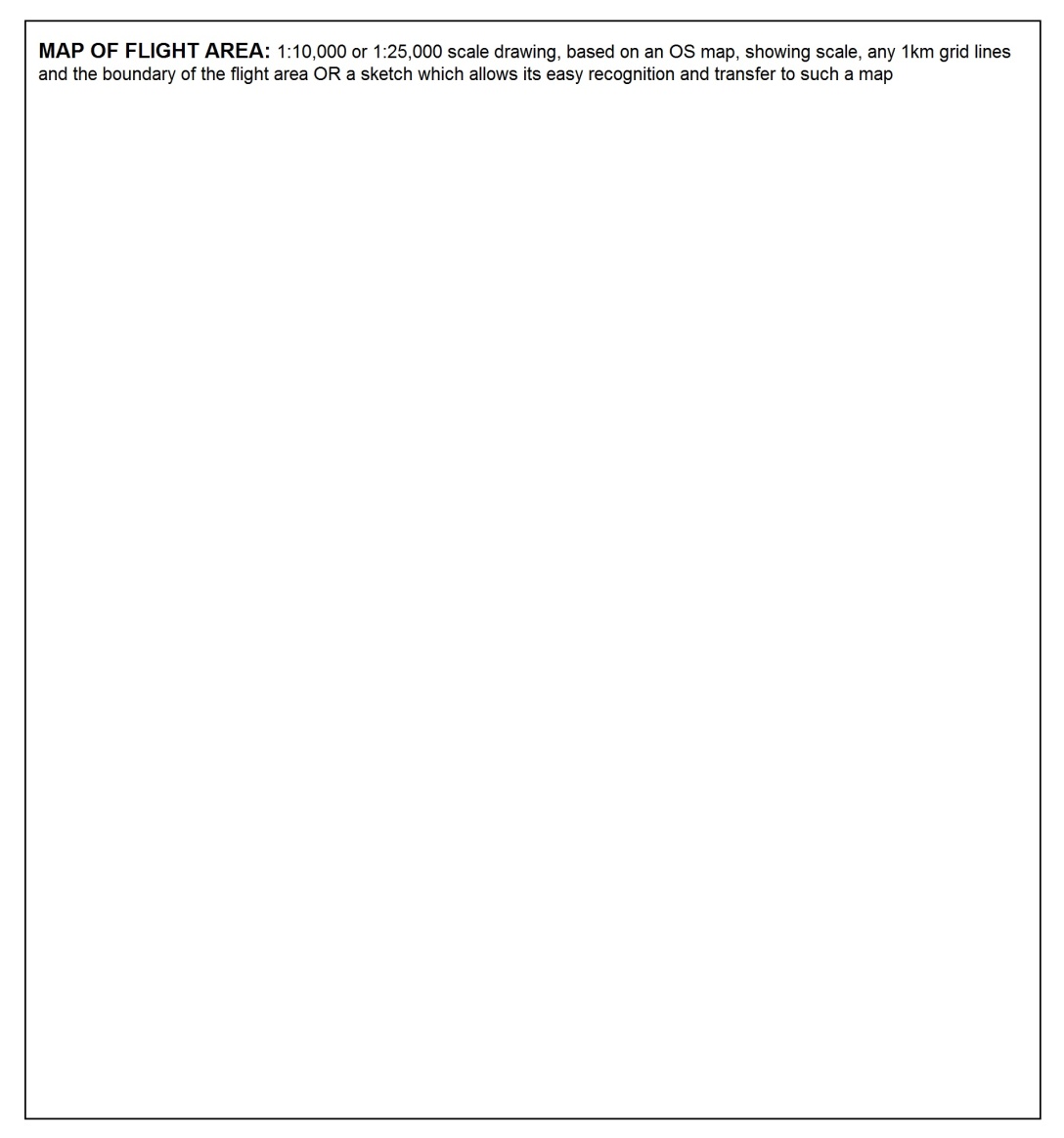
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Point-survey number | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| Approx. number violet plants  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| % cover brown litter (wood, dead Bracken, leaf)  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| % cover green matter (grass, herbs, excl. Bracken)  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| % cover bare ground  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Presence any nectar plants (e.g. Bugle, Dandelion)  within 2 metre diameter circle – Y or N |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Point-survey number | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| Approx. number violet plants  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| % cover brown litter (wood, dead Bracken, leaf)  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| % cover green matter (grass, herbs, excl. Bracken)  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| % cover bare ground  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Presence any nectar plants (e.g. Bugle, Dandelion)  within 2 metre diameter circle – Y or N |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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*FRITILLARIES FOR THE FUTURE* HABITAT CONDITION SURVEY FORM FOR SMALL PEARL-BORDERED FRITILLARY

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Site name |  | County |  | | |
| Central grid reference |  | Recorder |  | Date |  |



**WHOLE FLIGHT AREA ATTRIBUTES** – assessment of habitat attributes based on observations during both outbound (point-survey) and return (broad assessment) walks across the flight area

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| % estimate cover for whole flight area | | | | | | Presence? - Y or N | | | | | | | |
| Bracken (live) | Dead Bracken blanket where >15cm deep | Bramble | Tall (>1.5m) scrub | Dense brash | Tree canopy cover | Dappled sunlight & shade adjacent to fully sunny areas | Standing or running water or visibly damp areas | Drier refuge areas (e.g. gradient or banks) | Rush or sedge | Bluebell | Marsh Thistle | Ragged-robin | Violet growth in mat or large clump form |
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**OUTBOUND WALK** – point-surveys

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Point-survey number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Approx. number violet plants  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Average height (ruler) of the grass/herb component excluding Bracken (in cm) within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Presence any nectar plants (e.g. Bugle, thistles, Ragged-robin, Dandelion, Buttercup) within 2 metre diameter circle – Y or N |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Point-survey number | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Approx. number violet plants  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Average height (ruler) of the grass/herb component excluding Bracken (in cm) within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Presence any nectar plants (e.g. Bugle, thistles, Ragged-robin, Dandelion, Buttercup) within 2 metre diameter circle – Y or N |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Point-survey number | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| Approx. number violet plants  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Average height (ruler) of the grass/herb component excluding Bracken (in cm) within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Presence any nectar plants (e.g. Bugle, thistles, Ragged-robin, Dandelion, Buttercup) within 2 metre diameter circle – Y or N |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Point-survey number | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| Approx. number violet plants  within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Average height (ruler) of the grass/herb component excluding Bracken (in cm) within 2 metre diameter circle |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Presence any nectar plants (e.g. Bugle, thistles, Ragged-robin, Dandelion, Buttercup) within 2 metre diameter circle – Y or N |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Return of all *Fritillaries for the Future* Timed Count Butterfly Abundance Monitoring and Habitat Condition Survey Forms**

All *Fritillaries for the Future* Timed Count Butterfly Abundance Monitoring and Habitat Condition Survey Forms for Pearl-bordered and Small Pearl-bordered Fritillaries in Sussex should be returned to Neil Hulme at [nhulme@butterfly-conservation.org](mailto:nhulme@butterfly-conservation.org)

Thank you for assisting with this important work.

\* Brereton, Roberts & Warren (1999)

\*\* Jones et al. (2014)

Neil Hulme, April 2017