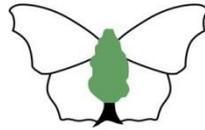


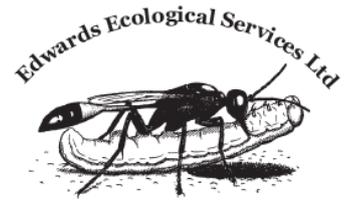


**Centre for
Ecology & Hydrology**

NATURAL ENVIRONMENT RESEARCH COUNCIL



Butterfly Conservation Wales
Gwarchod Glöynnod Byw Cymru



GMEP Pollinator Protocol

2014

Field survey guidelines

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|------------------------------|---|
| GMEP Procedure | Pollinator Field Protocol |
| GMEP Procedure ID | GMEP-WP2-004 |
| Description | This is the pollinator field protocol handbook for the Glastir Monitoring and Evaluation project. |
| Authors | Marc Botham, Jodey Peyton, Mike Edwards, George Tordoff, Russel Hobson and David Roy |
| Creation Date | April 2013 |
| Date of Last Revision | May 2014 |
| Version | 2 |

Version History

| Version | Updated By | Date | Changes |
|---------|-------------|----------|---|
| 1 | Marc Botham | May 2014 | Minor modifications to protocol following comments from wash-up meeting at end of year 1 field season. Minor changes to clarify some of the protocol Addition of new QA procedure New H+S and risk assessment documents added to replace previous outdated ones. |
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Introduction

Pollinator surveys will be carried out twice at each 1 km². The first survey should be carried out in July whilst the second should be carried out in August. In the event that a long period of unsuitable weather prevents a full set of surveys being carried out in July, the first survey should be carried out as early in August as possible for those squares where it was not possible in July. There should be a minimum of 10 days in between the two surveys for any given 1 km².

Permissions

Initially surveyors will provide a two week period in which they intend to carry out the surveys at given 1km squares. This information will be sent to the **Farm Liaison Officer (FLO), Anthea Owen**. Anthea will issue letters to farmers detailing these proposed time periods. Following this, surveyors will be provided maps with information on which farms they have access to and a list of which farms they will need to contact the farmer closer to the time of survey. Included with these maps will be the contact details for those farmers who have asked to be contacted by the surveyors. It is assumed that unless surveyors have told us differently, these surveys will be carried out in the first two weeks of July and August.

- When visiting a farm in the scheduled survey period there is no obligation to contact the landowner, unless they are listed on the separate contact sheets (see below).
- Landowners listed on the separate contact sheets (without maps) must be contacted even when surveyors plan to visit in the scheduled survey period.

The surveyor is to **contact the land owner directly** should they not be able to carry out the survey in the pre-defined two week period. Once site permission is obtained, the survey can be undertaken. **Please provide a weekly update to Anthea and George of which survey squares have been completed and details of any access complications not already relayed to Anthea.**

Some farmers may ask to meet with the surveyors before a survey can be carried out. If a farmer arranges to meet but fails to turn up you are able to carry out the survey, but please ensure that you endeavour to get a hold of them beforehand. Surveys should only be carried out when the farmers owning land in a given 1 km² have given their permission.

Contacting landowners

- Try and phone during the week / weekend prior to the survey if possible.
- Explain that you are carrying out butterfly / pollinator surveys on behalf of Centre for Ecology and Hydrology, who have been contracted by the Welsh Government to survey farms in relation to the Glastir land management scheme, including farms not currently included in the scheme. Explain that they should have received a letter saying the survey was planned to take place.
- If you are unable to contact the landowner after three attempts, then please contact the FLO who may be able to help by phoning or sending a letter.
- You may find that land has recently changed ownership for one reason or another, or that the contact supplied is not correct. When this is the case please pass this information on to the FLO so that they can update the records

To help plan surveys it is advised to check the weather forecast in advance as a preliminary guide, although we appreciate that there will still be a need for a degree of flexibility around this. The following meteorological applications are recommended, should you have a smart phone:

theyr.tv

<http://raintoday.co.uk/>

<http://itunes.pple.com/gb/app/weatherpro/id294631159?mt=8>

<http://www.xcweather.co.uk/>

Survey

Insect surveys will focus on butterflies, bees and hoverflies. Butterflies will be recorded to species level whilst bees and hoverflies will be recorded under groups detailed in the training session, supported by additional ID material. There will be ID support within the insect survey online recording website and simple identification guides will be provided to surveyors. Flowering plant groups will also be recorded to help interpret data on pollinating insect groups.

The pollinator surveys will consist of two independent parts: a **standardised 2 km transect** route through each 1km² followed by a **timed search in a 150 m², flower-rich area within the square**. These two methods are described in detail below:

Transect routes

The survey will broadly follow the methods used for the Wider Countryside Butterfly Survey. For each 1 km² we will provide a map showing areas of land, classified by access permission. Surveyors will also be provided with a map showing the individual farm boundaries, an aerial photograph of the map showing the broad habitat types and general land surface, and a black and white map of each 1 km² on which to draw the transect route. A 2 km transect route will need to be established in each 1km x 1km square. These routes will be split into 10 x 200m sections (see details below for setting up transect routes).

Details of parking places and entry points to the square, determined by other surveyors who have visited the square earlier in the year, will be provided where possible with the maps. However, these may have changed by the time you survey and/or you may locate more suitable parking places/entry points during your survey. Similarly, you may find that access to parts of your route have been restricted by fences and/or other obstructions (including land management such as harvesting and ploughing) not registered on the maps. **Please pass any information regarding parking places, entry points and obstructions on to the FLO at the end of your survey.**

Recording forms will be provided which will include a list of all the butterfly species likely to be encountered, with spaces for additional species. These spaces should also be used to optionally record any day-flying moths where identification is possible. Also included on the recording form are the bee, hoverfly and plant groups to be recorded. For butterflies, moths, bees and hoverflies the surveyor should record abundances of each species/group for each section using tallies in the relevant

recording boxes. When abundances are high surveyors should not spend too much time trying to count every individual and that the surveyor should be maintaining continuous movement rather than stopping to count. Using a technique such as counting to the nearest ten is suitable for high abundances. For plant groups the surveyor should score each transect section, for each plant group using the DAFOR scale:

D (Dominant): **>30%**

A (Abundant): **11-30%**

F (Frequent): **6-10%**

O (Occasional): **2-5%**

R (Rare): **0 - 1%**

X (not seen on route)

Only plants in flower at the time of survey should be recorded as we are interested in the resources available to the pollinators at the time of recording. Therefore, **DAFOR-X should be applied to only the area of the 200m section occupied by the flowers and not the vegetative cover.** On the recording form there is a list of plant groups which we considered to be most important for pollinating insects in July/August. Given temporal and spatial differences in species diversity and abundance other plant groups may be important on some of your survey squares. If this is the case please note the group down and record the DAFOR-X on the transect etc., as normal procedure for other plant groups. When entering this data online enter the DAFOR-X data any other plant groups you found to be important under 'Other Plant groups' and record which plant groups these were under the 'Notes' tab. Where you have recorded more than one extra plant group please enter an overall DAFOR-X score for all those groups combined.

Before the transect is walked, the surveyor should fill in the start time, date etc at the top of the recording form. To fill in the average temperature for the survey it is recommended that surveyors do this during the timed search by placing a thermometer in a shaded position at the start and recording the temperature at the end of the timed search. The transect should be walked at an even pace and only the insects which are observed within a 5 m box around the surveyor should be recorded (up to 5 m in front, 5 m above ground and 2.5 m either side; see Figure 1). **Do not** record anything which is flying further ahead or otherwise outside of this box.

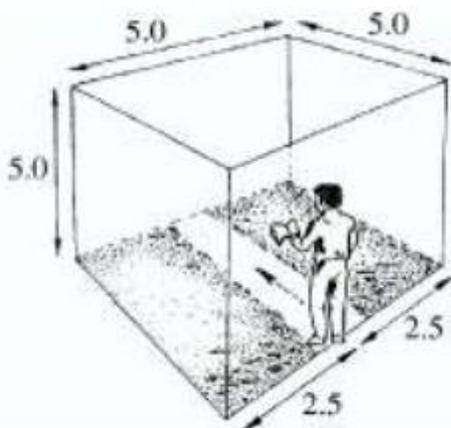


Figure 1. The 5 x 5 x 5m recording box for transects

For those species that are difficult to tell apart in flight (e.g. Large, Small and Green-veined Whites) it is advised to catch them for identification. Essex Skipper is uncommon in Wales but if surveying a square where this species is found please try to separate Small and Essex Skipper, adding the latter species to the recording form. As the two species can only be separated upon inspection of the underside of the last antennal segment, it is advised that the surveyor catches ten or more individuals along their transect to determine the approximate proportion of the two species whilst recording them as Small/Essex Skippers in the interim. At the end of the transect these proportions can then be used to calculate the numbers of each species across the transect. When capturing a butterfly for identification the surveyor should stop recording on the transect. Once the butterfly has been identified and released, the surveyor should return to the point in the transect that they stopped and continue recording from there. If an individual butterfly is encountered more than once and the surveyor is certain it is the same individual then it should only be recorded once. If there is any doubt then it should be recorded on each separate occasion it is observed.

Setting up a route

For each 1km² the surveyor needs to establish a fixed survey route through the square. Transect routes should be 2km long comprising of two parallel 1-km long survey lines across the 1km². These survey lines should run N-S or E-W or as close as possible, and should be subdivided into ten continuous 200m sections numbered 1-10 (Figure 2).

- Ideally, survey lines should be around 500m apart and 250m in from the edge of the square (Figure 2).
- In practice, survey lines are likely to deviate from the 'ideal' because of problems with access, or barriers such as roads, rivers, canals and fences (surveyors should avoid climbing over fences unless absolutely necessary). In cases where survey lines deviate considerably from the 'ideal', at no point should the two lines be closer together than 100m.
- For each of the two survey lines, only record 1-km even if it means not reaching the edge of the square (see examples below, Figure 2).
- Minor intrusions into adjacent squares are perfectly acceptable and may provide the only practical way to carry out the survey. Indeed the route will be acceptable as long as more of the survey line falls within the square rather than outside.
- 1 km Survey lines should be contiguous, but in extreme circumstances such as restricted access to large areas of land, the transect line may be divided appropriately across the 1km square. Individual sections on the 1-km transect line should always be 200m.
- Survey lines should avoid urban habitats including roadside verges. Such habitats can be used to get from one section to another if necessary but should not form part of the transect.

- Please make sure the exact route is drawn as accurately as possible on the online maps (www.ukbms.org/axis2poll). It is advised that the routes are also drawn on the hard copy of the maps to use in the field and that six figure GPS grid references are recorded at the start of each section which will be inputted into the online data for each survey route. Hand-held GPS units can also be used to measure each 200m section.

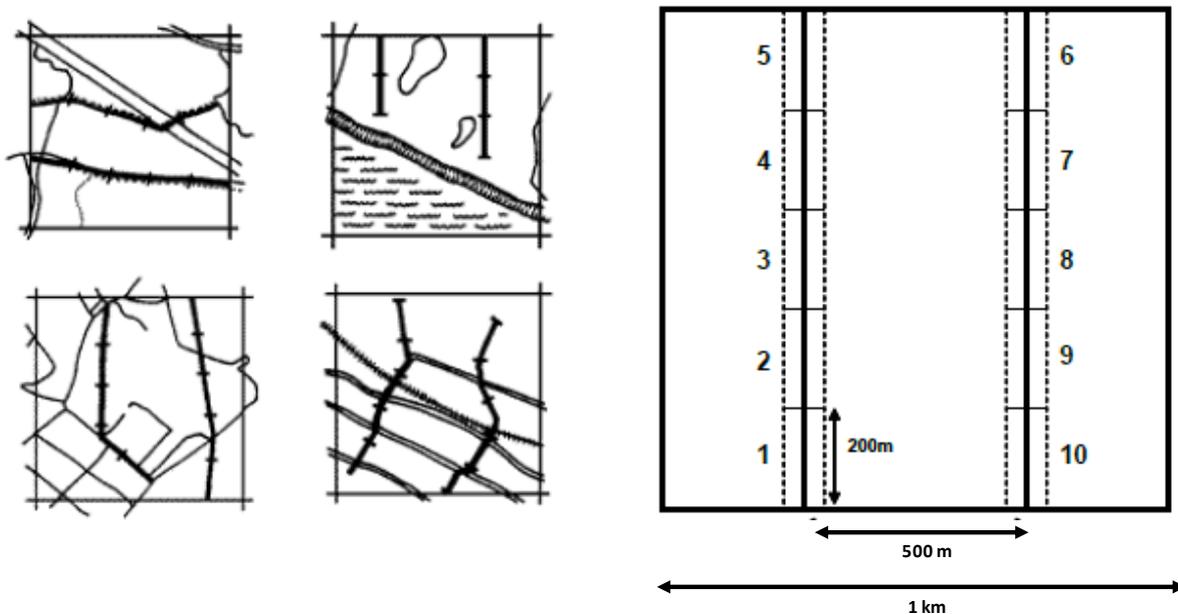


Figure 2. Example survey lines (left) where in reality obstacles, field margins and other land features cause the survey line to diverge from the ideal design (right).

Changes to routes: surveyors should avoid changing the original transect routes unless absolutely necessary because of unforeseen obstructions such as farmers erecting new fences or ploughing fields etc. Where it is necessary to change a route the surveyor should ascertain whether this change is temporary or permanent. Where temporary the original route should be walked in future visits and the site details submitted online should be kept as they are for the original route (see section on online data entry below). Where changes are permanent the original transect route should be updated on the online record for that 1km square and this should become the route that is now followed for all subsequent visits. Deviations from the original route, where necessary, should be kept to a minimum and surveyors should additionally make a note of this in the notes section of their recording forms.

Timed search

Whilst walking the transect the surveyor should identify a **150 m²** area (ideally rectangular or along a linear feature) with good coverage of flowering plants within the 1 km² that the transect route runs through. This can be located with its origin on the transect line if an appropriate area exists there, but where this is not the case it is equally acceptable to locate the 150 m² area elsewhere as long as it is within the 1 km survey square. It is advised to try and choose an area that is relatively sheltered when possible. Surveyors should take a photograph of the chosen area before the timed search in addition

to recording a DAFOR-X value for the overall flower cover in the 150 m². This photograph should encompass the entire 150m² area and be as restricted to this area as possible. These will then be submitted online as part of the data entry for the timed search data (details below in section on online recording).

Timed searches can be performed any time during the overall survey of the square after the first two sections of the transect have been walked depending on when a suitable area is located. If timed searches are conducted during a transect surveyors must stop recording on their transects. Following the timed search they should continue to walk and record on the transect from exactly the point where they stopped. The surveyor should spend **between 10 and 20 minutes** searching this area for butterflies, moths, bees and hoverflies. Where pollinator abundance is low and/or the 150m² area has a low density of flowering plants surveyors should spend a minimum of 10 minutes searching the area. The timed search should not exceed 20 minutes no matter how high the pollinator abundance is. Surveyors should record the duration of their timed search by recording the start and end times of the search. Timed searches should be conducted by continuously moving throughout the 150m² area, although it is acceptable to stop to count individuals unlike on transects. If within the 10 minutes the surveyor has already passed through the entire area they should pass back through it until a minimum of 10 minutes searching has been completed.

There is a separate recording form for the timed search on the reverse side of the transect recording form. This is presented as a grid so that the surveyor can mark which plant groups (when this is the case) that each species has been recorded at the flower of (note: only record the insect at the plant group if it is observed visiting the flower). When not visiting a flower the insect should be recorded in the separate column titled 'Not at flower'. As with the transect recording form, the surveyor should use a tally to record the number of each insect species or group at each plant group. There are a greater number of plant families on this recording form but surveyors may still find other plant families in their search area. Surveyors should make a note of these extra plant families and record the number of pollinators visiting them. When entering this data online please record these extra families under 'Other plants' and record which plant families were observed under the 'Notes' tab. Where more than one extra family is recorded the tally for each pollinator species/group visiting should be summed across all extra plant families. The grid reference of the chosen plot should be recorded along with the start time and other weather conditions as set out at the top of the recording form provided.

Note that the 150 m² area for the timed search is not fixed for the two visits in July and August as flowering patches are unlikely to remain in the same area throughout the year. The area should be chosen during each survey. Transect routes however, are fixed, and the same route should be walked in both the July and August visits for each 1 km².

Photographs

In addition to the photograph of the timed search area, surveyors are required to take a single photograph of a specimen from each bee and hoverfly group (a total of seven photographs). These photographs can be of any species within a given group and can be taken at any time during a survey from anywhere within a survey square but must be taken from a survey square belonging to that surveyor. These photographs should then be submitted online (details below).

Surveyors may also wish to take photographs of any insects or plants where identification is uncertain. These can then be emailed to Mike Edwards (Ammophila@macace.net), and the other surveyors on the project, for identification help. . For all photograph submissions please try and reduce the file size, especially for those sent by email for identification. Online submission of large photographs will be considerably slower and large photographs sent by email are likely to fill recipient inboxes. File sizes can be greatly reduced without any significant loss of clarity, especially for these purposes, using various image software programs of which a number are free to download from the internet.

Conditions under which recording should be undertaken

Surveys (transects and timed searches) should ideally be completed **between 10:00am and 16:00pm** and the start and end times should be accurately recorded on the top of the recording forms. **It is also permissible, and advised whenever possible, to record from 09:30-10:00 and 16:00-16:30, if at these times the majority (>75%) of the survey area is unshaded and the standard weather criteria (described below) have been met.** Surveys should also be completed only under the following weather conditions:

- **Between 11 and 17°C providing there is at least 60% sunshine**, unless in an upland area in which case the survey can be conducted when above 11°C with less than 60% sunshine. Upland squares are classified as squares where more than 50% of the land along the survey lines is above 300m (900 ft).
- **Above 17°C regardless of sunshine**, unless it is raining
- When **wind speed is less than 5** on the Beaufort scale detailed below.

Beaufort scale:

- | | |
|---|--|
| 0 | smoke rises vertically |
| 1 | slight smoke drift |
| 2 | wind felt on face, leaves rustle |
| 3 | leaves and twigs in slight motion |
| 4 | dust raised, small branches move |
| 5 | small trees in leaf begin to sway |
| 6 | large branches move, telephone wires whistle |

Sunshine should be calculated as the percentage of the transect that was walked within which the surveyor cast a shadow. Temperature should be recorded in centigrade (°C) to the nearest whole number, and under shade.

Whilst we do not expect a comprehensive species list for each square we encourage surveyors to record any species they can confidently identify during their survey as long as it does not detract from the main survey and/or significantly increase the time taken to complete the survey. Spaces on the

recording form are limited and should be used first and foremost for additional butterfly and day-flying moth species. Additional species should be recorded on a separate piece of paper.

Online data entry

All data should be submitted online at www.ukbms.org/axis2poll. To use this site surveyors are first required to register by clicking on 'Create new account'. Here they will be asked for their personal details and to create a password etc. Once registered surveyors will be able to log on and submit their records.

The first task for data entry is to complete details for the sites that have been surveyed which will be listed under 'My Sites'. This is done by clicking on 'Edit' under 'Actions' to the right of the relevant 1km square. The Transect Name and Grid Ref are both the 1km square grid reference. Under 'Your Route' the surveyor should then draw the transect routes for each survey square. For each section click on the relevant section tab (S1 to S10) and draw the section on the map using the drawing tool located to the right of the section tabs. Instructions are given on this page.

Entering transect data:

Following this, data can be added by entering 'My Walks' and selecting the '+' button on the relevant date. This brings you to the first page upon which you are required to fill in details of the survey date, time and weather conditions. These must be filled in before you can proceed to the next page and enter data on what pollinators were seen. After these data have been completed click on the 'Next' tab and a series of tabs separated into the different taxonomic groups will appear. Count data for butterfly species, bee groups and hoverfly groups should be entered on each relevant recording form. DAFOR-X values should be entered for the plant recording form remembering to always add an 'X' where the plant was not seen but was looked for. Thus, every box on the recording form for Plants on the transect route should be filled in.

Once you have finished putting your data in for each taxa, and entered any extra data in the notes, click on the 'Finish' tab. If you click on this before completing data entry for that square you can go back by re-entering the 'My walks' tab and clicking on the relevant 1km square on the relevant date. This will take you to the data you have already entered where you can then add the rest of your data.

Entering timed search data:

Once the transect data has been entered surveyors should enter the timed observation data for their survey square. This is done by entering the 'My Timed Obs' tab. Here you will be asked to choose the relevant 1km square from a drop down list based on those you have entered transect data for. Next enter the grid reference for the 150m² survey area – this can be done manually or by clicking in the relevant position on the map on the right of the page. Then upload the photograph you have taken for this area. After uploading your photograph you will be given the chance to write a caption for the

photograph. The caption should use the following format: Surveyors initials_1km square. For example, MSB_TL0438.

After this you are required to complete the data entry pertaining to weather conditions including a DAFOR-X score for the coverage of all flowering plants (flower cover only, not vegetative cover) in the 150m² area. Once this is completed you can proceed to entering the data by clicking on the 'Next' tab. Here you will find matrices for each taxonomic group recorded with columns referring to different plant groups and rows referring to different species (butterflies) or groups (hoverflies and bees). The first column is for those insects seen in the timed search but not visiting a flower. The final column is for other plant groups than those listed on the recording form. If you record in this column please note which plant group(s) you have observed the visitations in the 'Notes' tab.

As with the transect data, once all data has been entered click on the 'Finish' tab. If you accidentally click on this tab before data has been added, you can go back to this entry by entering the 'My Timed Obs' tab and clicking on the relevant 1km square entry on the relevant date. You can then continue entering the rest of your data.

Submitting photographs:

Surveyors are required to take photographs of pollinators for quality assurance assessment. A single photograph of a representative from each of the different Bee and Hoverfly groups (7 photographs in total) should be submitted online using the 'Photo Observations' tab. Photographs should be labelled using the following format:

Surveyor's initials_month of survey (numerical)_1km survey square_insect group (insect type+group number). For example, for John Smith to submit a photograph of mining bee from a July survey on survey square TL4038, the photograph should be named 'JS_07_TL4038_Bee3'. Photographs should not be too large as they will be slow to upload and surveyors should not spend too long taking these photographs.

If there are any issues or queries regarding the online recording please contact Marc Botham ([REDACTED]).

Quality Assurance

Part of the quality assurance process will be covered by the submission of photographs as detailed above. These photographs will be checked by experts in the relevant taxa. As an additional component to our quality assurance surveyors will be asked to complete two online assessments based on images of the typical pollinator species they will encounter during their surveys. The assessments will be made available on the website on which data is entered. The first will be posted for completion at the end of July after the July round of surveys has been completed, and the second will be available at the end of August after the August round of surveys has been completed. Each assessment will consist of a set of 30 images. These will include 20 images of bees and hoverflies and 10 images of butterfly species. Surveyors will be asked to identify each image in accordance with the level of identification required on survey transects (to group level for bees and hoverflies, and to species level for butterflies). For

each image there will be a drop down list with the possible answers to choose from (groups for bees and hoverflies and a species list for butterflies). Each image will remain on the screen for between 2 and 5 seconds and the surveyor will be given a further 10 seconds to make their identification selection. The assessments are meant to simulate the timed conditions of a survey transect so these time intervals are based on the typical times that a surveyor will get to identify pollinators during their surveys. This time will be randomised between images and each surveyor will be presented the images in a different randomised order to other surveyors. Once a species/group has been selected surveyors must click on the 'Check' tab which will return a message indicating whether their selection is correct or not. Where incorrect, the correct choice will be displayed. After each image is checked the surveyor will click on the 'Next' tab to move onto the next image. At the end of all images the surveyor will be shown their score of correct answers and this score will be saved to a spreadsheet. Surveyors will not be able to re-take the assessment after this. This spreadsheet will be downloaded so that the project leaders can calculate the level of recording accuracy across the different surveyors as a group.

Bio-security

When conducting the surveys please disinfect yourselves (as per the training event by Angus Garbutt) between farms as it is an **ESSENTIAL** part of this work that we follow the bio security stipulated for this project. There are currently a small number of farms with TB. Surveyors with these squares to survey will be informed and must use four times the concentration of disinfectant as normal (4 bottles of disinfectant per 3litres of water). A specific assessment of health risk associated with the farm chemicals is issued on the next page.

Surveyors will be supplied with the following:

- 7 litre hozelock sprayer (for spraying car)
- 1.5 litre sprayer (for use in field)
- Brush
- 5 litre water bottle
- Disposable Nitrile gloves
- 6-89 pots of disinfectant (1 bottle for 3 litres – increased to 4 bottles for 3litres in TB farms)
- Safety goggles
- Disposable mask

Please can surveyors brush and clean their boots, car tyres and hubs **before** and **after** leaving sites in their vehicles using the equipment provided. Additionally to this, please can surveyors spray their boots before accessing a new land owner's property using the 500ml sprayer which should be carried with the surveyor during all surveys. This protocol is an essential addition to this project and we remind surveyors that we are only able to carry out this survey due to land owners' good will and to consider how devastating any bio security outbreak would be to a farmer.

Please contact **Jodey Peyton** if you require anymore of *any* of the supplies or have any queries regarding this procedure

General Contacts

Contact details are given on the front page of this document. For any queries or issues relating to site access please contact **Anthea Owen (Farm Liaisons Officer)**. For all other queries please contact **Jodey Peyton** in the first instance.