

# Environment and Rural Affairs Monitoring & Modelling Programme (ERAMMP)

## ERAMMP Document-76: Field-Survey Handbook (Procedures) Pollinators 2021

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## Abbreviations Used in this Report

BTO	British Trust for Ornithology
ERAMMP	Environment and Rural Affairs Monitoring & Modelling Programme
MGRS	Military Grid Reference System
TB	Tuberculosis
UKCEH	UK Centre for Ecology & Hydrology

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# 1 INTRODUCTION

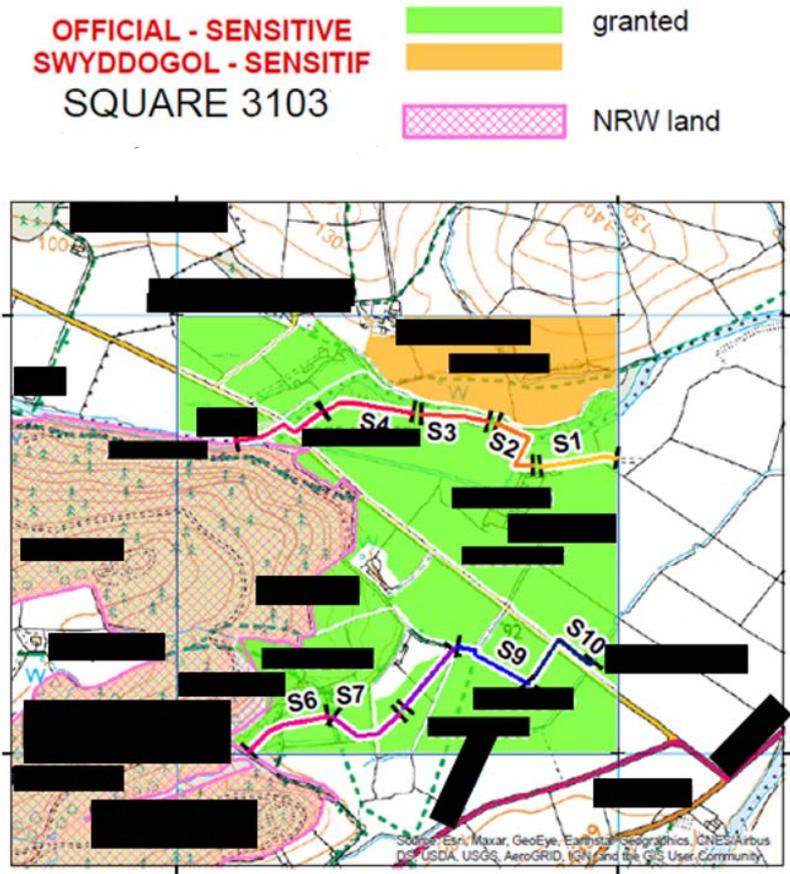
Pollinator surveys will be carried out twice at each 1 km square. The first survey should be carried out in July whilst the second should be carried out in August.

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 km square.

## 2 PERMISSIONS

Surveyors will liaise with BTO ERAMMP Survey Coordinator to determine which squares they will survey and when. Unless otherwise agreed, it is assumed that surveys will be carried out in the first two weeks of July and August. BTO ERAMMP Survey Coordinator and UKCEH ERAMMP GIS Lead will provide surveyors with “square packs” containing maps of pollinator transects, as well as areas of land where permission has been granted for the survey (Fig. 1).

Square packs will also include a table of contact details linked to areas where survey permission has been granted.



**Figure 1** Example of a “traffic light” map showing areas where permission is granted for survey (green). Transect sections are shown, but landowner identifiers are blacked out. NRW land can be accessed (although not marked in green).

Unless explicitly stated in the contact details table, surveyors should contact land managers whose land they will survey and express intent to visit their land 2-3 days (up to 7 days) before conducting a pollinator survey. Only contact details for landowners are provided who granted permission (green area on traffic light maps (Fig. 1)). You can enter NRW land (shaded on traffic light maps). Surveyors are to keep land managers informed of survey plans, and work around land managers if requested. **Please provide a weekly update to BTO ERAMMP Survey Coordinator of which survey squares have been completed, and provide details to ERAMMP Field Survey Manager about access complications.**

Landowners may ask to meet with the surveyors before a survey can be carried out. If a landowner wants to meet a surveyor, remind them of the ERAMMP COVID-19 risk mitigation protocol. Pre-arranged meetings are not permitted. Surveyors should explain all necessary

information over the phone. If the landowner passes by the surveyor on the day, adhere to social distancing guidelines laid out in the risk assessment. If a landowner cannot be reached via a call, surveyors are able to carry out the survey, but please ensure that you endeavour to get hold of them beforehand. If the surveyor leaves a message on an answering phone, please provide a phone number in case the landowner wants to call back.

## 2.1 Contacting landowners

Phone land owners 2-3 days (up to 7 days) prior to the survey unless explicitly told otherwise.

Explain that you are carrying out butterfly / pollinator surveys on behalf of the British Trust for Ornithology and the UK Centre for Ecology & 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. The landowner may also have been contacted through a company called "XSG Ltd"; the landowners may have granted permission over the phone. Alternatively, the landowners might have filled in an online questionnaire, granting permission this way.

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 ERAMMP Field Survey Manager and UKCEH ERAMMP GIS Lead 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:

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

<https://www.theyr.com/app.asp>

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

## 3 POLLINATOR SURVEYS

Pollinator 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. 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 1 km square followed by a **timed observation in a 150 m<sup>2</sup>, flower-rich area within the 1 km square**. These two methods are described in detail below:

### 3.1 Transect routes

The survey will broadly follow the methods used for the Wider Countryside Butterfly Survey.

For each 1 km square we will provide:

1. A map showing areas of land classified by access permission, with indication of land ownership.
2. An aerial photograph of the area showing the vegetation type and general land surface.
3. A black and white map of each 1 km square showing the previous 2 km transect route for that square. Transect routes are split into 10 x 200 m sections (see details below for setting up transect routes). Surveyors may walk new transect sections during surveys, which they are expected to draw on this map.

Where available, details of parking places and entry points to the square will be provided 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 ERAMMP Field Survey Manager at the end of your survey.**

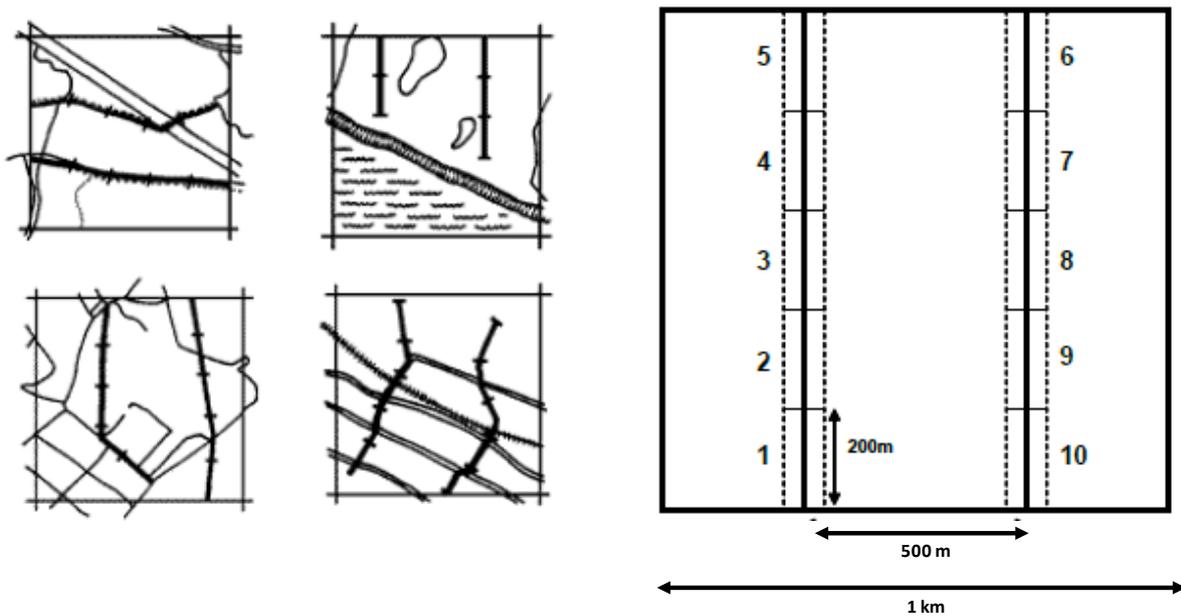
Surveyors will be provided maps of transect routes walked previously in each 1 km square. These routes are 2 km long (comprising two 1 km 'transect lines') divided into 200 m transect sections numbered 1-10. Previous surveys intended to make the 1 km transect lines run parallel in an N-S or E-W direction through the square. However, in practice, these transect lines deviate from the 'ideal' because of problems with access, or barriers such as roads, rivers, canals and fences (Figure 1; surveyors should avoid climbing over fences unless absolutely necessary). Transects walked previously deviate greatly from the 'ideal', but on average they represent paths of low resistance to carry out pollinator counts, avoiding walking across fields of crops and where possible following linear features such as hedgerows and footpaths which also facilitate relocation.

- Ideally, surveyors will walk exactly the same route as the one shown on the map provided, ensuring that counts and cover are recorded under the correct section number.
- In practice, some transect sections may no longer have access permission granted, which will be clear from the traffic-maps provided (Fig. 1), or may occur during the season (where

the surveyor receives new information, they should contact ERAMMP Field Survey Manager and UKCEH ERAMMP GIS Lead to let them know of the change so it can be documented).

- Established transect sections should be re-walked if possible, provided that either (1) access remains granted for >90% of that section OR (2) the section falls on a public right-of-way.
- Where transect sections are no longer accessible, surveyors will need to create new sections to replace those they can no longer walk. New sections should be set up following the guidance in Box 1 (Creating new transect sections).
- In some cases where access to land in the 1 km square has significantly changed over time, entire transect routes may need to be re-routed. Guidance in Box 1 should be followed, but in addition, as much as possible the new transect lines should aim to sample in the same habitat type as the previous ones.

For the second visit to each 1 km square, permissions should be the same. As such, we expect the same transect to be walked in the first and second visits. If surveyors do make changes to transect routes between their first and second visits, they should take note of this.



**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).

### **Box 1: Creating new transect sections**

When adding new transect sections, the following guidance applies:

- Ideally, transect lines should be around 500 m apart and 250 m from the edge of the square (Fig. 1).
- In cases where transect lines deviate considerably from the 'ideal', at no point should the two lines be closer together than 100 m.
- The total length of each transect route should equal roughly 1 km. Where new transect sections are required they should be planned to be of a similar length to those they are replacing. For each of the two transect routes, only record 1-km even if it means not reaching the edge of the square (see examples below, Fig. 1).
- Minor intrusions into adjacent squares are acceptable only where permission to survey is understood to be granted (for example where a transect section crosses the border of a 1 km square but remains in the same field).
- 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 1 km square. Individual sections on the 1-km transect line should always be 200 m.
- Survey lines should avoid urban habitats including roadside verges unless absolutely necessary.
- When new transect sections are established, it is important to (1) draw the new transect section(s) on the hard copy of the transect map and number them appropriately, and (2) draw any new sections as accurately as possible on the online data entry form.
- If changes to transect sections are due to permanent access restrictions (e.g. construction developments) rather than mapped permissions, surveyors should indicate that the changes they have made are permanent on the online data entry form.

## **3.2 Survey conditions**

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 observation by placing a thermometer in a shaded position at the start and recording the temperature at the end of the timed observation.

## **3.3 Insect counts**

The transect should be walked at an even pace and only the insects of the target groups 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 Fig. 2). **Do not** record anything which is flying further ahead or otherwise outside of this box.

Recording forms will be provided which will include a list of all the butterfly species likely to be encountered, with spaces for additional species. Also included on the recording form are the bee, hoverfly and plant groups to be recorded. For butterflies, 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; surveyors 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 and/or using mechanical counters or counter apps on mobile phones.

For those species that are difficult to tell apart in flight (e.g. Large, Small and Green-veined Whites), surveyors are encouraged 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.

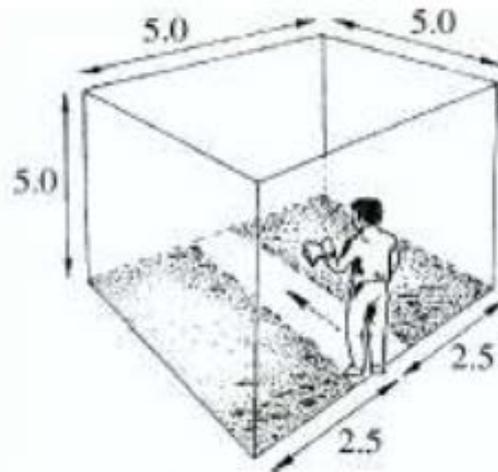


Figure 2, The 5 x 5 x 5m recording box for transects.

Only plants in flower at the time of survey should be recorded, because we are interested in the resources available to the pollinators at the time of recording. **Surveyors are asked to record cover of flowers, not vegetation.** Therefore, DAFOR-X should be applied to only the area of the 200m section occupied by the flowers and not the vegetative cover. This means that the cover for each transect section is unlikely to sum to 100%.

### 3.4 Flower cover

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)	

On the recording form there is a list of plant groups 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.

### 3.5 Timed observation

Whilst walking the transect the surveyor should identify a **150 m<sup>2</sup>** area (ideally rectangular or along a linear feature) with good coverage of flowering plants within the 1 km square 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 m<sup>2</sup> 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.

Timed observations 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. It is, however, advised that a greater length of the transect is walked before performing the timed observation as you may encounter more suitable flower-rich areas when having covered more of the 1km square.

If timed observations are conducted during a transect, surveyors must stop recording on their transects. Following the timed observation 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 the timed observation area for butterflies, bees and hoverflies.

Where pollinator abundance is low and/or the 150 m<sup>2</sup> area has a low density of flowering plants, surveyors should spend a minimum of 10 minutes searching the area. The timed observation should not exceed 20 minutes no matter how high the pollinator abundance is. Surveyors should record the duration of their timed observation by recording the start and end times of the search.

Timed observations should be conducted by continuously moving throughout the 150 m<sup>2</sup> 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 observation 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 visiting (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 observation 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.

**The 6-figure OS grid-reference should be recorded at the centre of the 150 m<sup>2</sup> area for each timed observation.** Note that the 150 m<sup>2</sup> area for the timed observation 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 km square.

### 3.6 Photographs

Surveyors are required to take a single photograph of a specimen from each bee and hoverfly group (a total of seven photographs) and send these directly to the BTO ERAMMP Survey Coordinator.

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 to the surveyor team for verification (details below). **Geotagging must be switched off** on the camera/phone you are using.

Surveyors may also wish to take photographs of any insects or plants where identification is uncertain. These can then be emailed to the External ERAMMP Plant and Pollinator ID contact, butterfly ID queries to the UKCEH ERAMMP Pollinator Lead, and the other surveyors on the project, for identification help. If interested, surveyors may choose to join a WhatsApp group, but geotagging must be switched off on the phone.

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.

## 3.7 Conditions under which recording should be undertaken

Surveys (transects and timed observations) should ideally be completed **between 10:00 and 16:00** 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 300 m (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.

Surveyors may 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. Additional species should be recorded on a separate piece of paper, and recorded in the “comments” box in the online data form.

## 3.8 Online data entry

Data entry must be carried out on devices provided and administered by BTO. You will use two online data entry forms (designed using ESRI software Survey123). Separate online forms (separate URLs) are used to input data for pollinator transects and (2) timed observations. The URLs for the online forms will be provided during training.

When entering data online, it is important to remember the following:

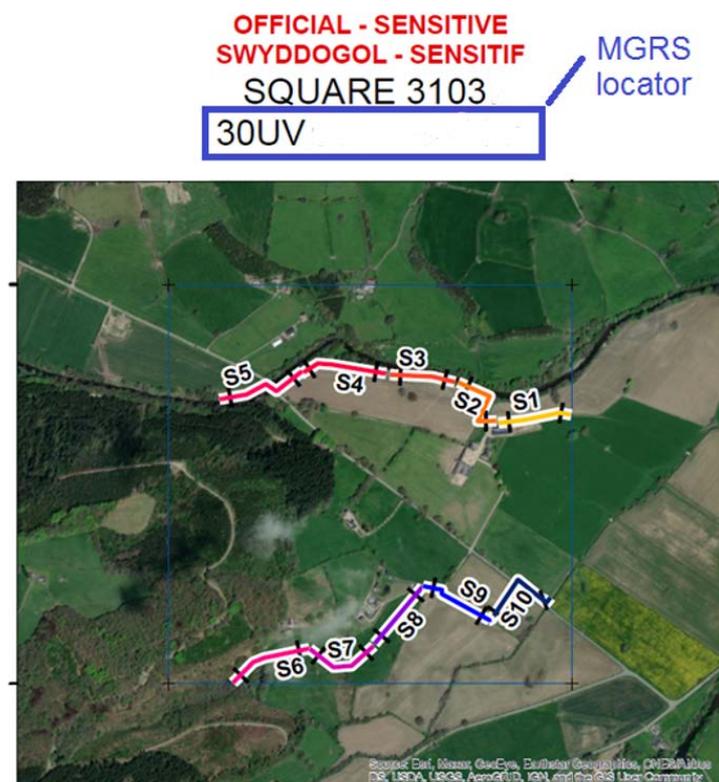
- Once you start to enter data for a given transect or timed observation, **do not close or refresh your browser** or you will have to start from the beginning.
- As such, ideally data for a given transect or timed observation should be entered in one sitting. For transects in particular, you should set aside **30 minutes** of continuous time for data entry.
- Hard copies of data, on paper forms, should be retained and returned the BTO ERAMMP Survey Coordinator at the end of the survey year.

The process for entering transect data is as follows:

- With your completed paper form to hand, navigate to the online form for transect sections (provided during training) on your BTO device.
- There are two main parts to the form: **General information** and **Transect sections**.
- **General information** is the first part of the online form, where you enter data related to the visit as a whole. Most of this can be copied from the top of the paper form:

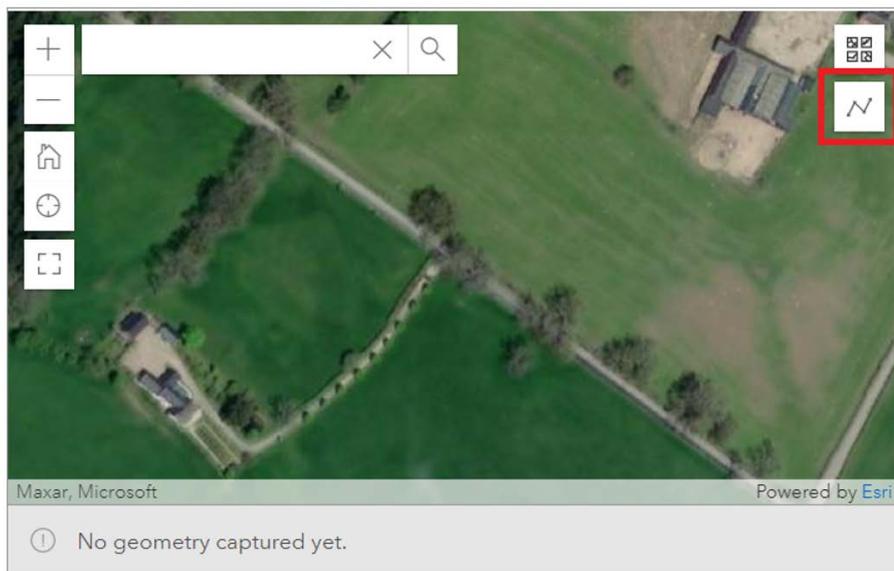
<b>RECORDER:</b>		<b>SQUARE REF:</b>		<b>GRID REF:</b>		<b>DATE:</b>	
<b>Start time:</b>		<b>End time:</b>		<b>% Sunshine:</b>		<b>Wind speed:</b>	
						<b>Temp °C:</b>	

- As well as the data at the top of the paper form, you will need to enter an **MGRS locator**. This is a 15-digit code used to locate your square when you sketch transect sections on the online form. You can find the **MGRS locator** on the transect maps for the square you are surveying (Fig. 3).



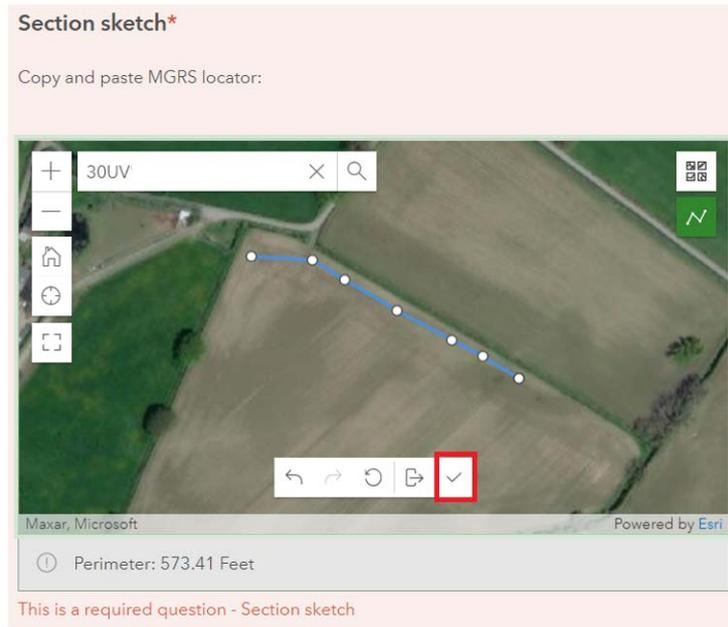
**Figure 3** Example of a transect map for an ERAMMP square, highlighting where the MGRS locator can be found.

- **Transect sections** is the second part of the online form, where you enter data about each of 10 transect sections. This includes indicating whether a section was replaced or not, drawing a sketch of the section, as well as which taxa were present, flower cover and insect counts.
- This section is repeated 10 times to record data for each section. Some items on the form will only be available if appropriate boxes are ticked; for example, if butterflies are not ticked under “taxa present” for a given section, then butterfly counts cannot be recorded.
- To provide a sketch of a given section, first copy and paste the MGRS locator into the search bar in the section sketch sub-window and hit enter (Fig. 4; if there is no MGRS locator to copy, you need to enter the 15 digit code under **General information**). This will zoom the window to the centre of the ERAMMP survey square.
- Referencing the transect maps provided, as well as your memory and the sketches you made in the field, pan the map (click and drag) and zoom (+/- buttons) so that the sub-window captures the area in which the section was walked.
- Click the “geoline” button to start sketching the transect section (Fig. 4). Use a sequence of clicks to draw **one continuous line** which accurately represents the section. If you aren’t happy with the section, delete (dustbin button) and start again.



**Figure 4** The section sketch sub-window after entering the MGRS and zooming in on the square. The “geoline” button is highlighted with a red outline.

- Once you are happy with the section, either (1) double click the final point or (2) click the “finish” button (the tick; Fig. 5). **If you don’t finish the section, you will not be able to submit your results.**



**Figure 5** The section sketch sub-window after drawing section 9 for square 31037 (Fig. 3). The section was not replaced. The “Finish” button is highlighted with a red outline.

- Record cover/counts of any recorded taxa below the section sketch. We advise you do so in the following order:
  - Flower cover
  - Bees counts
  - Hoverfly counts
  - Butterfly counts
- Minimize the section for each taxon after you enter all relevant data – this is done using the small green arrows in the online form.
- Repeat the above process for all 10 transect sections. Then, give the form a final check-over, and click the “Submit” button at the bottom of the form. If any necessary details have not been provided, you will be prompted to revisit those parts of the form and complete them. If this happens, you can navigate to the uncompleted sections by clicking the red bar at the top of the screen (Fig. 6). After completing all missing details, click “Submit” again.



**Figure 6** Any necessary details which are not filled out will turn pink. After failed submission, you can click the red bar to navigate to missing details and fill them out.

## 4 BIO-SECURITY

When conducting the surveys please follow biosecurity protocols using the disinfectant and equipment provided. It is an ESSENTIAL part of this work that we follow the biosecurity stipulated for the ERAMMP 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 (four tablets instead of one per 500 mL 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:

- 500 mL spray bottle (for use of disinfectant)
- 9 x 5 g Virkon tablets (1 per 500 mL water, increased to 4x the concentration if TB farms in squares)
- Disposable Nitrile gloves
- Safety goggles

Surveyors must clean their boots, car tyres and hubs before and after leaving farmyard sites in their vehicles using the equipment provided.

Additionally to this, spray boots before accessing a new land owner's property using the 500 mL sprayer which should be carried with the surveyor during all surveys. This protocol is an essential addition to the ERAMMP project and we remind surveyors that we are only able to carry out this survey due to land owners' goodwill and to consider how devastating any bio security outbreak would be to a farmer.

Please contact the BTO ERAMMP Survey Coordinator if you require anymore of any of the supplies or have any queries regarding this procedure.

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