

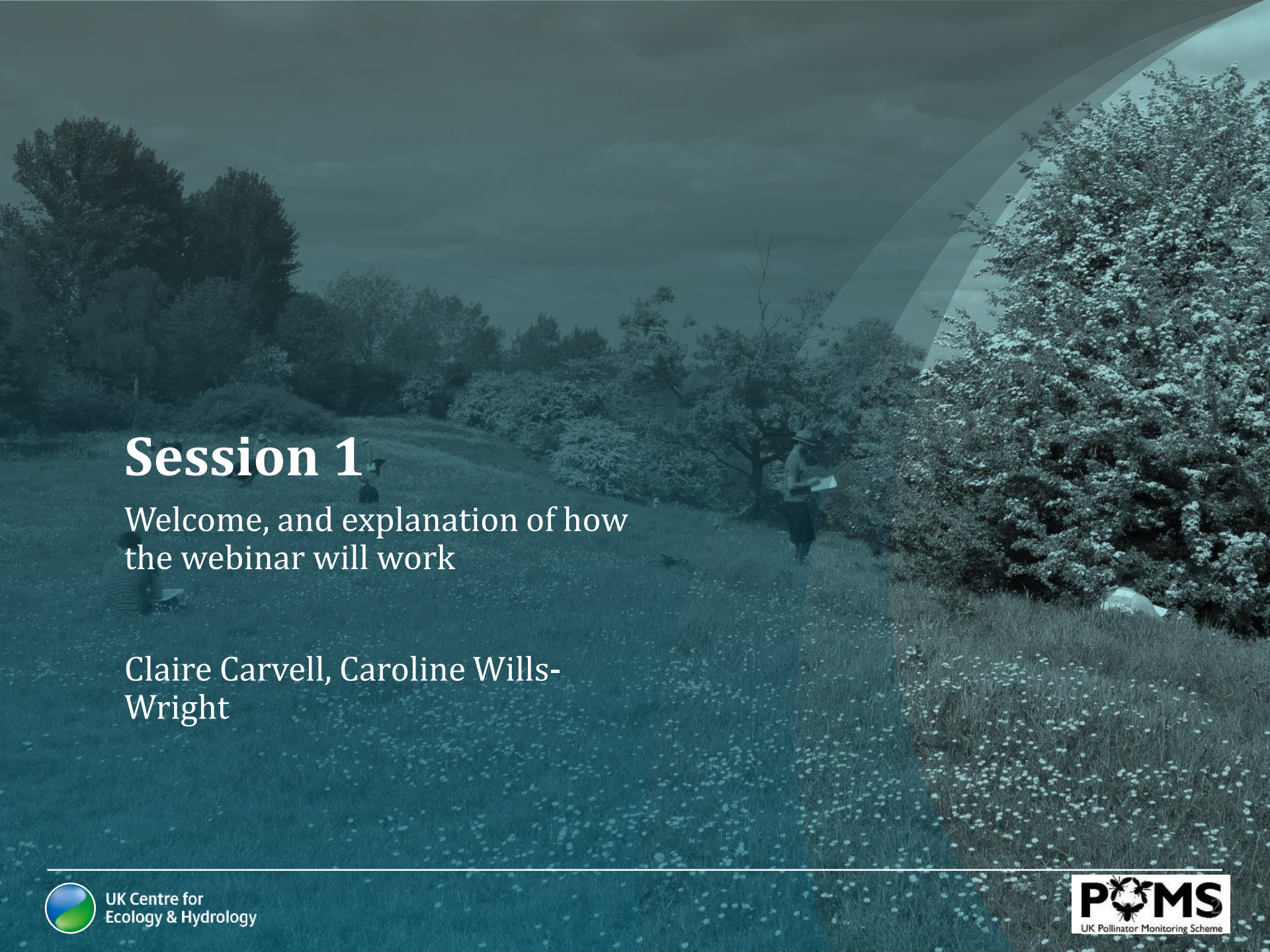
Welcome to the PoMS webinar!

This webinar took place on 31st March 2020

A full recording is available at https://youtu.be/OdkOgFnYGQ0

- The webinar ran from 2:30–4pm, presented by four members of the PoMS team
- Attendees contributed questions via the webinar Questions box. Questions and answers are summarised at the end of this document.

UK Centre for Ecology & Hydrology
Scottish Government Riaghaltas na h-Alba gov.scot
JNCC Joint Nature Conservation Committee
Department for Environment Food & Rural Affairs
Llywodraeth Cymru Welsh Government
PoMS UK Pollinator Monitoring Scheme



Session 1

Welcome, and explanation of how the webinar will work

Claire Carvell, Caroline Wills-Wright

Update on PoMS surveys for 2020

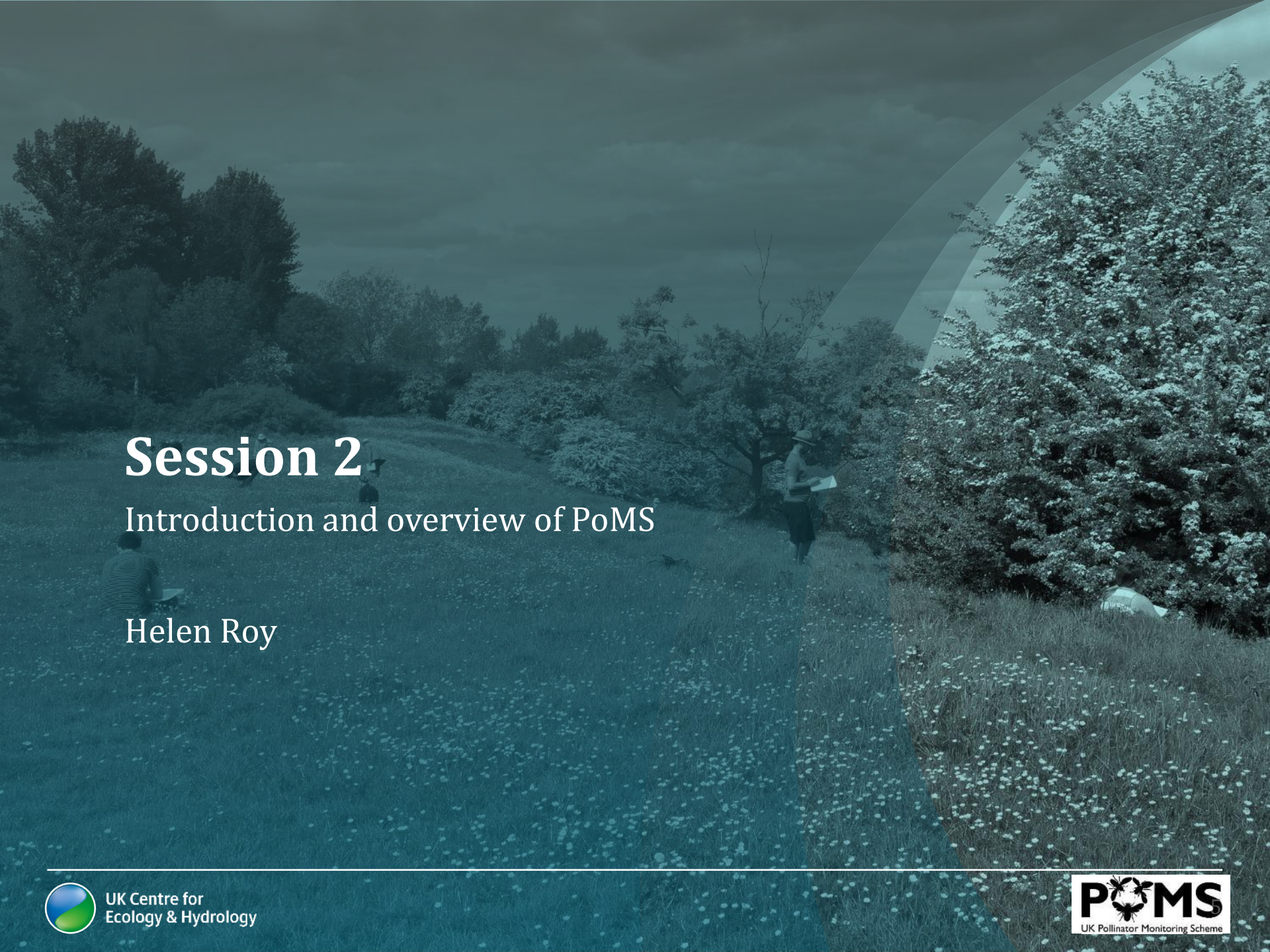
- During the Covid-19 restrictions, follow guidance from the UK government: Stay at home and away from others.
- PoMS 1km square field surveys and FIT Counts in public spaces have been **suspended until further notice**
- FIT Counts can be carried out on private property such as **gardens, yards, balconies and window boxes**.
- Allotments are not to be used for PoMS FIT Counts at this time.
- Updates will be communicated to all volunteers allocated to PoMS 1km squares, via the PoMS webpage and Twitter @PoMScheme.
- Those who can…….get out and enjoy FIT Counting in your garden!

Any questions on PoMS and covid-19?

A clusterfly (*Pollenia* species) feeding on sallow (*Salix*) blossom (FIT Count: **other flies**)

UK Centre for Ecology & Hydrology

PoMS UK Pollinator Monitoring Scheme



Session 2

Introduction and overview of PoMS

Helen Roy

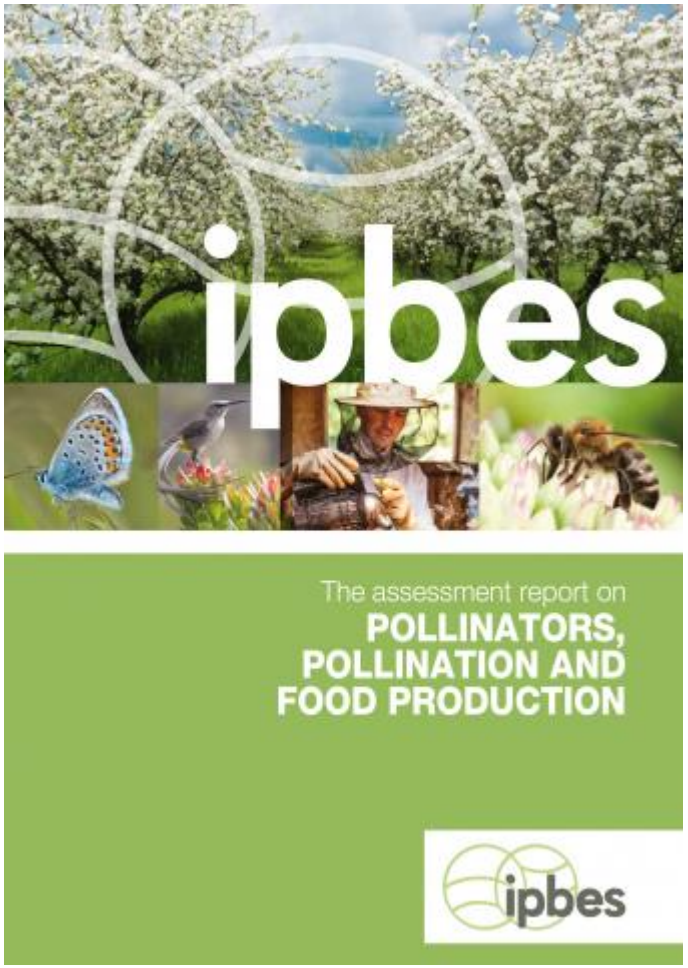
UK Centre for Ecology & Hydrology

POMS
UK Pollinator Monitoring Scheme

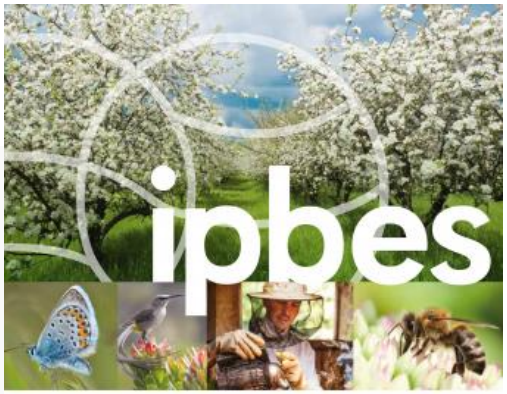
Global declines in wild pollinators

Wild pollinators have declined in occurrence and diversity (and abundance for certain species) at local and regional scales

Long-term international or national monitoring of both pollinators and pollination is urgently required to provide information on status and trends for most species and most parts of the world.



Pressures on pollinators



The assessment report on
POLLINATORS, POLLINATION AND FOOD PRODUCTION

ipbes

Land-use and agriculture
- Organic, small-scale or diverse farming
- crop rotation
- Pesticides, conventional intensive farming

Chemicals and pollutions
- Higher mortality
- Higher susceptibility to diseases

Climate changes
- Shifting of suitable habitats for both wild plants, crops, and pollinators

Diseases
- Higher mortality
- Higher mortality in interaction with pollution/chemicals

Wild pollinators

Invasive Alien Species
- Changing food sources
- Loss or gain of nest sites
- Replacing native species
- Introduced predators and diseases

Managed pollinators
- Legitimate pollination
- Competition over food and nesting places with wild pollinators
- Source and vector of diseases
- Nectar robbing

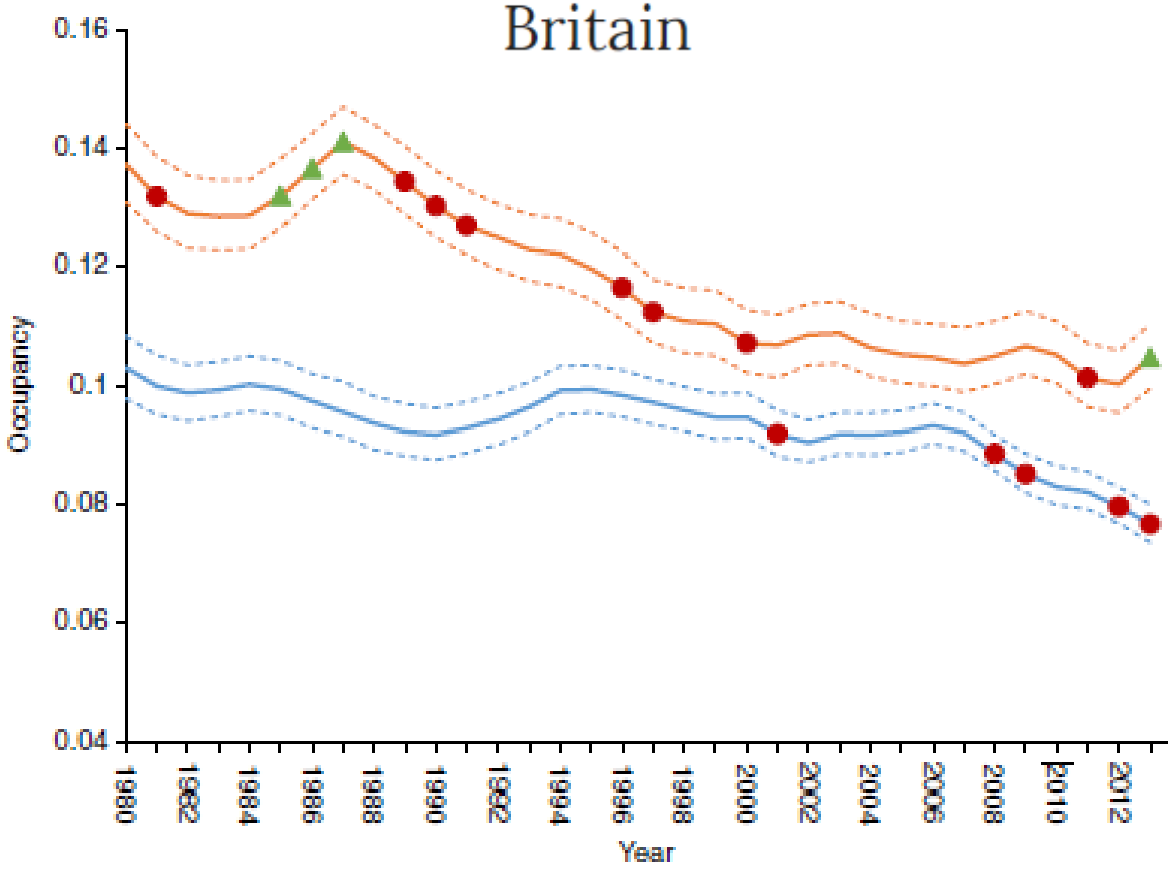
Native plants and crops

Number and/or abundance of pollinators
- Increasing trend
- Decreasing trend
- Both increasing and degreasing trend

nature COMMUNICATIONS

Article | Open Access | Published: 26 March 2019

Widespread losses of pollinating insects in Britain



Powney et al. (2019)

National Pollinator Strategies

Department for Environment Food & Rural Affairs

www.defra.gov.uk

England's 'Priority Actions': 11 Evidence-gathering

1. Develop and test a sustainable monitoring **framework** that can be implemented by professionals and volunteers (2014-16)

2. Implement new monitoring scheme(s) to establish recent and ongoing trends in pollinator populations and their status with greater confidence (2017- 2020……)

3. Improve data standards

4. Expand pool of taxonomic expertise

5. Improve understanding of the motivations of volunteer recorders

6. Support long-term storage, new technology

The Pollinator Monitoring and Research Partnership

Department for Environment Food & Rural Affairs

Llywodraeth Cymru Welsh Government

Scottish Government Riaghaltas na h-Alba gov.scot

JNCC Joint Nature Conservation Committee

UK Centre for Ecology & Hydrology

Bumblebee Conservation Trust

Butterfly Conservation

BTO

Hymettus

UNIVERSITY OF LEEDS

University of Reading

BWARS Bees, Wasps & Ants Recording Society

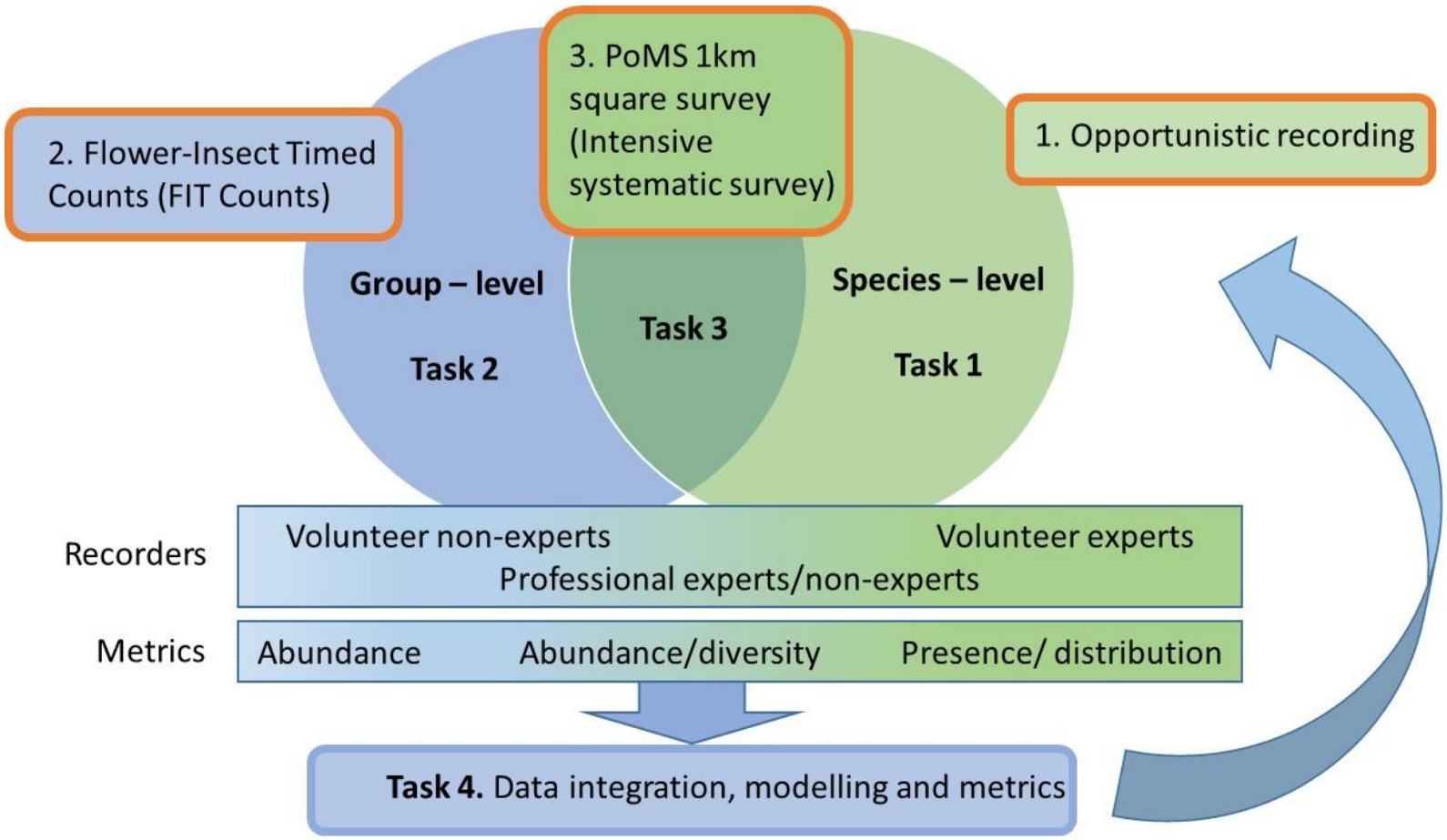
National Plant Monitoring Scheme

NATURAL HISTORY MUSEUM

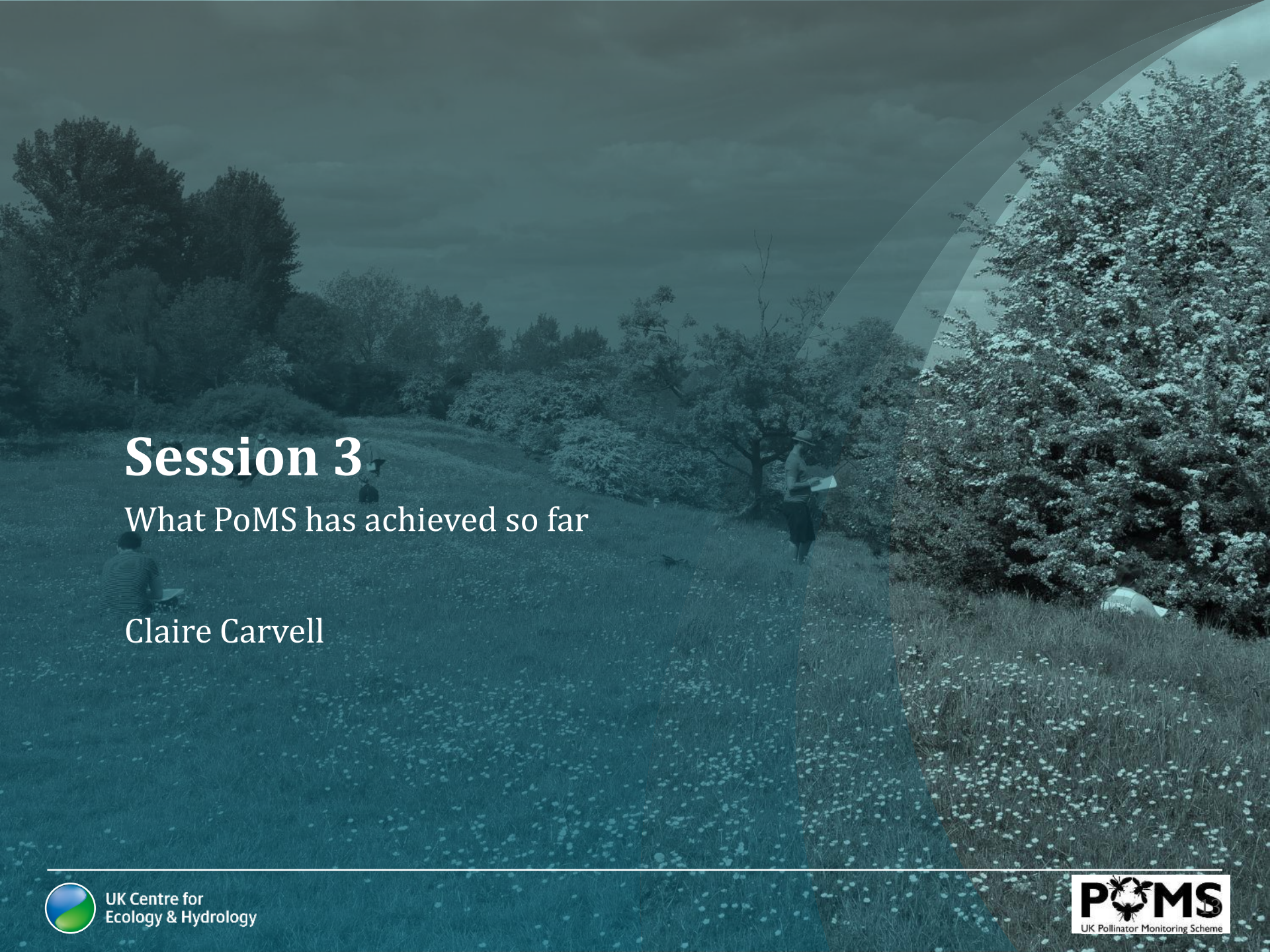
volunteer recorders & landowners

poms@ceh.ac.uk

An integrated approach across methods and recorders



Buff-tailed Bumblebee (*Bombus terrestris*) feeding on Betony (*Stachys officinalis*) (FIT Count: **bumblebees**)



Session 3

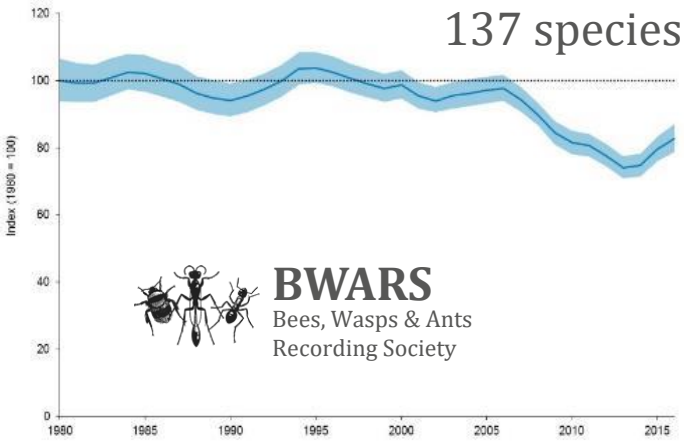
What PoMS has achieved so far

Claire Carvell

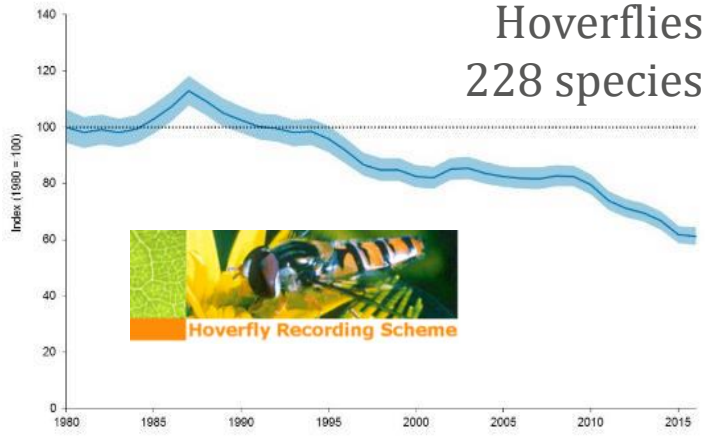
Task 1: Trends in distribution from species records

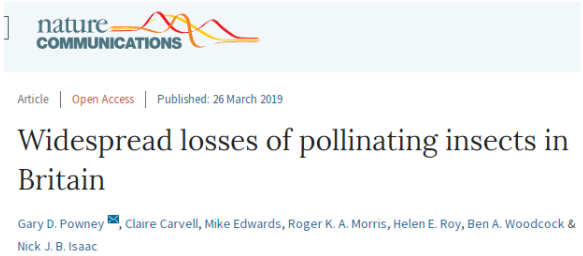
- UK Biodiversity Indicators: annual status of pollinating insects (365 spp)
- Distribution size declined on average by 31% between 1980 - 2016
- 37% of bee species declined; 20% increased
- Country-level trends for England, Scotland and Wales (fewer species and squares = lower precision)
- Linking trends to ecology and geography – specialist solitary bees and upland species declining most

Bees
137 species



Hoverflies
228 species

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Article | Open Access | Published: 26 March 2019

Widespread losses of pollinating insects in Britain

Gary D. Powney, Claire Carvell, Mike Edwards, Roger K. A. Morris, Helen E. Roy, Ben A. Woodcock & Nick J. B. Isaac

https://jncc.gov.uk/our-work/ukbi-d1c-pollinating-insects/

UK Centre for Ecology & Hydrology

PoMS UK Pollinator Monitoring Scheme

Task 2: Flower-Insect Timed Counts (FIT Counts)

- To collect data on abundance of flower visitors and plant-pollinator interactions across a variety of habitats and places
- In warm, dry weather April – September
- Count ALL insects that land **on target flowers** within 50×50cm patch during 10-minute period
- Identification to group level (+ photos)

Target flower list

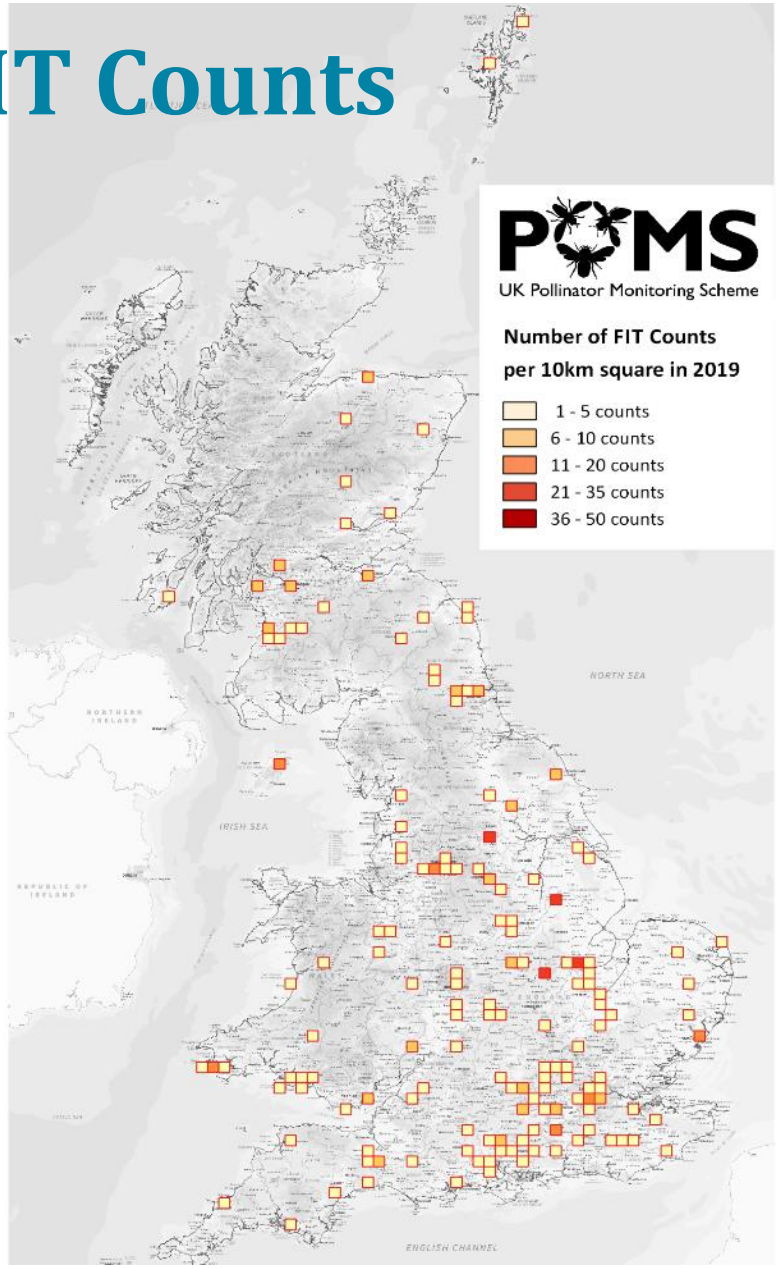
Bramble Buddleia
Buttercup Dandelion
Hawthorn Heather
Hogweed Knapweed
Lavender (English)
Ragwort Thistle
White Clover
White Dead-nettle Ivy

UK Centre for Ecology & Hydrology

PoMS UK Pollinator Monitoring Scheme

Results from “Public” FIT Counts

Public FIT Counts GB	2018	2019
Number of FIT counts submitted	584	809
Total number of insects counted	5,452	10,651
Mean insects per count	9.3	13.2



Results from “Public” FIT Counts

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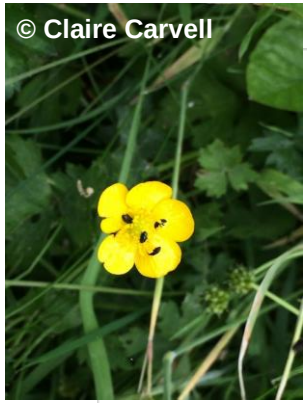


Target flowers of "Public" FIT Counts 2018

Where were counts conducted?

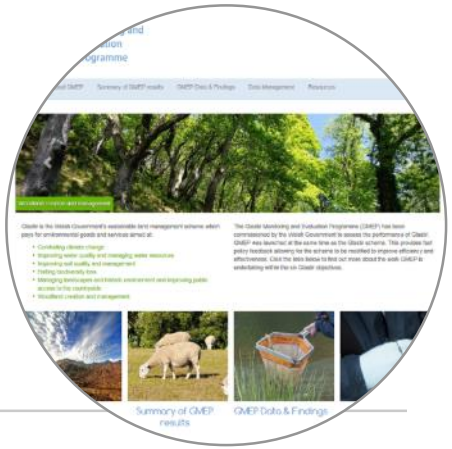
- 45% of counts conducted in gardens
- Buttercup, White clover, Dandelion most popular targets (plus Lavender in 2019)
- 36% of counts on "other" flowering plants

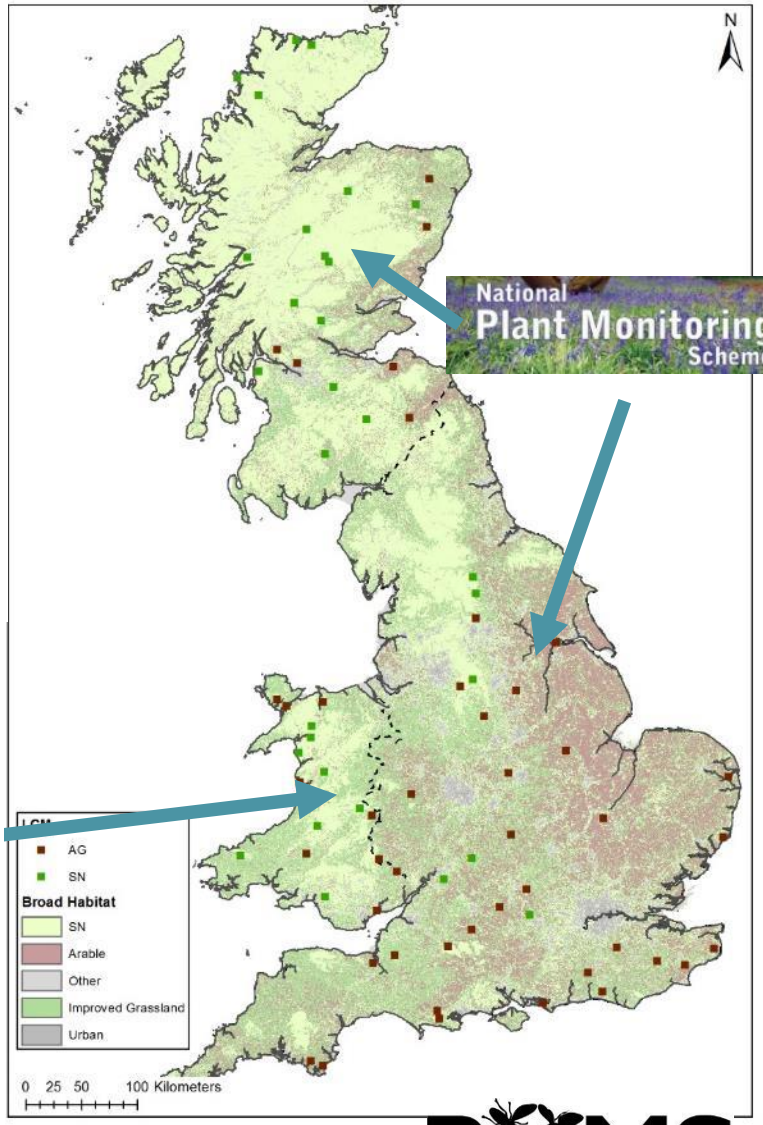
Which attracted highest numbers of insects?

- Bumblebees & honeybees highest on Lavender (followed by Knapweeds & Thistles)
- Solitary bees highest on Ragwort (followed by other flowers, and Knapweeds)
- Hoverflies highest on Ivy, Heather, Ragwort
- FIT Counts on 1km squares highest on Hogweed, Bramble, Knapweed, Dead-nettle

Task 3: 1km square survey

- Network of 75 1km survey squares
- Stratified by country area and relative cover of agricultural (AG) vs semi-natural (SN) land
- Designed to detect broad GB-level changes in pollinator groups **and some species**
- Co-located with NPMS (England, Scotland)
- Co-located with ERAMMPP (Wales)



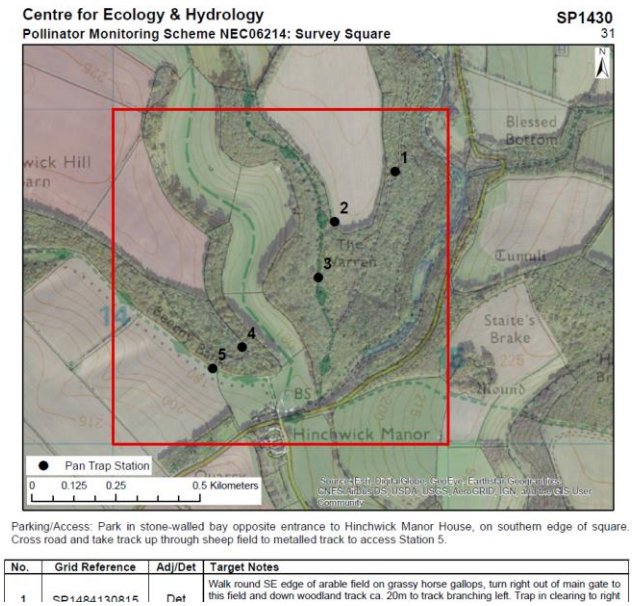


UK Centre for Ecology & Hydrology

UK Pollinator Monitoring Scheme

Task 3: 1km square survey

	# squares surveyed			Mean surveys per square		
	2017	2018	2019	2017	2018	2019
England	36	33	35	1.6	2.6	3.1
Scotland	19	17	22	1.7	1.5	2.8
Wales	17	15	17	1.9	1.3	3.6
GB Total	72	65	74	1.7	1.8	3.1



2017-18 pan trap catches*

- 2,108 bees belonging to 88 species
- 3,250 hoverflies belonging to 79 species
- 3-5 bee species and 4-6 hoverfly species per 1km survey (depending on country and other factors)

UK Centre for Ecology & Hydrology

**Unpublished data: report under review*

PoMS UK Pollinator Monitoring Scheme

Pan trap results 2017-18*

Variable	Effect in preliminary statistical models
Survey Year	More bees, hoverflies and 'total insects' sampled in 2018 than 2017
Country – date interaction	Highest numbers and species richness of bees in England and of hoverflies in Scotland and Wales, BUT patterns vary over the season
Habitat type	More hoverflies and 'total insects' in agricultural squares than semi-natural; no effect for bee numbers or total species richness
Flowers within 2m radius	No significant effects of number of flower units around pan traps (weak negative effect on hoverfly species richness)

Pan trap species compared with abundance of key crop pollinators during 2018 crop bloom to look at spatial and temporal overlap

- pan trap catches did not closely resemble crop flower visitors, but did include key pollinators

University of Reading

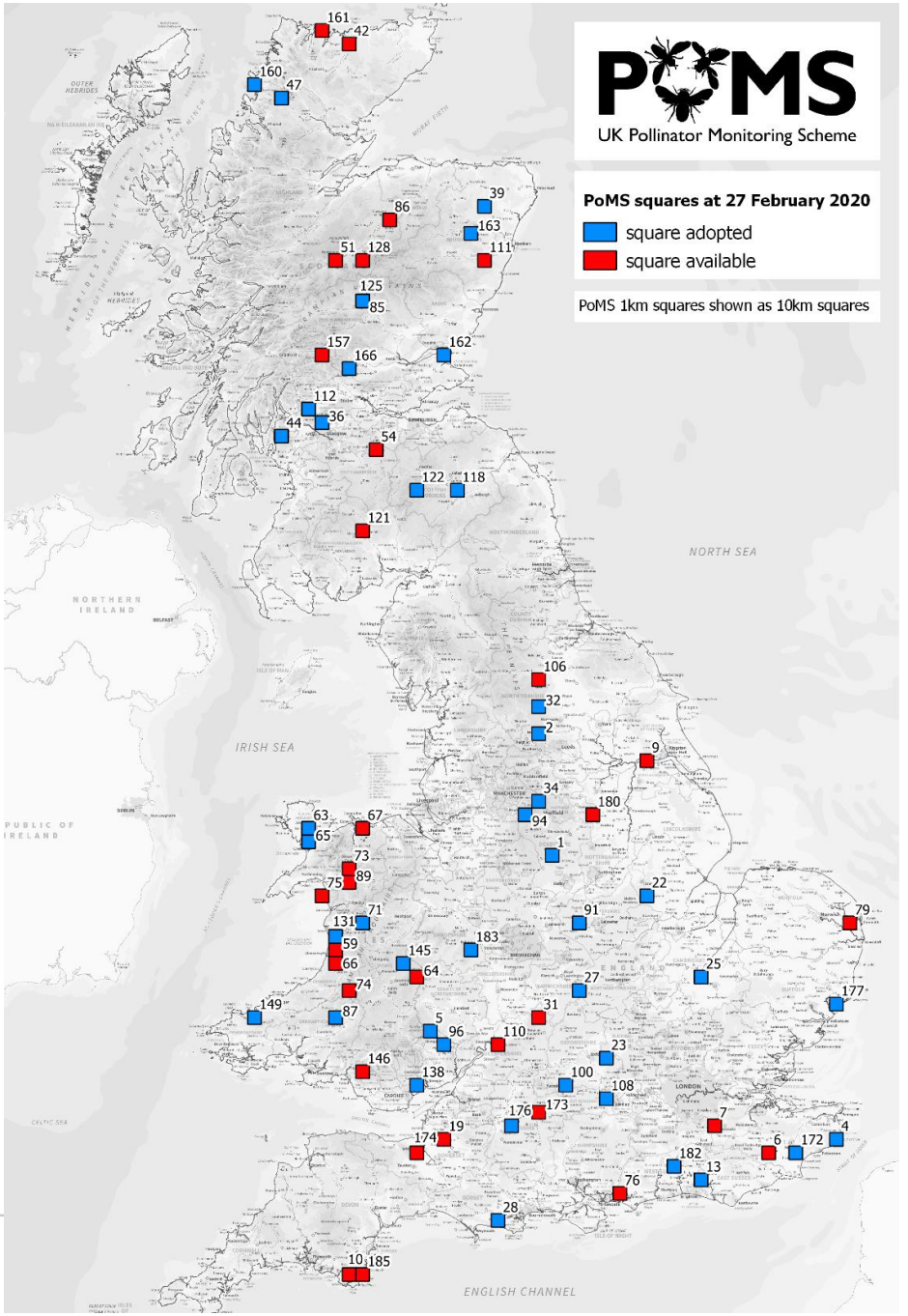
UK Centre for Ecology & Hydrology

**Unpublished data: report under review*

PoMS UK Pollinator Monitoring Scheme

PoMS Squares volunteer allocation

- UKCEH team arrange access and set-up squares; then **allocate to volunteers** with training and mentoring
- 61 volunteers trained or signed up on 54 squares
- Vacant squares available! (shown in red)



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Task 4: Integrated modelling of unstructured and structured survey data

Initial outputs for one hoverfly species – the modelling is tricky!

Adding structured data from PoMS pan traps (71 sites, 0 shared at 1km, 22 shared with HRS at 5km) almost doubled precision of occupancy estimate

Phase 2 using other hoverfly species and bumblebee records from BeeWalk scheme (Bumblebee Conservation Trust)

Francesca Mancini pers comm.

Task 5: Pollinator Monitoring Research Advisory Group (PMRAG)

- Aims to increase opportunities for collaboration with the research community, identify knowledge gaps and share PoMS data
- Workshop with researchers to identify common themes and gaps
- NHM collaboration to develop DNA barcoding approaches for individual bee and hoverfly specimens, pollen carried on sampled insects or suspended in the storage ethanol and whole 'bulk' samples of by-catch
- FIT Counts in Ireland, Jersey, Cyprus, Chile and Argentina!


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Article | Open Access | Published: 26 March 2019

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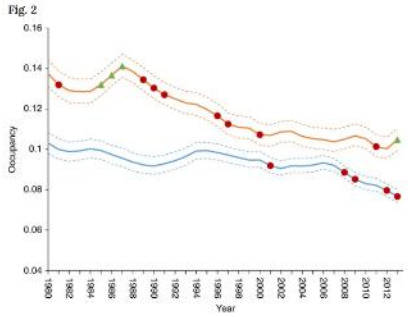


ELSEVIER

Global Ecology and Conservation

Volume 20, October 2019, e00781

Original Research Article

Capacity and willingness of farmers and citizen scientists to monitor crop pollinators and pollination services

M.P.D. Garratt [a], S.G. Potts [a], G. Banks [b], C. Hawes [b], T.D. Breeze [a], R.S. O'Connor [a], C. Carvell [c]

Development,

rsh Gifford,

BRITISH ECOLOGICAL SOCIETY

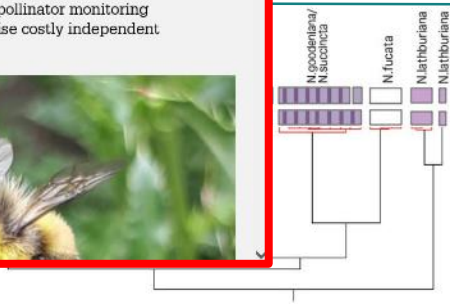
View all News & Opinion

Invest in pollinator monitoring for long-term gain

11 December 2019

By BES Press Office

New research shows that for every £1 invested in pollinator monitoring schemes, at least £1.50 can be saved, from otherwise costly independent research projects.



Methods in Ecology and Evolution

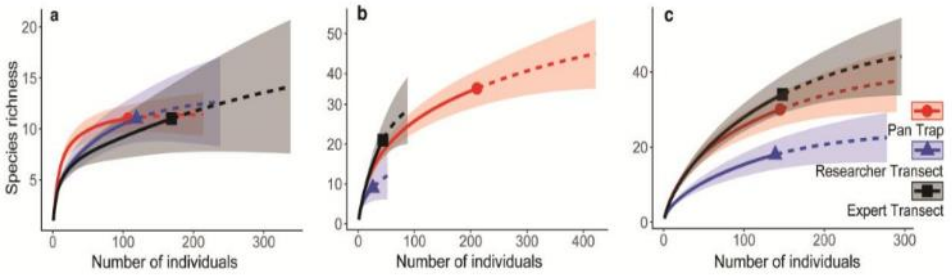
BRITISH ECOLOGICAL SOCIETY

Research Article | Full Access

Monitoring insect pollinators and flower visitation: the effectiveness and feasibility of different survey methods

Rory S. O'Connor, William E. Kunin, Michael P. D. Garratt, Simon G. Potts, Helen E. Roy, Christopher Andrews, Catherine M. Jones, Jodey Peyton, Joanna Savage, Martin Harvey, Roger K.A. Morris, Stuart P.M. Roberts, Ivan Wright, Adam J. Vanbergen, Claire Carvell ... See fewer authors

First published: 04 September 2019 | https://doi.org/10.1111/2041-210X.13292



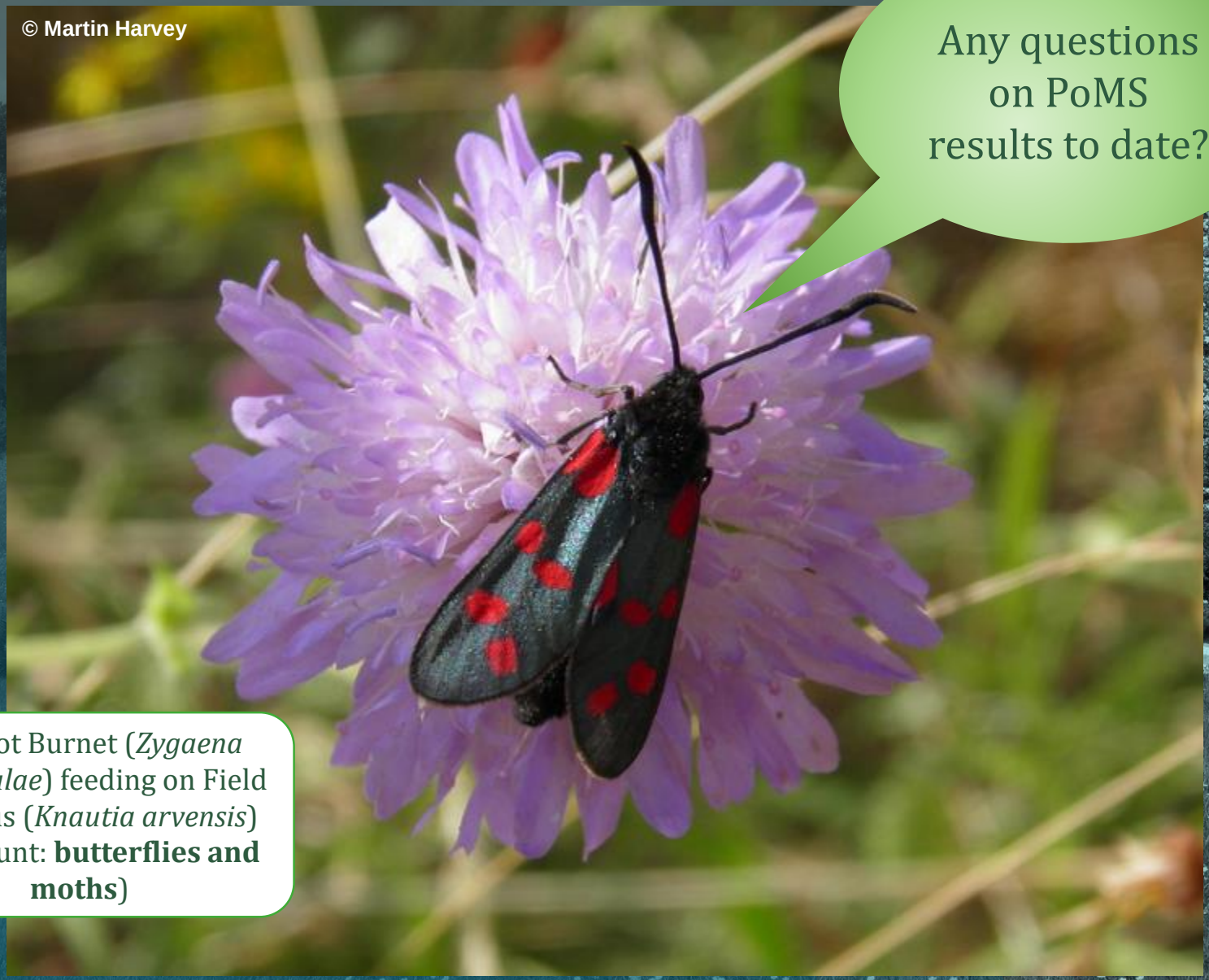
MOLECULAR ECOLOGY RESOURCES

RESOURCE ARTICLE | Full Access

A validated workflow for rapid taxonomic assignment and monitoring of a national fauna of bees (Apiformes) using high throughput DNA barcoding

Thomas J. Creedy, Hannah Norman, Cuong Q. Tang, Kai Qing Chin, Carmelo Andujar, Paula Arribas, Rory S. O'Connor, Claire Carvell, David G. Notton, Alfried P. Vogler

First published: 10 July 2019 | https://doi.org/10.1111/1755-0998.13056



Any questions on PoMS results to date?

Six-spot Burnet (*Zygaena filipendulae*) feeding on Field Scabious (*Knautia arvensis*) (FIT Count: **butterflies and moths**)

Session 4

PoMS in the field and in the lab

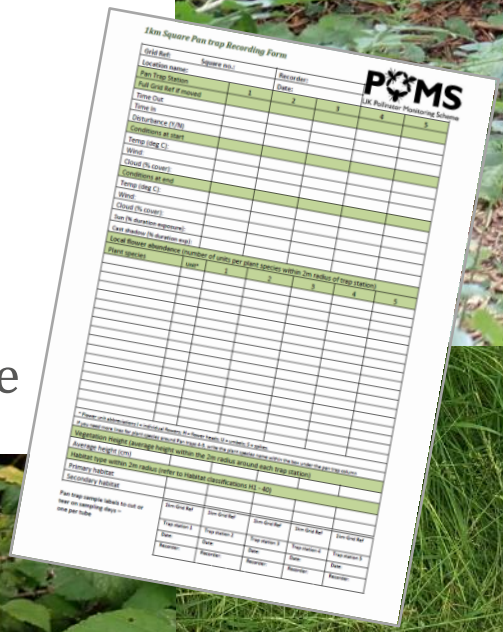
Edwina Brugge and Nadine Mitschunas

1km survey squares

- Random squares, shared with National Plant Monitoring Scheme in England and Scotland
- Half are mainly agricultural, half are mainly semi-natural
- A mix of upland and lowland

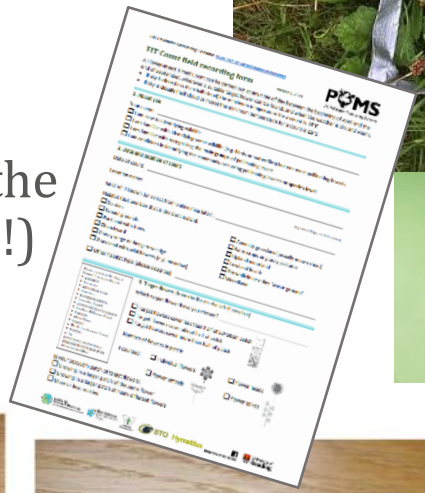
Carrying out the 1km survey

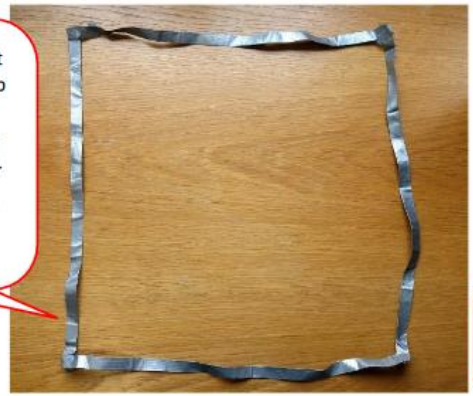
- Prepare in advance
- Refer back to guidance docs
- Don't forget hammer, pencil and permanent marker pen!
- Plant field guide useful
- Cast shadow vs sun exposure



1km FIT Counts

- Two or more FIT Counts within 1km square
- Prepare your quadrat
- Find target flower
- Count insects landing on the flowers (not on the leaves!)





Each side of the quadrat can be made from a strip of gaffer tape, about 54cm long (to allow for overlaps at the corners).

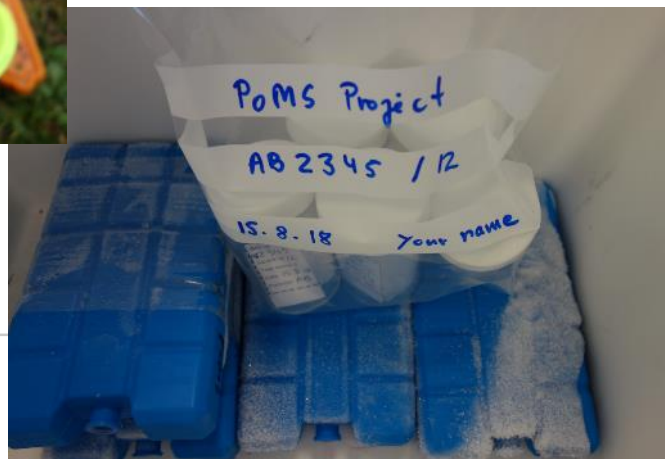
Fold each strip back on itself so that it is no longer sticky.

Cut a small strip of gaffer tape to bind the corners together.

Time to relax!

Specimen collection

- Transfer from trap to tube
- Store in freezer if possible until posting back to UKCEH lab



Specimens in the lab

- >1,180 pan trap samples received in 2019 (the potential max is 1,500), including over 4,200 individual bees and hoverflies
- Average 3 – 4 bees & hoverflies per trap station per day (plus other insects) using PoMS protocol
- Not detrimental to local populations over time*

*Gezon et al (2015) Methods in Ecology and Evolution

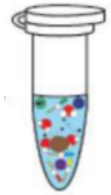
Specimens in the lab

- All specimens counted, bees and hoverflies passed to taxonomists for identification, rare species + random sample cross-checked for accuracy
- Species lists for 1km squares will be circulated as soon as possible

1.5 hrs sorting per site
Ave. 18 specimens per survey + 'by-catch'

Taxonomist

DNA barcoding



?

NATURAL HISTORY MUSEUM

Any questions on fieldwork and lab procedures?

Drone-fly hoverfly (*Eristalis tenax*) feeding on cultivated Helianthemum
(FIT Count: **hoverflies**)

Session 5

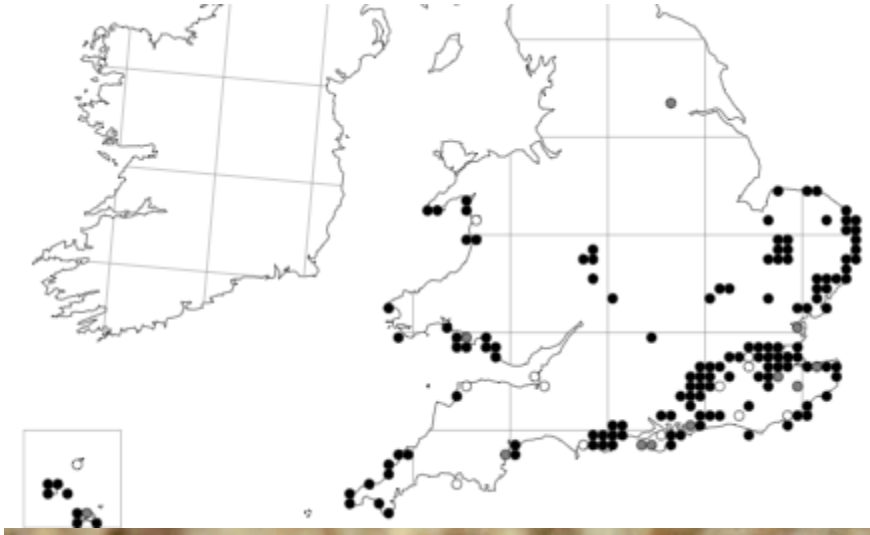
PoMS, species and links to recording schemes and partners

Martin Harvey

Pantaloon Bee
Dasypoda hirtipes

- English name comes from the long yellow hairs forming the pollen basket on the hind legs
- A scarce species confined to southern England and Wales, found in a PoMS 1km square in East Suffolk in 2018

BWARS map

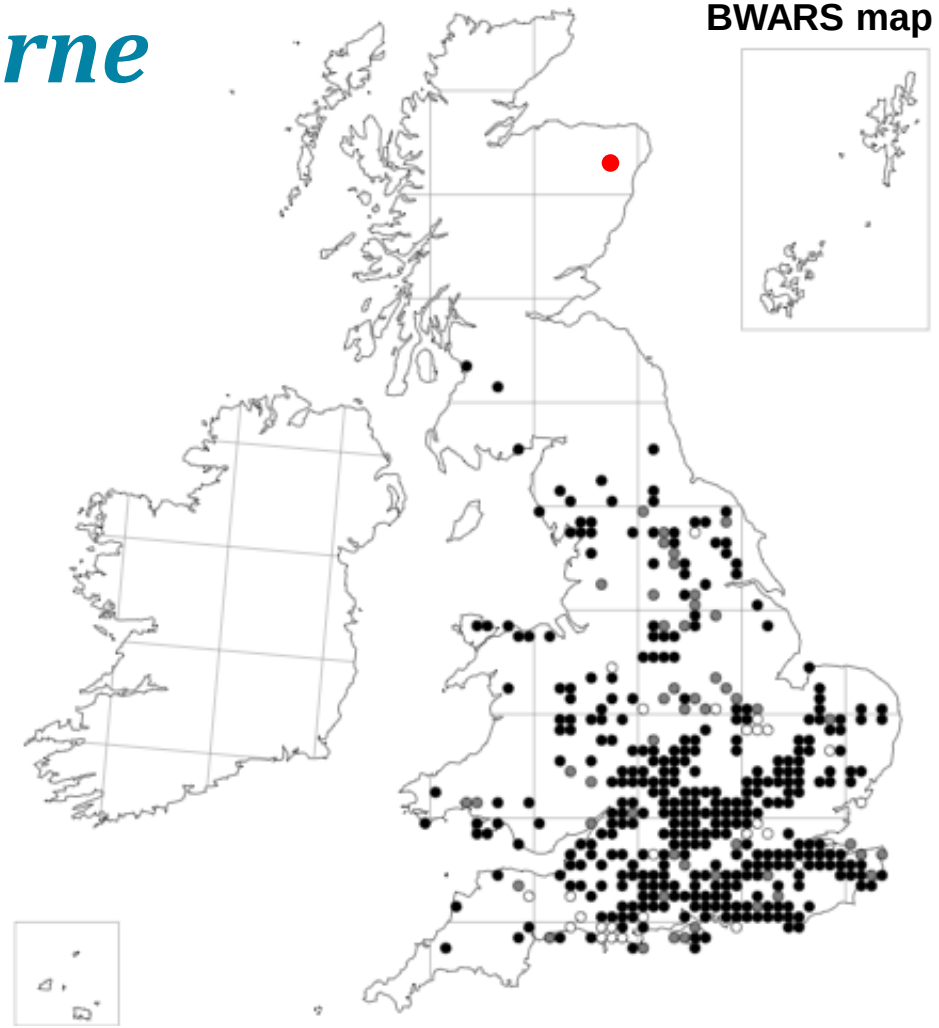


Alder Wood Hoverfly
Xylota abiens

- Associated with damp, mature woodland, with larvae in the decaying roots of trees such as Beech
- Found quite widely across England, but very localised and records show a decline
- Has now been recorded in both 2018 and 2019 in a single PoMS square in Oxfordshire

Chalk Furrow Bee
Lasioglossum fulvicorne

BWARS map



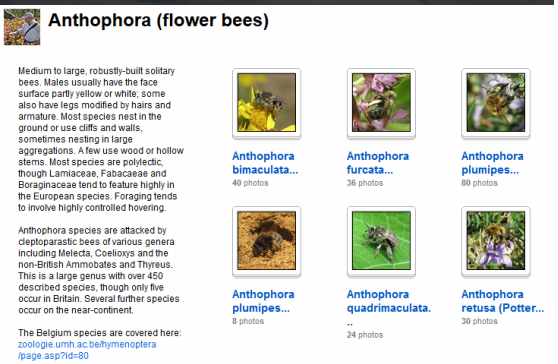
- Major extension of range, plus helps validate an historical unconfirmed record from the same area
- Species very similar to *L. fratellum*, a species of acidic habitats which is more frequent in Scotland – ID confirmed by expert cross-checks

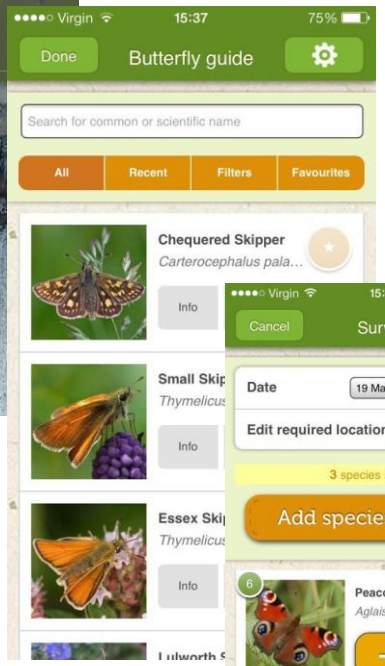
PoMS
UK Pollinator Monitoring Scheme

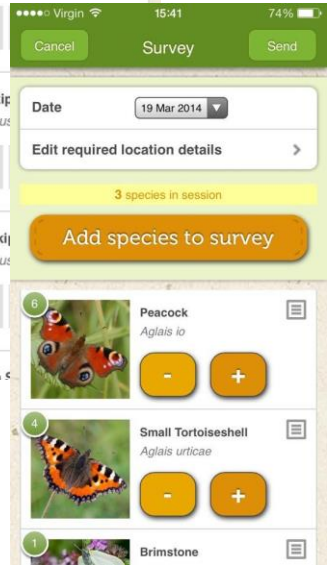
Species recording

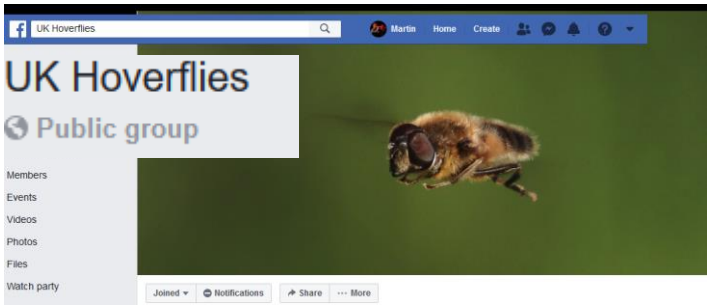
- FIT Count insect group counts and 1km survey data is all added to iRecord via the PoMS recording forms
- We are also working with the various pollinator recording schemes, including BWARS (bees, wasps and ants), Hoverfly Recording Scheme, Butterfly Conservation (butterflies and moths) and others
- If you recognise species seen during your PoMS surveys and wish to record them, they can be added to the standard recording forms on iRecord or via the iRecord app – ID help often available on Facebook
- If you have time after doing PoMS surveys and want to get more involved, there are plenty of other projects!
  - Bumblebee Conservation Trust "Bee Walks"
  - Butterfly Conservation butterfly transects and wider countryside surveys
  - BTO surveys for birds and other groups
  - National Plant Monitoring Scheme

ID help









Bumblebee Conservation Trust

About us | Our work | About bumblebees | Get

Top tips for bumblebee ID

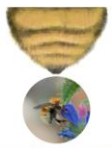
Bumblebees can be very difficult to identify at first, although they straightforward!

Step 1: Tail colour
Bumblebees fall into three rough groups based on tail colour: white-tailed (includes off-bees, where the tail is the same colour as the rest of the abdomen (usually ginger).

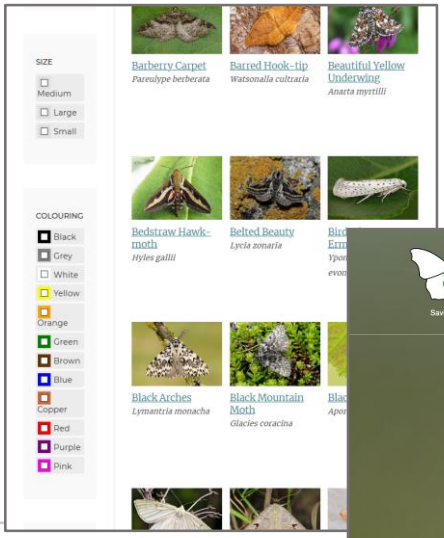
Click on a tail colour below to identify a bumblebee:


White-tailed bumblebees


Red-tailed bumblebees


Ginger-yellow bumblebees

Alternatively, use our top tips page to identify a bumblebee *or* click here to see our complete guide to all the UK's bumblebee species.



iRecord

Home | Record | Explore | Activities | Summarise | Verify | Verify - new

Welcome back

- Enter a casual record
- Enter a list of records
- Enter records at several places
- Taxon-specific forms
- Project-specific forms

A busy ye

ver 2 million records were made
vailable via iRecord during 2019

- RHS Cellar Slug Survey
- UK Pollinator Monitoring Scheme (PoMS)
- Xylem-feeding insects

Over a million records were checked by

Activities

View | Edit

Clone content

My activities | Browse all activities | Organisations offering activities | My finished activities

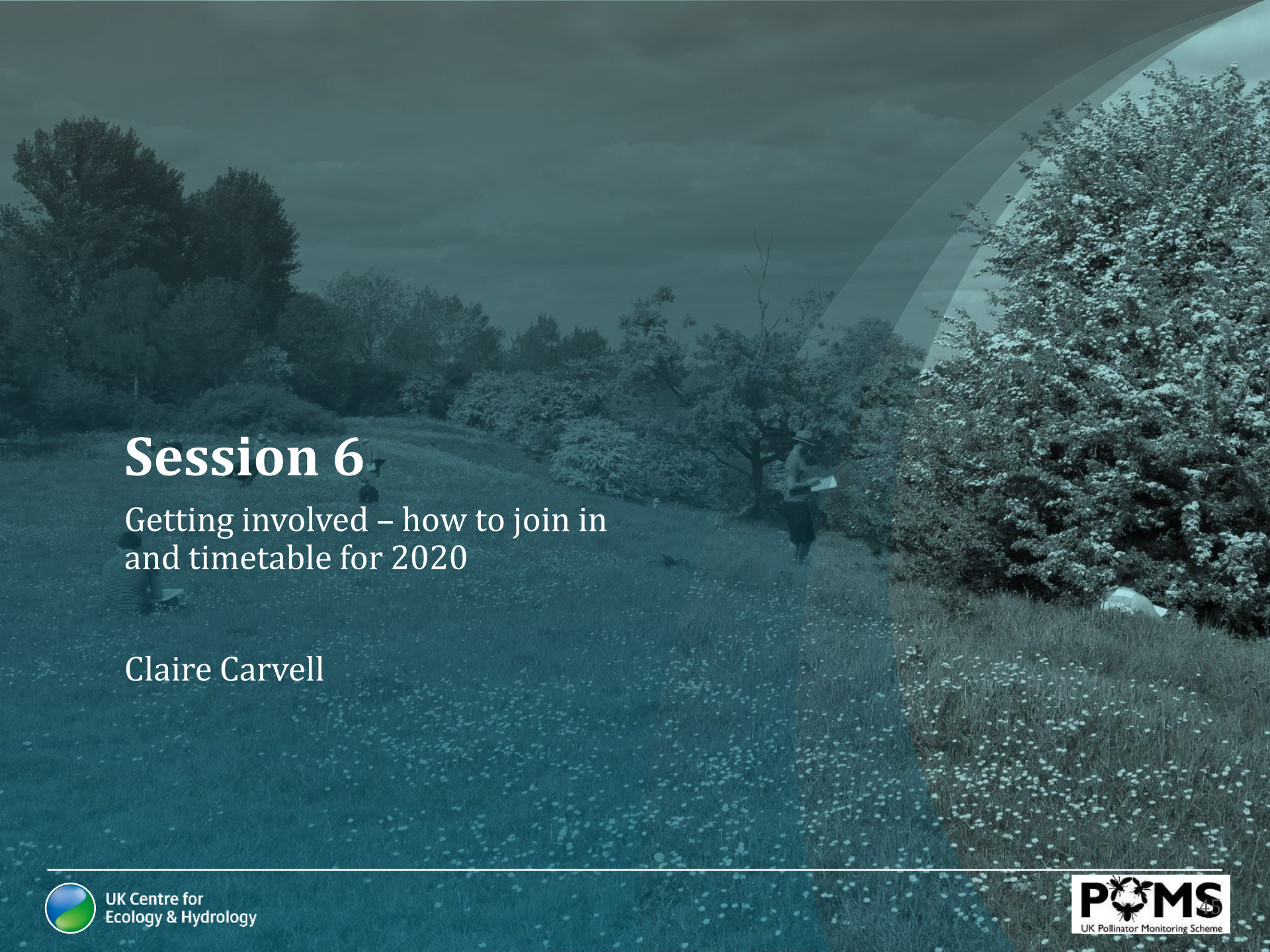
Search for: Go | Create new activity

About the activity	Members	Links	Actions
1km square survey - FIT counts Forms for entering and editing data from the FIT Counts carried out as part of the 1km square intensive surveys.	70	Edit 1km FIT Counts Enter 1km FIT Counts	
1km square survey - pan-traps Forms for entering and editing data from pan-trapping carried out as part of the 1km square intensive surveys.	71	EDIT pan-trap SAMPLE data BYCATCH data: select pan-traps DO NOT USE! DO NOT USE! SPECIES data: select pan-traps ENTER pan-trap data	

UK Centre for Ecology & Hydrology

Grey-gastered Mining Bee (*Andrena tibialis*) on *Prunus* blossom
(FIT Count: **solitary bees**)

Any questions on species and partner links?



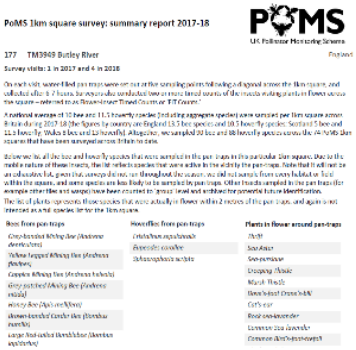
Session 6

Getting involved – how to join in and timetable for 2020

Claire Carvell

The year ahead

Newsletter


PoMS 1km square survey: summary report 2017-18

- In the coming weeks we will be sending out the PoMS Newsletter + 1km square species reports for 'your square'
- FIT Counts can be done from 1 April to 30 September in suitable weather
- Restrict activity to gardens until covid-19 situation changes
- If 1km square surveys resume for 2020, we will provide kit top-ups to existing volunteers, and arrange an initial visit for new volunteers
- Check our website for more information and updates:

www.ceh.ac.uk/pollinator-monitoring

Twitter: @PoMScheme

- For all enquiries:

poms@ceh.ac.uk

Thank you to all our volunteers and recorders
Read on for webinar questions and answers

UK Centre for Ecology & Hydrology

POMS
UK Pollinator Monitoring Scheme

poms@ceh.ac.uk

Twitter: @PoMScheme

A summary follows of the questions contributed by webinar participants

Sulphur Beetle (*Cteniopus sulphureus*) feeding on umbellifer flowers (FIT Count: **beetles**)

Questions and answers 1 of 4

General	
Are there any age restrictions for taking part – can young children be involved?	For the FIT Counts anyone can take part as long as they can count and recognise the different insect groups. For small children the ten minutes might feel like a long time, but as long as the count is completed as accurately as possible anyone can join in! For our 1km square surveys independent travel to the field sites is required, and we're not able to support under-18s to do this, but it may be possible for adults to do the survey with children helping. Contact us for more information if needed.
Can these surveys be used to monitor the smaller 'unidentifiable' pollinating insect species?	It can certainly be difficult to recognise some of the smaller insects. In the FIT Counts we count all insects seen, and it's fine to include anything unidentifiable in the "Other insects" or "Small insects" (less than 3mm) categories as appropriate. The main thing is to ensure that all insects are counted so that the total number of insects is as accurate as possible. Our pan-traps catch a range of different insects, all of which are counted into their groups. At the moment we are only taking bees and hoverflies to species level, but the full samples are retained and it may be possible to use DNA analysis in the future to gather more information on the other insect groups.
Are records from the local records centres also being used in the analysis, to maximise the data set?	PoMS is working with the national recording schemes that cover pollinating insects and for analysing trends in the data we work with the data held by those schemes, so as to ensure that we have a consistent set of data that has been checked by the national verifiers. Some local environmental records centres share data on a regular basis with the national recording schemes and in that case the data will be included. Species records added to iRecord are available to both the national schemes and the local centres and data-sharing is becoming easier.
Where can we find out more and obtain the recording guides and forms?	All the forms, guidance and ID guides for the FIT Counts can be downloaded from our website, in English or Welsh. The website also provides links to video guides and other updates from PoMS. The protocols and forms for the 1km square surveys are not on the website, and are sent direct to our volunteers, but if you want to know more about the methodology we will be happy to send information – please contact us via email.

Questions and answers 2 of 4

FIT Counts	
Is it okay to use flowers that are not on the target list, e.g. Red Dead-nettle instead of White Dead-nettle?	Yes, that is fine. If you can find one of our 14 target flowers we would really like to have counts using those flowers – the more counts we can get for this set of flowers the stronger the data will be. But if you don't have the target flowers at your location, or if you've done a target flower count and want to do another on a different flower, that is absolutely fine. Just tell us what flower you used when you fill in your results.
Some hoverflies pretend to be bees or wasps (which seems unfair!) - I think it can still be difficult to identify to the category of wasp, solitary bee or hoverfly. How critical is this?	Insects can be very good at imitating each other! Everyone will get this wrong from time to time, and our analysis is done with this in mind. Three things can help get over this problem: the first is to look as carefully as you can, and if you are not sure then use the "Other insects" category; the second is to help us get as many counts done as possible so that any incorrect identifications become a small fraction of the total; and the third is to ensure that you count every insect into the most accurate category you can, so that we have a robust total number of insects seen.
We don't get feedback about the accuracy of our identification but would you tell me if I was getting it really wrong.	We do cross-check all photographs of insects and flowers submitted with FIT Counts, but as yet we don't have a system of giving 1-1 feedback on these. It's encouraging that so far people have been fairly accurate and only a few easily confused bee/hoverfly species are being wrongly classified. As PoMS develops we would like to improve the feedback mechanisms to volunteers.

Questions and answers 3 of 4

1km square surveys	
There are no PoMS 1km squares near me – can new squares be added?	This question comes up a lot, and unfortunately for the moment at least it is not possible for us to set up new squares. This is partly because PoMS has been carefully designed to use a set of 75 randomly-selected squares, aimed at providing the right amount of data to enable us to analyse national trends. And it is partly because each square comes with costs in terms of providing the equipment needed, ensuring that volunteers are supported to carry out the surveys, and to process and identify the specimens that result. We are funded to operate across 75 squares but there is no spare capacity.
Is there any potential for PoMS to help people develop identification and taxonomic skills, and carry out some of the identification of the pan-trapped specimens?	PoMS is not set up to deliver lots of training events itself, but many of the recording schemes with which we work run fantastic identification courses, sometimes in conjunction with the Field Studies Council. Some of the entomologists who work with PoMS and organise the recording schemes also run courses independently. We try to signpost these where we can, and will see if we can do more to link things up. For the pan-trapped specimens we have a rigorous laboratory protocol to ensure that the specimens are kept in conditions suitable for subsequent DNA analysis, with specimens kept in alcohol and frozen when not being examined, and which includes tracking each individual bee and hoverfly during the identification process. Identification is currently carried out by professional entomologists and subject to cross-checks to ensure that a consistent identification standard is being met. At the moment we are unable to replicate these processes outside the laboratory, although we continue to keep this under review. Another strand of PoMS is to work with the recording schemes to develop an online system that provides an opportunity to test your identification skills, and perhaps get involved with verifying records from photographs. This is currently under development and we hope to be able to start demonstrating the prototype soon. More updates to follow!

Questions and answers 4 of 4

1km square surveys (continued)	
Can PoMS provide additional kit for people to set up their own pan-traps?	We can only provide survey kits to the volunteers who have signed up for one of our 1km squares. However, if you wish to make up the same kit for yourself please get in touch and we can provide the details of what we use, most of which is based on readily available materials.
What level of Identification can be achieved for all the insects caught in the pan-traps? Can all specimens be identified after deterioration and/or damage in transit?	At the moment we are only identifying bees and wasps to species level, while all other insects are counted into their main groups, and retained for potential future analysis. It is rarely the case that specimens suffer significant damage once they are in alcohol, and they can be kept securely in the storage tubes for long periods. For the bees and wasps nearly all can be identified to species. Where there are exceptions this is usually due to taxonomic difficulties, e.g. for some species only the males, or only the females, can be safely identified, and for a few species groups it is not possible to reliably separate them on morphological features, such as the bumblebees in the *Bombus lucorum* group, which are most reliably identified via DNA analysis. For those groups where a full species ID is not possible, they are recorded at the most appropriate aggregate level, e.g. *Sphaerophoria* hoverflies can only be identified to species level in the males, and any females are recorded as genus *Sphaerophoria*.