Annual Report 2020

National Biodiversity Data Centre
A Heritage Council Programme

Project Co-Ordinator

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Key Partners

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2020 at a glance

112 transects

60 transects walked at least 6 times

74 recorders

1,000 km walked

500 hrs of effort

13,968 bumblebees

14 species recorded

An Chomhairle Oidhreachta
The Heritage Council

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

All-Ireland BUMBLEBEE Monitoring Scheme

2020, Carder bees still in trouble

Large carder bee

Common carder bee

2020 was the 9th year of the All-Ireland Bumblebee Monitoring Scheme. Thanks to the combined effort of the schemes expert volunteers, we know that bumblebees remain in a precarious position, with the carder bumblebees still showing worrying declines

What is it? The All-Ireland Bumblebee Monitoring Scheme is a citizen science scheme that tracks population trends in Irish bumblebees, detecting the impacts of factors such as land use and climate change on the Irish bumblebee population. It is the only monitoring scheme currently underpinning the All-Ireland Pollinator Plan. It involves walking a fixed route (transect) on a monthly basis from March to October each year, when weather conditions are favorable. The number of the different bumblebee species seen along different sections of each transect are recorded. These recordings are the basic data upon which the analysis is based.

What type of analysis is completed within the scheme? Two separate analyses are undertaken to determine the change (if any) in bumblebee populations. The first is a multi-species index which estimates the overall direction of change in the bumblebee population, as a whole, using Irelands most common bumblebees (8 species). A trend line is estimated from the multi-species index which summarises the overall direction of the population change since the commencement of the recording scheme (i.e., 2012). The second type of analysis is the estimation of a trend that tracks the status of the individual species of bumblebees. The multispecies index and the individual species trends are estimated using international best practice methods developed by Statistics Netherlands (TRends and Indices for Monitoring data, TRIM, Pannoeck & van Strein, 2005; Multi-Species Indicators, MSI, Soldaat et al., 2017).

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What does the addition of the 2020 data tell us?

- The most important thing it highlights is the phenomenal effort our citizen science volunteers have put in over the years. In 2020, they collectively spent over 500 hours walking just over 1,000 km, counting 13,968 bumblebees across 14 species! This is despite the difficulties of COVID-19!
- Without their generous efforts, we simply would not know how the populations of this vitally important group of insects are changing. We did worry that the scheme would be severely impacted by COVID. However, while many walks were restricted at times, thanks to their efforts the overall impact has been minimal.
- 2020 was a relatively good year for bumblebees. The overall bumblebee count was higher than the scheme average, and was up 27% on 2019. The impact of weather is again evident. In 2020, at the beginning of the pandemic we had warm, sunny conditions and you can see that April and May numbers were well above average. They then dropped to below average in June, before returning to typical levels for the rest of the season.
- With only 9 years of data we still have to err on the side of caution, but the trends do seem to indicate that bumblebees remain in a precarious position. The current overall trend from 2012-2020 is a year-on-year decline of 4.6%. As expected, with the addition of more data each year, the estimates are improving. As a result, overall loss figures are reducing slightly.
- Comparing like with like - in terms of total numbers observed, almost all species were up on 2019 figures. This was particularly the case for B*. pascuorum, B. terrestris* and *B. lapidarius*. Only *B. lucorum* agg. and *B. pratorum* were down slightly.
- The two carder bumblebees continue to show worrying declines. Both remain in moderate decline, although the addition of the 2020 data does pull B. *pascuorum* back from the strong decline shown by the 2012-2019 data. It is very easy for continued gradual losses to go unnoticed. That fear is what inspired us to establish the All-Ireland Bumblebee Monitoring Scheme in 2012. By coming together to monitor bumblebees, our volunteers are helping us understand that these vital wild pollinators are in difficulties. Through the All-Ireland Pollinator Plan, we are trying to tackle that. The addition of the 2020 data reinforces the importance of those efforts.

Bombus lucorum

Bombus pratorum

Bombus ruderarius

Figure 1: Total number of each bumblebee species recorded in 2020

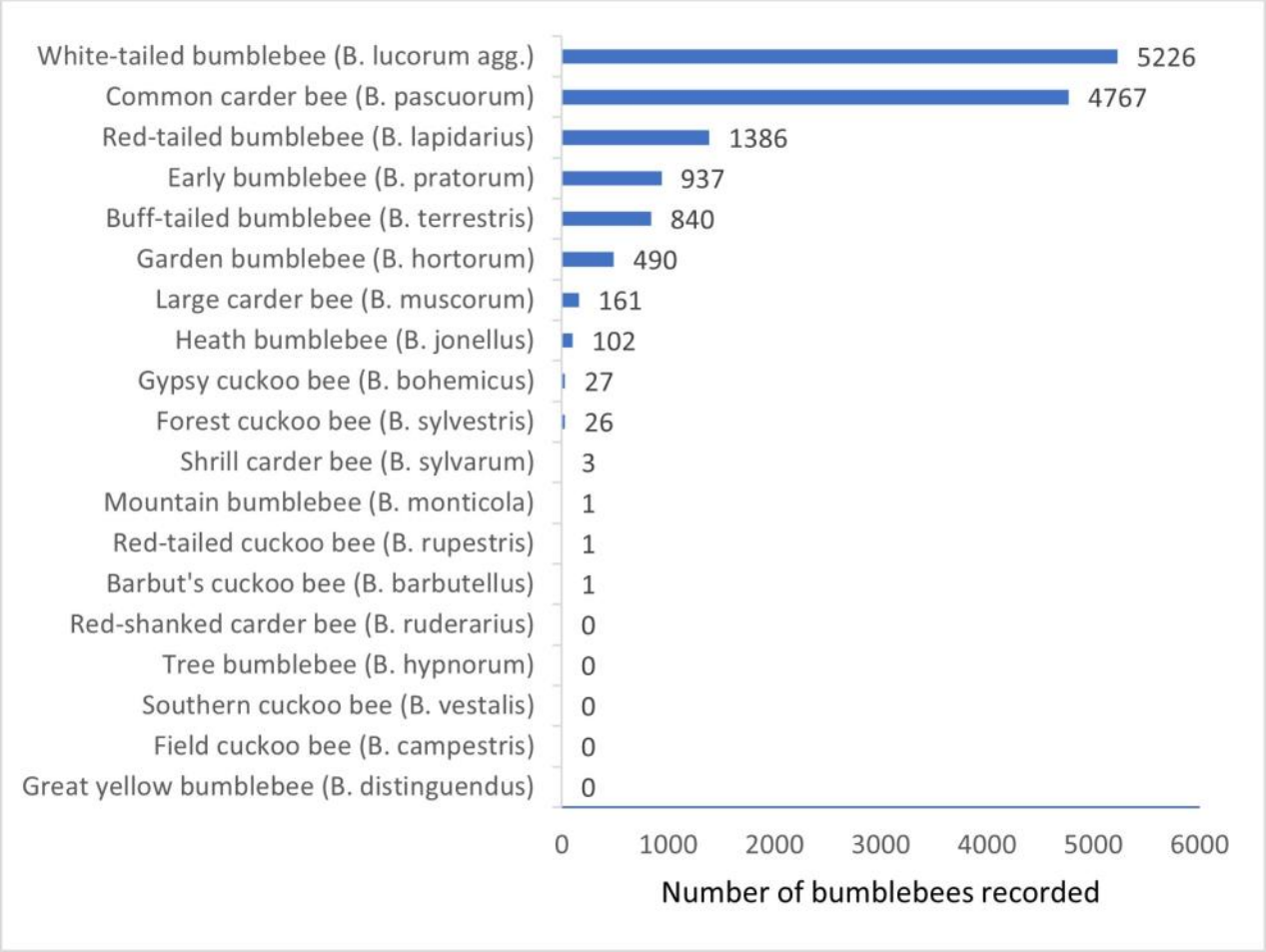
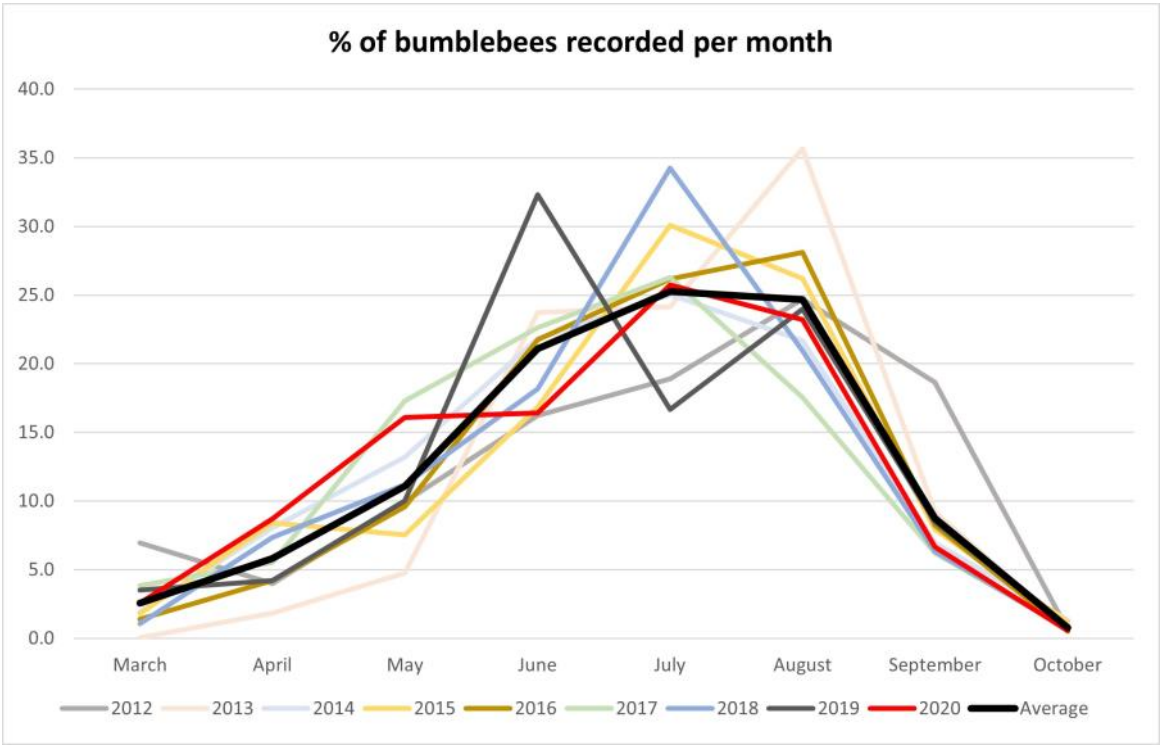


Figure 2: Percentage of bumblebees recorded per month since 2012



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Bumblebee population trends 2012-2020

Multispecies Index of bumblebee population change 2012-2020

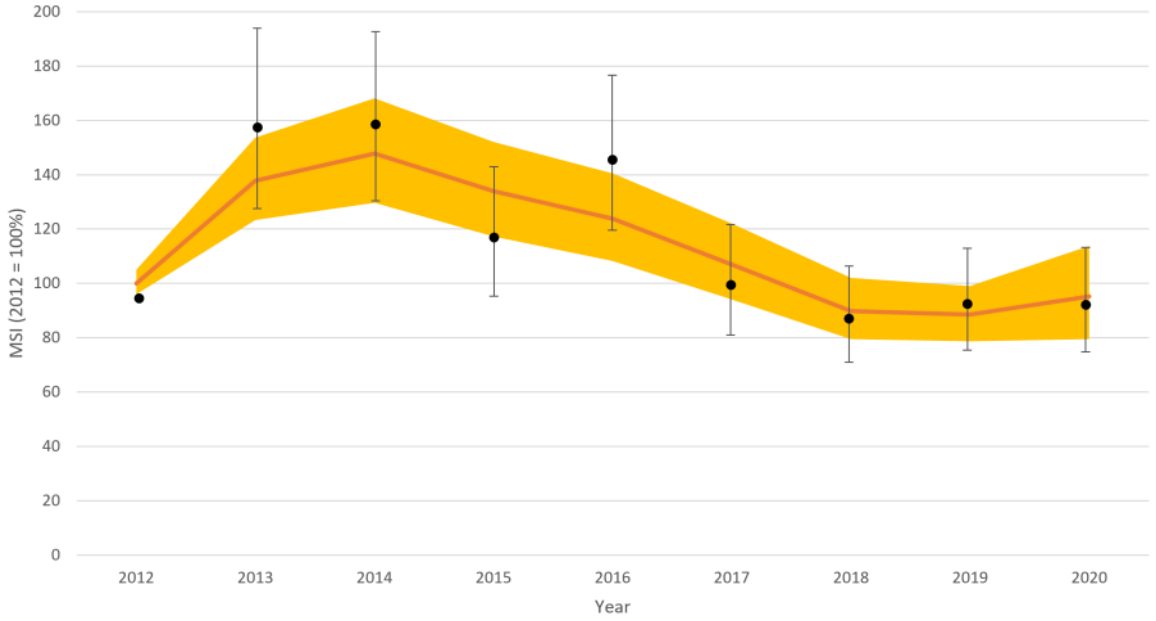


Figure 3: The multi-species index derived from the amalgamation of the population trends of 8 common species of bumblebees from 2012 to 2020. The dark orange line is the smoothed trend line, and the circle markers represent the multispecies index per year. Error bars (on markers) and the shaded area surrounding the trend line are the 95% confidence intervals.

The "multispecies index" of bumblebee population change illustrates our estimates and the level of statistical confidence around those estimates. It is based on the eight species where we have sufficient information to accurately assess changes. This year things have continued to stabilise, but it is still showing an overall loss across populations since 2012. The current overall trend from 2012-2020 is a year-on-year decline of 4.6% (with a 95% confidence interval around our estimate being ± 2.4%).

With only 9 years of data, we still have to err on the side of caution in reading too much into these trends. A longer term dataset will be necessary to smooth out the fluctuating impacts of Irish weather. However, things remain precarious for our bumblebees and we can say that some individual species are showing worrying losses. *Bombus pascuroum* has traditionally been one of our most common bumblebees. Last year, figures showed a strong decline. Things have improved slightly for the species in 2020, but it is still in moderate decline.

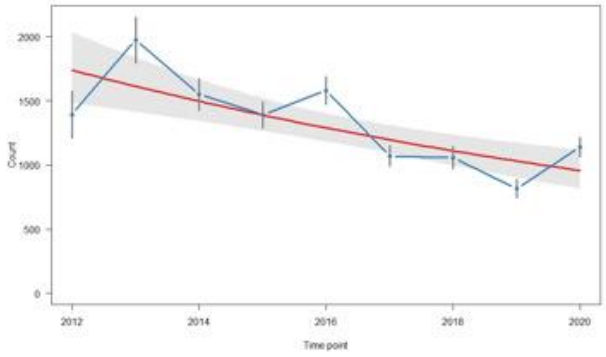
Perhaps less surprising, *Bombus muscorum* is showing a moderate decline. This species is listed as Vulnerable in the 2014 European Bee Red List and as near threatened in the 2006 Irish Bee Red List. Ireland is now one of it's strongholds. In a positive, a number of local communities have been coming together through the All-Ireland Pollinator Plan to create joined up habitat corridors and protect the species in their local area. It is hoped that they can inspire others to follow their example, and give the Large carder bee a fighting chance at long term survival.

Bumblebee species trends 2012-2020

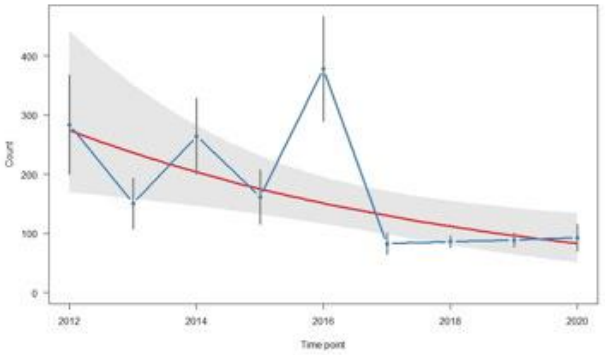
Species	Change 2012-2020	Statistical Confidence
Bombus pascuorum (Common carder bee)	Moderate Decline (< +5% p.a.)	95%
Bombus muscorum (Large carder bee)	Moderate Decline (< +5% p.a.)	95%
Bombus hortorum (Garden bumblebee)	Uncertain (> ±5% p.a.)	
Bombus jonellus (Heath bumblebee)		
Bombus lapidarius (Red-tailed bumblebee)		
Bombus lucorum agg. (White-tailed bumblebee)		
Bombus pratorum (Early bumblebee)		
Bombus terrestris * (Buff-tailed bumblebee)		

* Based on queens

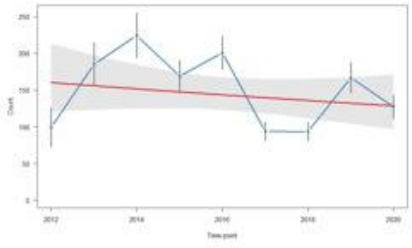
Bombus pascuorum



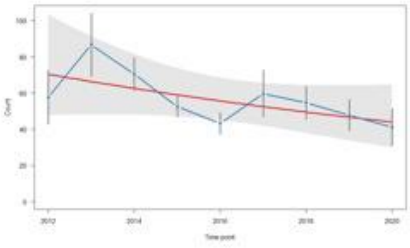
Bombus muscorum



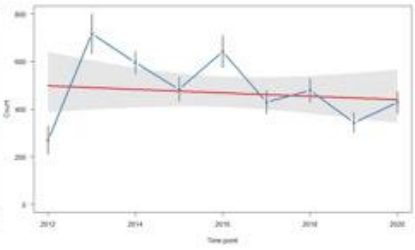
Bombus hortorum



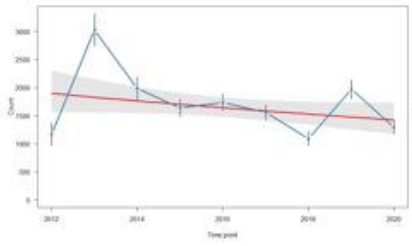
Bombus jonellus



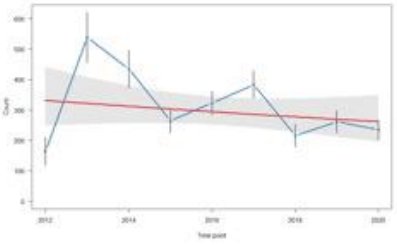
Bombus lapidarius



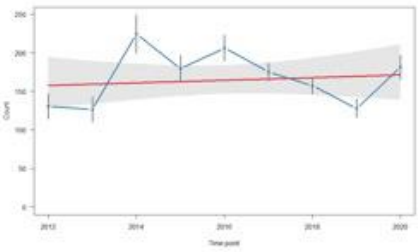
Bombus lucorum agg.



Bombus pratorum



Bombus terrestris



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How do we want to improve the All-Ireland Bumblebee Monitoring Scheme?

1. The most critical thing is that we still need more walks. The scheme is reliant on long term walks that are visited at least 6 times a year. Where some months are missed, it is possible to calculate estimated counts using the previous and subsequent counts, but the fewer missed counts the greater the accuracy of the data. Ensuring transects are walked as much as possible, for as many years as possible, will allow us to reap the biggest benefits from that data we are collecting year on year. There is obvious and understandable flux within citizen science schemes like this, so the more walks we have the better!
2. Currently, we are only gathering sufficient data to analyse trends in eight of our most common bumblebee species. Some species are exceptionally rare and will always be outside the scheme, but there are others where a dedicated campaign to encourage volunteers to establish transects in areas where rare species occur would be useful. This will require workshops, which has made it impossible to progress during the pandemic, but we hope to be able to revisit this in the coming years.
3. We need to ensure that the findings of this scheme are continually translated into action. Within the All-Ireland Pollinator Plan, we have taken on board what it is telling us and have been trying to encourage proactive measures to better protect the Large carder bee at local levels. This will require long-term action, but we pay tribute to those communities who have already risen to the challenge, such Sustainable Skerries.
4. We now have very large quantities of data since 2012. Over the coming years, we hope to carry out more analyses, beyond the core multi-species index and individual species trends. I think that will help us better understand what is happening. For example, how concerned should we be that just two species now seem to be predominating in terms of numbers of individuals counted? It would also help us better understand how to improve the scheme and how to better support our volunteers. I'd also love to see us being able to provide feedback on the individual trends for those volunteers who have long term walks in the scheme. I hope that by linking with Dr Dara Stanley in UCD, over time some of this will become possible.

THANK YOU!

Most importantly, a sincere thank you to every single one of the volunteers who make this scheme possible. Without their efforts in walking their transects once per month, double-checking IDs, sending in photos and ultimately submitting their records to the Data Centre, we simply would not understand what is happening with bumblebees, and would lack the evidence-base to help us protect them into the future.

Bombus sylvarum

Thanks to the following for photographs: Colin Stanley, Rachel McKenna, Janet Whelehan, Karina Dingerkus, Leon Van der Noll.

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All-Ireland Bumblebee Monitoring Scheme recorders in 2020

Recorder	County	Recorder	County
Áine Fenner	Roscommon	Katy Bell	Fermanagh
Áine Fenner (2 walks)	Longford	Lee Donohue	Meath
Andrew Bergin	Kildare	Liz Gabbett (2 walks)	Limerick
Anna McEvoy	Cork	Lorna Folan	Westmeath
Anthea Southey	Kilkenny	Louise Garcia	Tipperary
Athena Michaelides	Galway	Margaret Brennan (2 walks)	Carlow
Barry Walsh (2 walks)	Wicklow	Margaret Synnott	Tipperary
Bernadette Connolly	Cork	Mark Holmes (4 walks)	Mayo
Caitriona Cunningham	Galway	Mary Brennan	Kilkenny
Carol Killarney	Galway	Mary Foley	Wexford
Catherine Penny	Limerick	Mary Montaut	Dublin
Celia Graebner (2 walks)	Mayo	Maurice Lyons	Limerick
Charles Heasman (3 walks)	Dublin	Michael O'Donnell	Wexford
Ciaran Taylor	Wicklow	Michelle Judge	Waterford
Clare Bromley (2 walks)	Donegal	Mireille McCall (2 walks)	Kildare
Colette Blaney	Limerick	Nabla Rea	Kilkenny
Colm Grant	Donegal	Natalie Barry	Cork
Damien Clarke	Antrim	Native Woodland Trust (10)	Multiple
Daniel Clarke	Down	Nuala Cuffe	Kilkenny
Dara Stanley	Dublin	Oisín Duffy (2 walks)	Waterford
Deirdre NicLochlainn	Donegal	Pat Foley	Offaly
Edward Hill	Dublin	Ralph Sheppard	Donegal
Edward Hill (2 walks)	Kildare	Ray Kazmierczak (2 walks)	Clare
Emma Stewart-Liberty	Clare	Rob Wheeldon	Leitrim
Eva De Jong	Roscommon	Rose Cremin	Fermanagh
Geoff Newell (2 walks)	Antrim	Ruth Maxwell	Westmeath
George McDermott	Donegal	Sallyann Marron	Clare
Gerard Kavanagh	Dublin	Saorla Kavanagh	Waterford
Hugh Lee	Wicklow	Sean Forde (2 walks)	Kerry
Ian Edwards	Wicklow	Sophia Couchman	Carlow
Isobel Kurz	Wicklow	Sophia Couchman	Kildare
Janet Whelehan	Wexford	Sr Fionnuala O'Connor	Dublin
Jeanne Sampier (3 walks)	Galway	Tara Dirilgen	Dublin
Jerome Walsh	Laois	Tom Gittings	Cork
Joanna Hodghton (2 walks)	Wexford	Tony Miller	Cork
Juanita Donnelly	Kildare	Trish McAndrew	Mayo
Justin Ivory (5 walks)	Wicklow	Úna Fitzpatrick (3 walks)	Waterford
Karina Dingerkus	Mayo	William Bryan	Waterford
Kate Harrington	Dublin		

These were all registered on the online system and at least one month of data added for 2020. Not all were included in analyses.

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