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Key Partners

Bumblebee

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2022 at a glance

120 transects

90 transects walked at least
6 times

76 recorders

1,000 km walked

800 hrs of effort

17,980 bumblebees

14 species recorded

2022: Large Carder Bee remains in serious decline



Bombus muscorum, Large Carder Bee

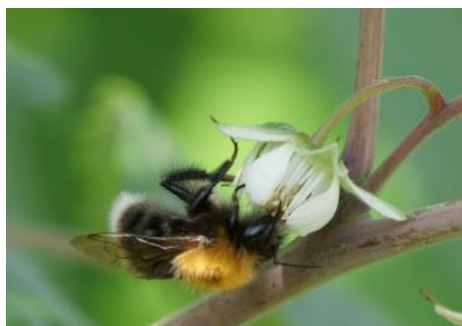
2022 was the 11th year of the All-Ireland Bumblebee Monitoring Scheme. Thanks to the combined effort of the schemes expert volunteers, we know that bumblebees still remain in a precarious position, with the carder bumblebees in most difficulties

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 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.

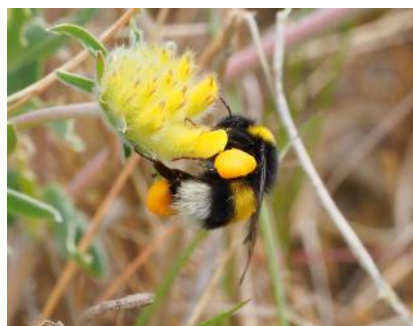
What type of analysis is completed within the scheme? Two separate analyses are undertaken to determine the change (if any) in bumblebee populations. The first is a multi-species index which estimates the overall direction of change in the bumblebee population, as a whole, using Ireland's most common 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, Pannoek & van Strein, 2005; Multi-Species Indicators, MSI, Soldaat et al., 2017).

What does the addition of the 2022 data tell us?

- The most important thing it highlights is the phenomenal effort our citizen science volunteers have put in over the years. In 2022, they collectively spent 800 hours walking just over 1,000 km, counting 17,980 bumblebees across 14 species! Without their generous efforts, we simply would not know how the populations of this vitally important group of insects are changing.
- 2022 was our best year yet for the bumblebee monitoring scheme. A record ninety transects were walked at least 6 times from March-October. This is an incredible achievement and we thank all our volunteers. We are getting closer and closer to our target of 100!
- The impact of weather is again evident. In 2022, we had lovely weather in late March and April. This is reflected in Figure 2, where above average numbers of bumblebees were spotted in those months. For the rest of the year, the weather wasn't particularly good, and bumblebee numbers remained slightly below average.
- While we do now have eleven years of data, we still have to err on the side of caution in reading too much into the trends until a longer term dataset is available. The current overall trend from 2012-2022 is a year-on-year decline of 3.3% (down from 4.1% last year). As expected, with the addition of more data each year, the estimates are improving, and as a result overall loss figures are reducing slightly. The trends do still indicate that bumblebees remain in a precarious position, but there is evidence that things may be starting to stabilise.
- The Tree Bumblebee (*Bombus hypnorum*) is our most recent bumblebee arrival, being first recorded from the island of Ireland in Autumn 2017. It was recorded in the scheme for the first time in 2021. In 2022, it was picked up in low numbers on three transects in N. Ireland.
- The addition of the 2022 data reveals that the Large Carder Bee (*Bombus muscorum*) is still in serious decline nationally. The Common Carder Bee (*Bombus pascuorum*) remains in moderate decline. In 2021, in response to this threat, clearly flagged by the generous monitoring efforts of our volunteers, the All-Ireland Pollinator Plan published an evidence-based guideline on how local communities can help protect this bumblebee: <https://pollinators.ie/helping-endangered-pollinators/large-carder-bee/> A number of local communities have been taking action. While it remains in difficulties nationally, we know that where actions are taken, the bee is responding and it's local status can improve relatively quickly.



Bombus hypnorum



Bombus lucorum agg.



Bombus jonellus

Figure 1: Total number of each bumblebee species recorded in 2022

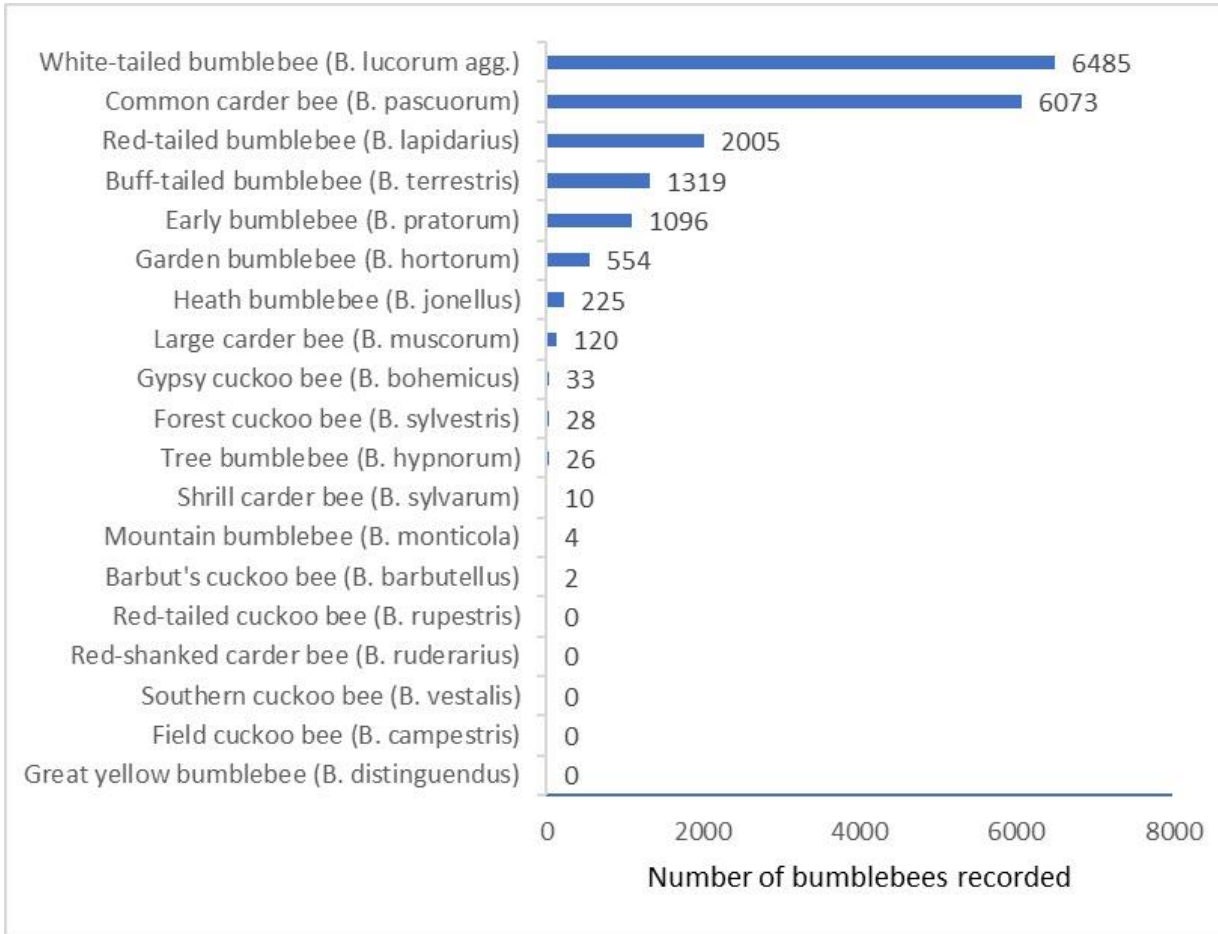
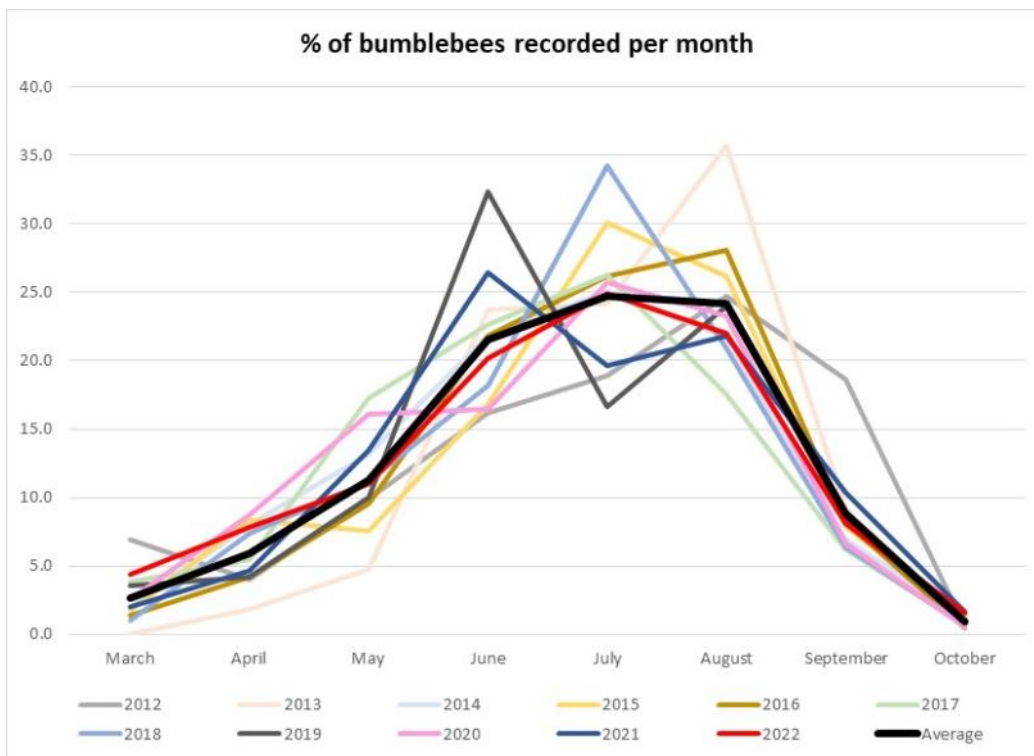


Figure 2: Percentage of bumblebees recorded per month since 2012



Bumblebee population trends 2012-2022

Multispecies Index of bumblebee population change 2012-2022

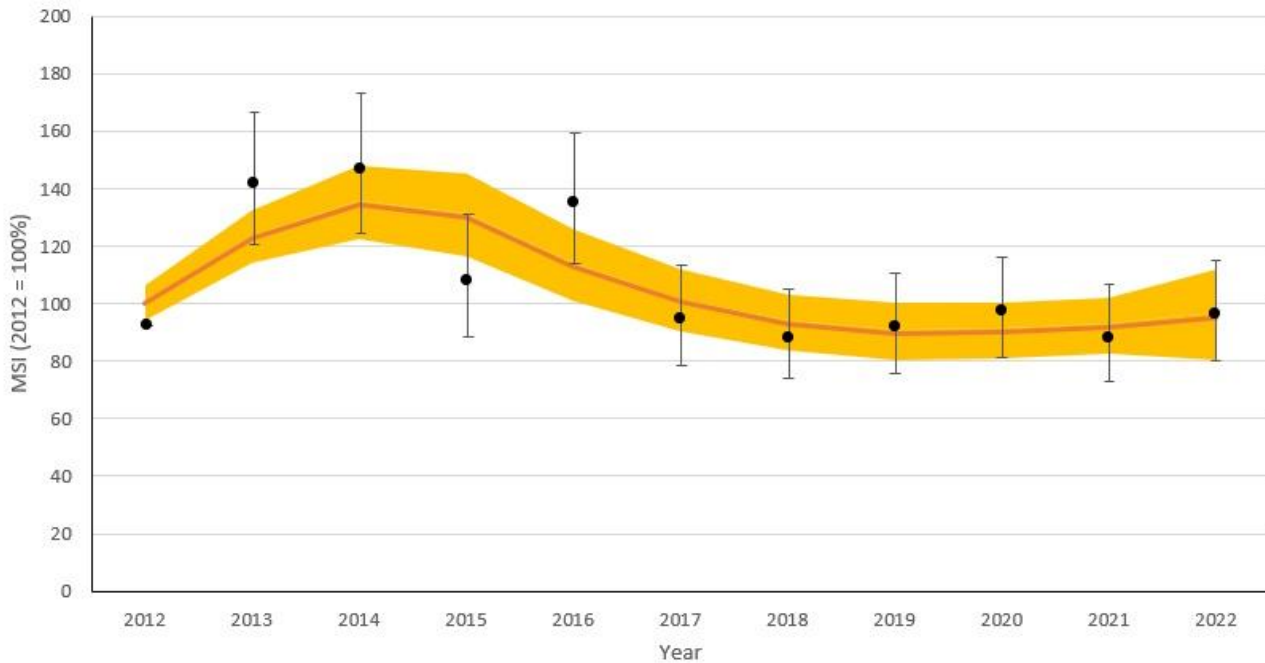


Figure 3: The multi-species index derived from the amalgamation of the population trends of 8 common species of bumblebees from 2012 to 2022. The dark orange line is the smoothed trend line, and the circle markers represent the multispecies index per year. Error bars (on markers) and the shaded area surrounding the trend line are the 95% confidence intervals.

Trends in the bumblebee population, as a whole

The “multispecies index” of bumblebee population change (above) 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 2012-2022 is a year-on-year decline of 3.3% (with a 95% confidence interval). While we now have eleven 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.

Individual species trends

While bumblebees as a whole remain in difficulties, the data also shows that some individual species are showing worrying losses. *Bombus pascuorum* (Common Carder Bee) has traditionally been one of our most common bumblebees. Things have improved slightly for the species since 2020, but it is still in moderate decline.

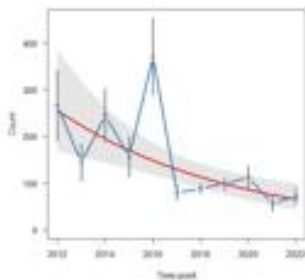
Unfortunately, *Bombus muscorum* remains in strong decline. This species is listed as Vulnerable in the 2014 European Bee Red List. Ireland is one of its strongholds within Europe, making our trends all the more concerning. In a positive, increasing numbers of local communities have been coming together 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 survival in the longer term.

Bumblebee species trends 2012-2022

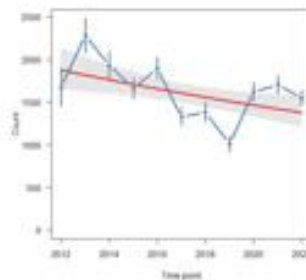
Species	Change 2012-2022	Statistical Confidence
<i>Bombus muscorum</i> (Large carder bee)	Strong Decline (> 5% p.a.)	95%
<i>Bombus pascuorum</i> (Common carder bee)	Moderate Decline (< 5% p.a.)	95%
<i>Bombus hortorum</i> (Garden bumblebee)	Uncertain	
<i>Bombus jonellus</i> (Heath bumblebee)		
<i>Bombus lapidarius</i> (Red-tailed bumblebee)		
<i>Bombus lucorum</i> agg. (White-tailed bumblebee)		
<i>Bombus pratorum</i> (Early bumblebee)		
<i>Bombus terrestris</i> * (Buff-tailed bumblebee)	Stable	

* Based on queens

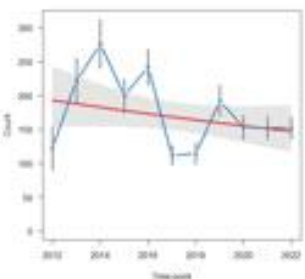
Bombus muscorum



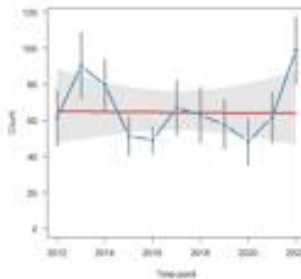
Bombus pascuorum



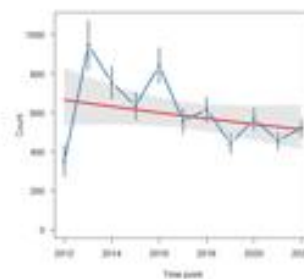
Bombus hortorum



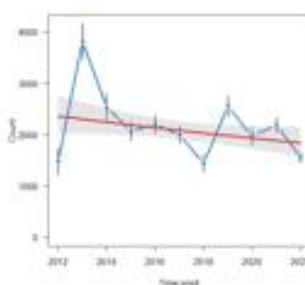
Bombus jonellus



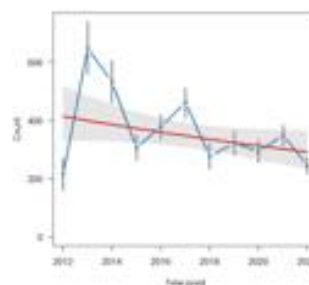
Bombus lapidarius



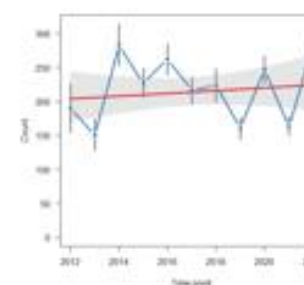
Bombus lucorum agg.



Bombus pratorum



Bombus terrestris



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

1. While the scheme continued to grow in 2022, the most critical thing is that we still need more walks. It 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 the data. There is an understandable flux of volunteers 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 these less common species occur would be useful. This will require workshops and we hope to continue progressing this in the coming years.
3. We need to continue ensuring that the findings of this scheme are translated into action. Within the All-Ireland Pollinator Plan, we have taken on board what it is telling us, and have been encouraging 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, particularly Sustainable Skerries and the Tramore Eco Group. In positive news, both these communities have taken action by creating new habitats and ecological corridors for the bee in their local area, and both have seen the bee expand its range within a very short period of time. This shows that while it may be in decline, with evidence-based action, this can be reversed.
4. We now have very large quantities of data since 2012. In coming years, we hope to carry out more analyses, beyond the core multi-species index and individual species trends. For example, how concerned should we be that just two species now seem to be predominating in terms of numbers of individuals counted? We hope this will help us better understand how to improve the scheme and how to better support our volunteers. It remains our future aim to be in a position to provide feedback on individual trends to those volunteers who have long term walks in the scheme.

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.

Thanks to the following for photographs used in this report: Martin Fitzpatrick, Janet Whelehan, Ruth Wilson, Micheal O'Briain, Colin Stanley.



Bombus sylvarum

If you would like to reference this document: FitzPatrick, Ú & Judge, M (2023) '2022: Large Carder Bee remains in serious decline', All-Ireland Bumblebee Monitoring Scheme, Annual Report 2012-2022. National Biodiversity Data Centre.

All-Ireland Bumblebee Monitoring Scheme recorders in 2022

Recorder	County	Recorder	County
Áine Fenner (4walks)	Longford & Westmeath	Lorna Folan	Westmeath
Alison O'Reilly	Dublin	Louise Garcia (3 walks)	Tipperary
Anna McEvoy	Cork	Lyn Nolan	Limerick
Anthea Southey	Kilkenny	Maeve Foley	Armagh
Barry Walsh (2 walks)	Wicklow	Martin Malachy	Fermanagh
Breda Curran	Kilkenny	Margaret Brennan (2 walks)	Carlow
Brenda Murphy	Cork	Mark Holmes (2 walks)	Mayo
Brid Colhoun/Horacio Prieto	Killarney	Mary Brennan	Kilkenny
Carol Killarney (2 walks)	Galway	Mary Foley	Wexford
Catherine Penny (2 walks)	Limerick	Mary Montaut	Dublin
Celia Graebner	Mayo	Michael McAllister	Antrim
Charles Heasman (4 walks)	Dublin	Michelle Judge	Waterford
Ciara Ni Laighin	Limerick	Mireille McCall (2 walks)	Kildare
Ciaran Taylor (2 walks)	Wicklow	Muriel Moore, Patrick Arthur (3 walks)	Down & Antrim
Clare Hamilton	Dublin	Nabla Rea	Kilkenny
Colette Blaney	Limerick	Nuala Cuffe	Kilkenny
Colm Damery (3 walks)	Cork	Oisín & Mairead Duffy (2 walks)	Waterford
Damien Clarke	Antrim	Pat Foley	Offaly
Dara Stanley	Dublin	Pat Walsh	Kildare
Darren Reidy	Dublin	Patrick Fahy (2 walks)	Mayo
Dave Suddaby (2 walks)	Mayo	Paula Farrell	Kildare
Donal Toolan	Waterford	Ralph Sheppard	Donegal
Edward Hill	Dublin	Raymond Kazmierczak	Clare
Emma Stewart-Liberty (2 walks)	Clare	Richard Walsh	Kilkenny
Genevieve O'Reilly, Derek Wilson, Mags McGarvey (2 walks)	Down & Antrim	Rob Wheeldon	Leitrim
Geoff Newell (2 walks)	Antrim	Rory Finnegan	Kildare
Helen Higgins	Wicklow	Rose Cremin	Fermanagh
Hugh Gryspeerdt (4 walks)	Wicklow & Dublin	Rosemary Rooney	Carlow
Isobel Kurz	Wicklow	Ruth Wilson	Down
Jane O'Sullivan	Kerry	Sallyann Marron	Clare
Jeanne Sampier (3 walks)	Galway	Saorla Kavanagh	Waterford
Jerome Walsh	Laois	Sharon Parr	Clare
Joanna Hodghton	Wexford	Simeon Cathcart	Antrim
Justin Ivory (5 walks)	Wicklow	Sophia Couchman (2 walks)	Kildare & Carlow
Karina Dingerkus	Mayo	Sr Fionnuala O'Connor	Dublin
Katy Bell	Down	Tom Gittings (2 walks)	Cork
Kirsty Orr (3 walks)	Down	Tony Miller	Cork
Lee Donohue	Meath	Úna Fitzpatrick (4 walks)	Waterford
Leif Barry	Dublin	William Bryan	Waterford
Lorcain Cameron	Dublin		

These were all registered on the online system and at least one month of data added for 2022. Not all were included in analyses.