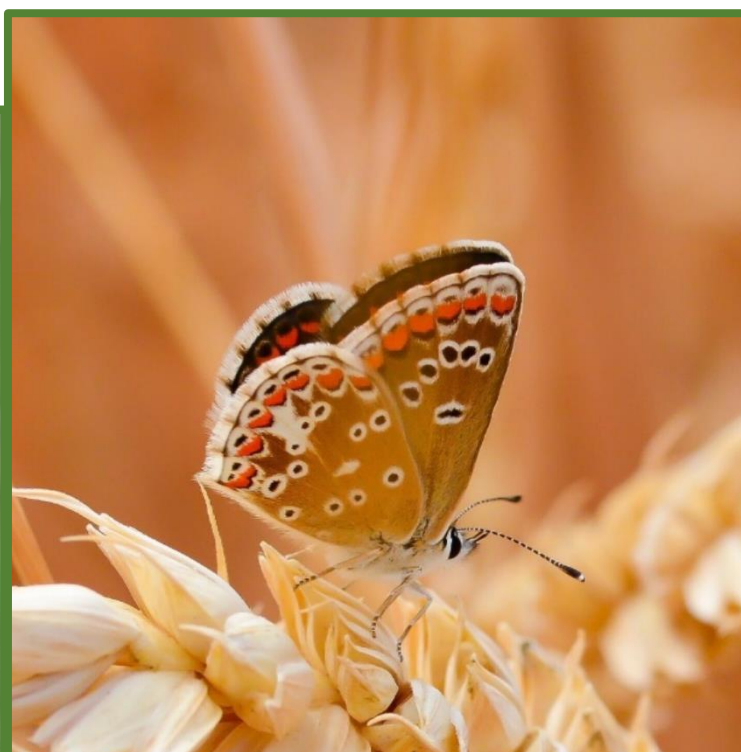
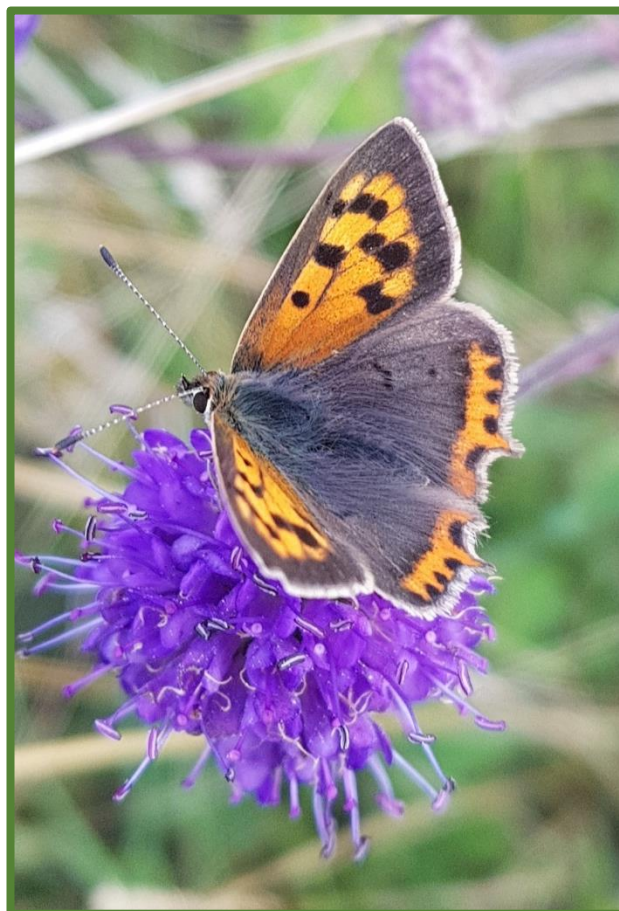


Epping Forest District Council

Butterfly Census Report 2015-2020

Bobbingworth Nature Reserve and Church Lane Local Nature Reserve



Picture References: Small Copper at Church Lane, 30082018. Brown Argus at Church Lane, Colin Banks 2018. Marbled White at Church Lane, Colin Banks 2018.

Jess Hodges, Countrycare Assistant
October 2020

Introduction

Butterflies have been around for at least 50 million years; however, it is believed they could have first evolved closer to 150 million years ago and in that time, they have become extremely valuable members of the ecosystem. The presence of butterflies and moths within a habitat shows that it is healthy and indicates presence of wider range of invertebrates. Which in turn provides a range of environmental benefits including natural pest control, pollination and contributions to the food chain. Of the 59 species of butterflies present in the UK, 27 species have been identified across the two sites in the district where the survey is conducted. Of these species, 1 is listed within the Red List (Fox et al, 2010) as being near threatened indicating that the species are likely to qualify for one of the threatened categories in the near future. These species is the Small Heath, which is found on the two sites included in the UKBMS within the district.

Church Lane flood meadow (Fig.2) was created in 1989 as part of the North Weald Flood Alleviation Scheme and incorporates many habitat types including: stream fed pond, hedgerow and wet grassland meadow. The other site is Bobbingworth Nature Reserve (Fig.1); a former Landfill site, which in 1989/90 was capped with clean clay. Approximately 7000 trees were planted to offset the carbon footprint which exist among many other habitat types including a wetland and scrub.



Fig 1. Bobbingworth Nature Reserve in July



Fig 2. Church Lane Local Nature Reserve in July

Due to the Covid-19 pandemic commencing in March 2020; the data recorded for the two sites this year has been severely impeded. The council followed the UKBMS guidance as well as the Government guidance. In March the UKBMS was anticipating the transect to continue as it was classed as a solitary, outdoor activity with little risk of contracting and spreading the virus (UKBMS. 1 2020). However, at the beginning of April, the advice changed to cease all transect walking and recording, data entry onto the UKBMS website was suspended (UKBMS. 2 2020). Therefore, there is limited data for the 2020 dataset which in its nature does not present a fair representation of the butterfly populations within the sites; for this reason, the 2020 dataset has been removed from some of the analysis.

Methodology

Since 2015, Countrycare have been conducting the UK Butterfly Monitoring Scheme (UKBMS) at two sites with the Epping Forest District, being Bobbingworth Nature Reserve and Church Lane Local Nature Reserve. This is a standardised methodology where a set transect is walked on a weekly basis where conditions permit from the beginning of April through to the end of September when butterflies are more likely to be active.

Each transect consists of 7 sections which aim to cover the sites diversity as thoroughly as possible including the flora communities and habitat types (Fig. 3 & 4).

The set transect is conducted at a steady pace which allows the surveyor to observe butterflies within 2.5m either side of the transect line and 5m in front of the surveyor, double counting should be avoided. Before commencing the transect, the conditions should meet the optimal conditions and be recorded to include the following: wind speed below 5 on Beaufort scale, above 13 degrees Celsius, between 10:45 and 15:45. All results are recorded using the UKBMS weekly field recording form (Fig. 5).

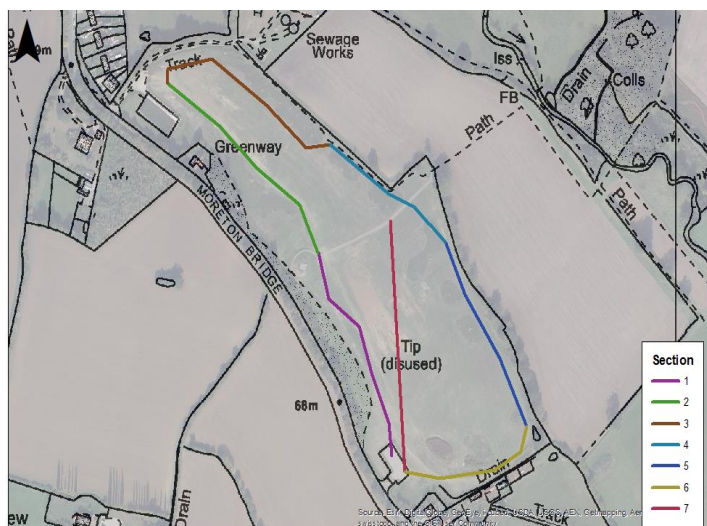


Fig 3. Bobbingworth Transect Map

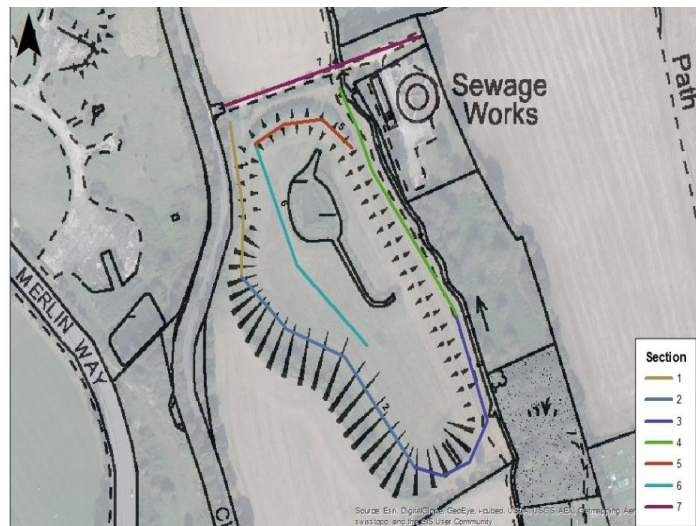


Fig 4. Church Lane Transect Map

F2: BUTTERFLY TRANSECT WEEKLY FIELD RECORDING FORM

Site Name: _____ Recorder: _____

Year: _____ Date: _____ Week No: _____ Start: _____ Finish: _____

Average Temp. (°C): _____ Average Wind Speed (0-6): _____ Wind Direction: _____

SECTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL
Small skipper																
Essex skipper																
Small / Essex skipper																
Large skipper																
Dinky skipper																
Grizzled skipper																
Clouded yellow																
Brimstone																
Large white																
Small white																
Green-veined white																
Orange tip																
Green hairstreak																
Purple hairstreak																
Small copper																
Small blue																
Brown argus																
Common blue																
Chalkhill blue																
Holly blue																
White admiral																
Red admiral																
Painted lady																
Small tortoiseshell																
Peacock																
Comma																
Dark green fritillary																
Silver-washed fritillary																
Speckled wood																
Wall																
Marbled white																
Grayling																
Gatekeeper																
Meadow brown																
Ringlet																
Small heath																
TOTAL																
% SUNSHINE																

NOTES:

Fig 5. UKBMS Weekly Transect Recording Form

Results

Of the 26 available weeks for the UKBMS to take place the year with the highest survey effort for Church Lane was 2017 where only 1 survey was not conducted (Fig.7). For Bobbingworth the years with the highest survey effort was both 2015 and 2017 where only 2 surveys were missed on each year (Fig.6). By stark comparison, 2020 was the year with the lowest survey effort for both sites where only 9 transects were conducted at Bobbingworth and only 6 transects were conducted at Church Lane.

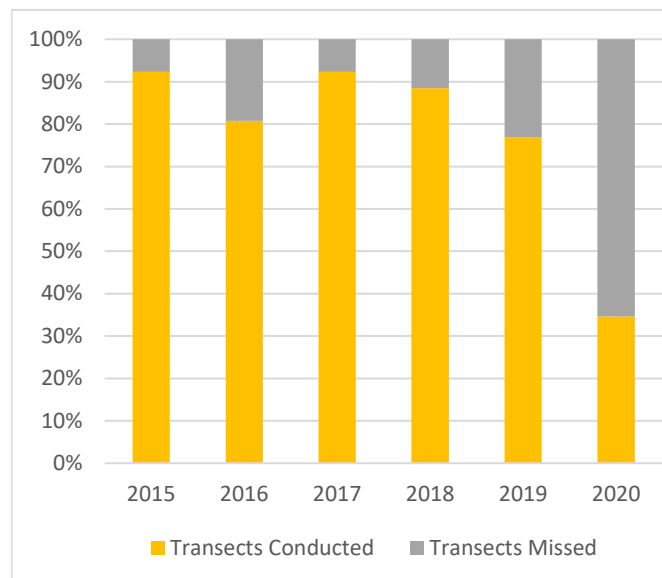


Fig 6. Bobbingworth survey effort from 2015-2020 as a percentage

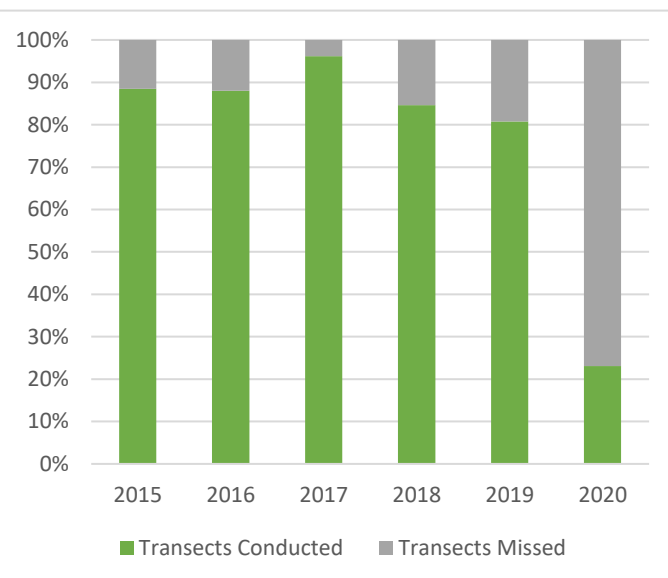


Fig 7. Church Lane survey effort from 2015-2020 as a percentage

Year on year, Church Lane records a greater population of butterflies (Fig.8), with 2017 being its best year with a total count of 1756 individuals. In comparison, 2018 was the most successful year for Bobbingworth with a total of 927 individuals. Both sites had their worst year of the survey period in 2016 where Bobbingworth yielded 460 butterflies and Church Lane achieved 781 butterflies.

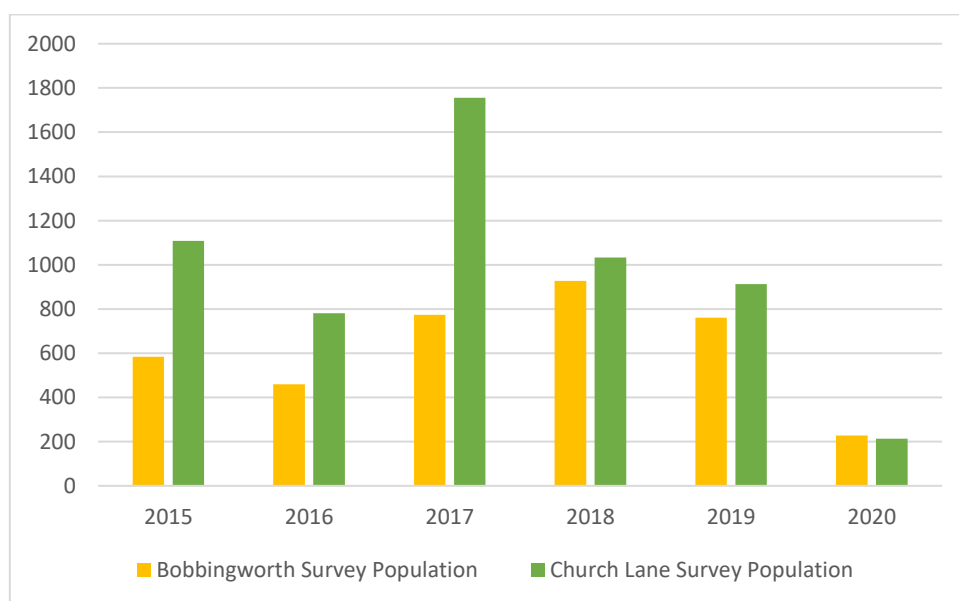


Fig 8. Total individuals recorded of all species at each site from 2015-2020 as part of UKBMS transect

When considering the species of butterfly present at each site it is encouraging that this number is relatively constant. As Church Lane maintains between 24-29 species, while also acknowledging that the 24 species was recorded during the worst year (other than 2020). When looking at the species richness of Bobbingworth there is a generally increasing trend, again with 2016 being the lowest at 17, and 2019 being the highest with 26 species (Fig.9).

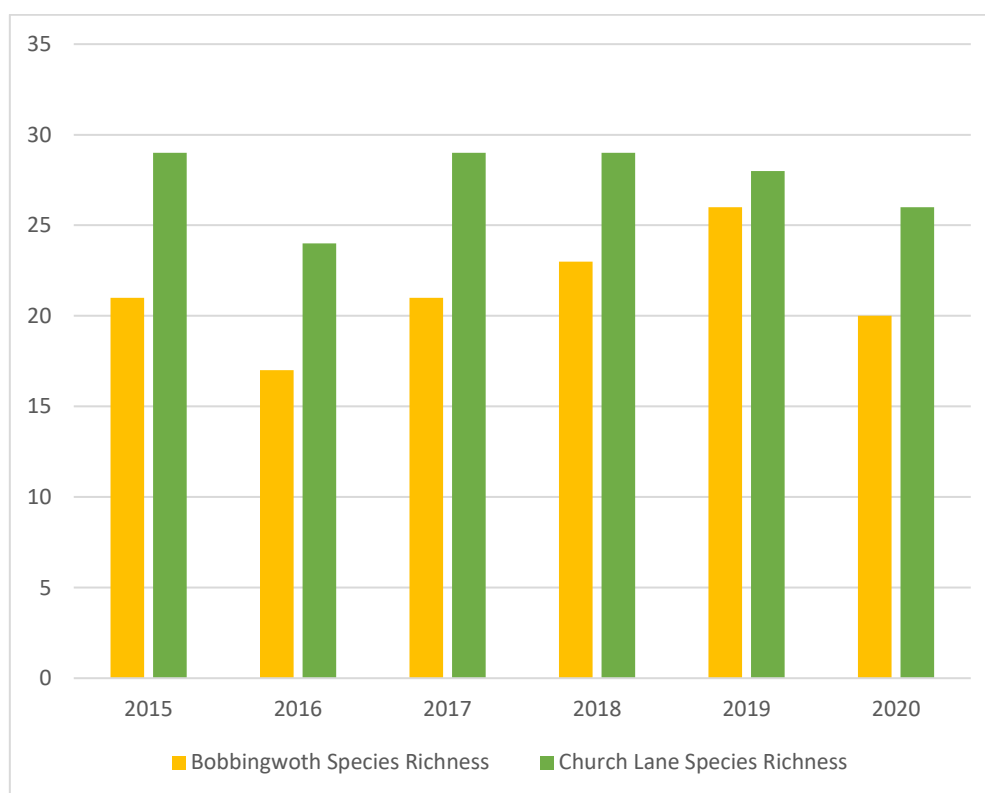


Fig 9. Species richness (number of species) recorded to be present at each site from 2015-2020 as part of UKBMS transect

When looking closer into the species of each site, similar trends can be identified, the meadow brown is the most abundant species on each site where its highest population on Bobbingworth was in 2019 at 336 whereas at Church Lane in 2017 it was recorded to be 624 (Fig 10 &11). When considering the skipper family Church Lane has recorded Large Skippers every year since the transect started; however, Bobbingworth has only recorded a population of 3 Large Skippers in 2019 showing a new species recorded at the site (Fig. 12 &13). There are healthy positive trends evident in the white family for both sites showing increases in population for example: the Green veined white at Church lane; or the quick recovery following a worse year evident at Bobbingworth with the Large white (Fig 14 &15).

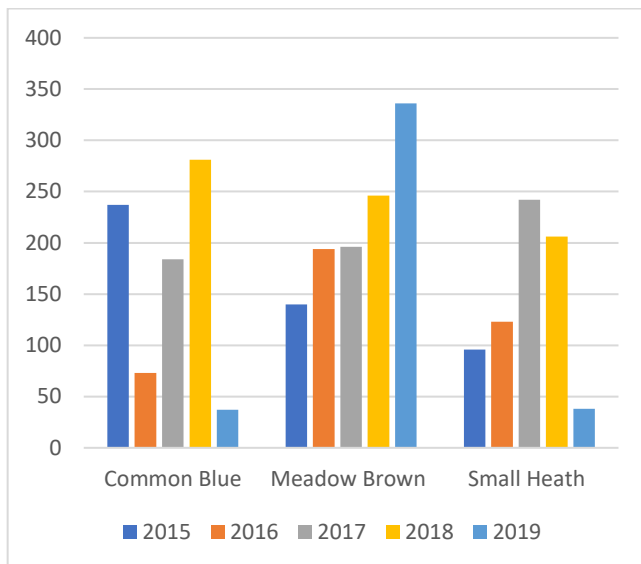


Fig 10. Yearly figures of Common blue, Meadow brown and Small heath butterfly 2015-2019 at Bobbingworth

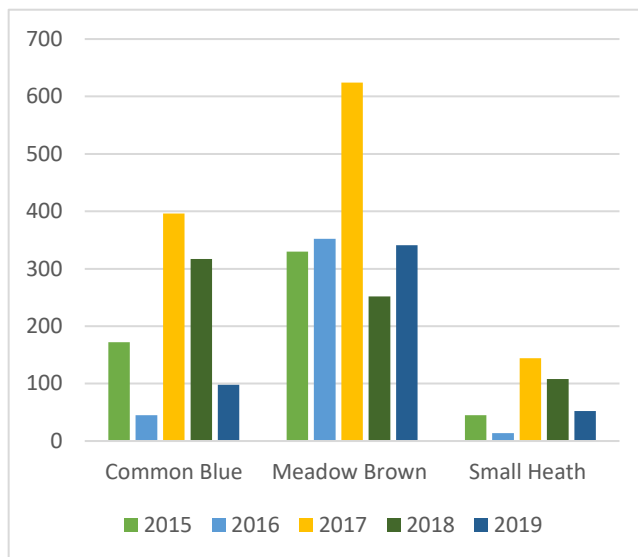


Fig 11. Yearly figures of Common blue, Meadow brown and Small heath butterfly 2015-2019 at Church Lane

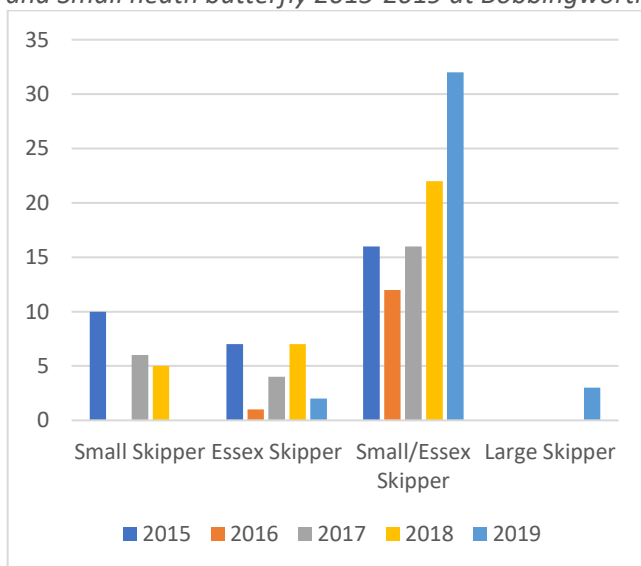


Fig 12. Skipper family at Bobbingworth 2015-2019

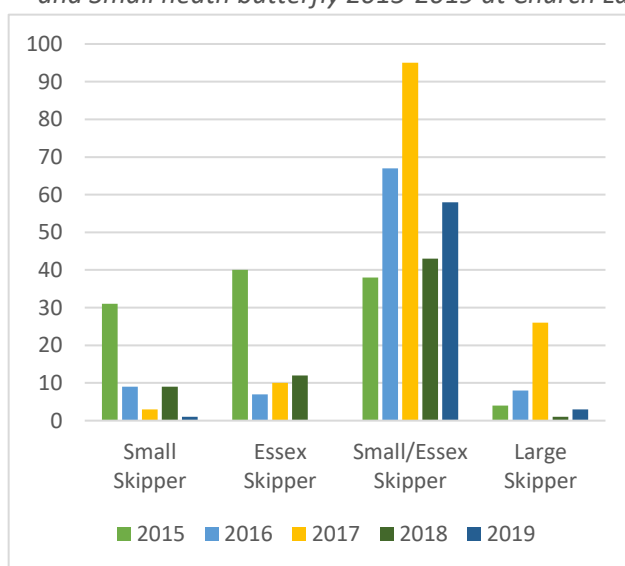


Fig 13. Skipper family at Church Lane 2015-2019

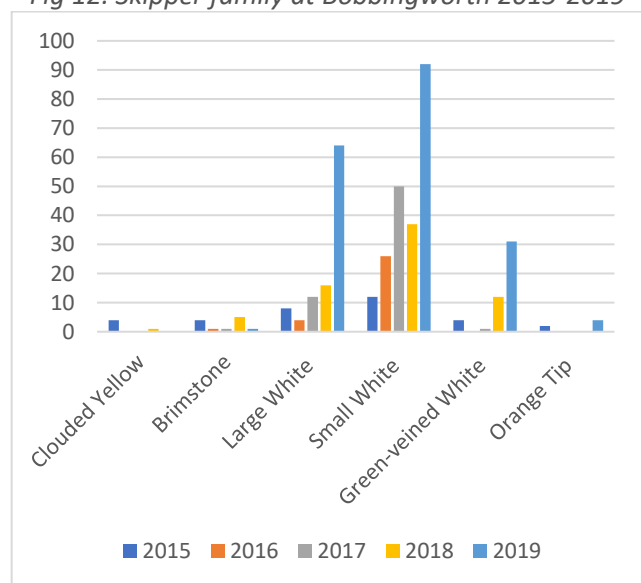


Fig 14. White family at Bobbingworth 2015-2019

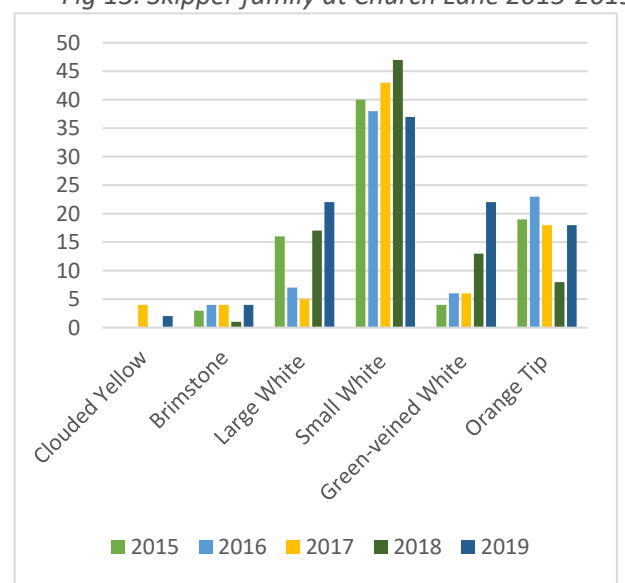


Fig 15. White family at Church Lane 2015-2019

Value of Butterflies and Protected Green Space

Butterflies are the most studied group of UK insects, they respond rapidly to environmental change giving indicators of the wider ecosystem and services; however, can also be used to judge the effectiveness of conservation measures (Butterfly Conservation, 2015). This is evident as it is stated by Butterfly Conservation (2015) that Sites of Special Scientific Interest (SSSI's) hold the greatest abundance of British butterfly and dragonfly species highlighting the value of protected green space. Protected green space holds the statutory protection allowing high quality habitats to be developed, maintained for wildlife interest and wherever possible reduce the risk of habitat isolation (Butterfly Conservation, 2015). Church Lane is a designated Local Nature Reserve providing the site with a level of protection which could be used to explain the significantly higher population of butterflies identified on the site; there is also a constantly high species richness at this site despite being surrounded by agricultural land. Agricultural land is not as beneficial to butterflies as protected areas because of the use of pesticides which lead to direct mortality or sub-lethal effects to butterflies, and herbicides which remove nectar sources and food plants of larvae particularly (Rudloft & Smith, 2006). Despite being old tip land the species richness and increasing populations at Bobbingworth is exciting and reflects the strength of the habitat and its suitability for wildlife while also neighbouring farmland.



Common Blue

The Methodology



Clouded Yellow

The UKBMS was established in 1998 to assess the trends of UK butterfly populations (Butterfly Conservation, 2017). However, there are limitations to this survey method including the survey conditions restrictions or the potential for human error.

Overall, as a survey technique, the UKBMS is supported by a large sample size across the country, is contextualised with limitless support from Butterfly Conservation and the risk of human error is minimised by the use of identification charts and opportunity to catch the species in a net for closer examination.

Worryingly, the Big Butterfly Count recorded the lowest number of butterflies for the past 11 years in 2020 despite strong participant engagement and effort (Butterfly Conservation, 2020). Although, this year the count recorded 1.4 million butterflies the numbers logged

per count were down by 34% on previous years (Butterfly Conservation, 2020). However, not all species struggled in 2020, such as the common Blue, Holly blue and Small copper all showing positive trends; unlike the Painted Lady who's number were expectedly at rock bottom following 2019 being a migration year for the species.

In reference to the 2020 as a survey period for EFDC, it has been treated as anomalous data due to the unprecedented circumstances of the year. Alongside this, high winds and rainfall also restricted the dates in which the UKBMS could be conducted. Hence, the 2020 dataset has been removed from some of the analysis.

A closer look at the species

In the UK there are 59 species of Butterfly, 3 of which are considered to be migrant species, although that line is being blurred as the Red Admiral is now often present in the UK over winter and there are indications that larvae or pupae of the Clouded Yellow have been over wintering in warmer sheltered spots in the UK. This change in migratory behaviour could be a result of climate change also reflected in changing geographic distribution of some species; however, we should not assume that species with a southern distribution will benefit from climate change (Butterfly Conservation, 2015).

In 2010 Fox *et al.*, created the Red List of butterflies to protect species most at risk of extinction or vulnerable classification, as they state butterflies are a highly threatened group of UK insects. Therefore, habitats which can host species at risk are immensely valuable and this report confirms that both Church Lane and Bobbingworth hold this status. One class within the Red List is “Near Threatened,” this is to say a species which is currently of least concern is likely to soon qualify for a “threatened” category (Fox *et al.*, 2010); of the 11 near threatened species 1 species is present at both of the sites in question. Small heath (*Coenonympha pamphilus*) butterflies are listed as near threatened on the Red List and both sites hold a healthy population of this species; although both sites saw a decline in 2019.

Qualitative Data from around the district

Although not covered by the UKBMS transect surveys many of the other sites around the Epping Forest District play host to a range of butterfly species evident by the picture records, the following are a small selection of these. The Orange tip (*Anthocharis cardamines*) butterfly has been recorded in Thornwood Common in 2019, the individual in the photo is a female which doesn't display the orange tip and is a member of the white family (RSPB, 2020). It is encouraging for the site that this butterfly was recorded as it does not generally form discrete colonies but is instead a wandering species using hedgerows and woodland margins (Eele, 2020). The Purple hairstreak (*Favonius quercus*) butterfly has also been found at multiple locations across the district including Norton Heath where the image was taken. This is the most common species of the hairstreak family which tends to fly high in the canopy feeding on honeydew and basking lower down on both trees and scrub (Eele, 2020).

The Silver-washed fritillary (*Argynnis paphia*), a member of the fritillary family has been found and photographed at Roughtalleys Wood. This is the largest fritillary found in the UK, founded mainly in woodlands in the south (Eele, 2020).



Orange Tip



Purple Hairstreak



Silver-washed fritillary

Butterflies Nationally

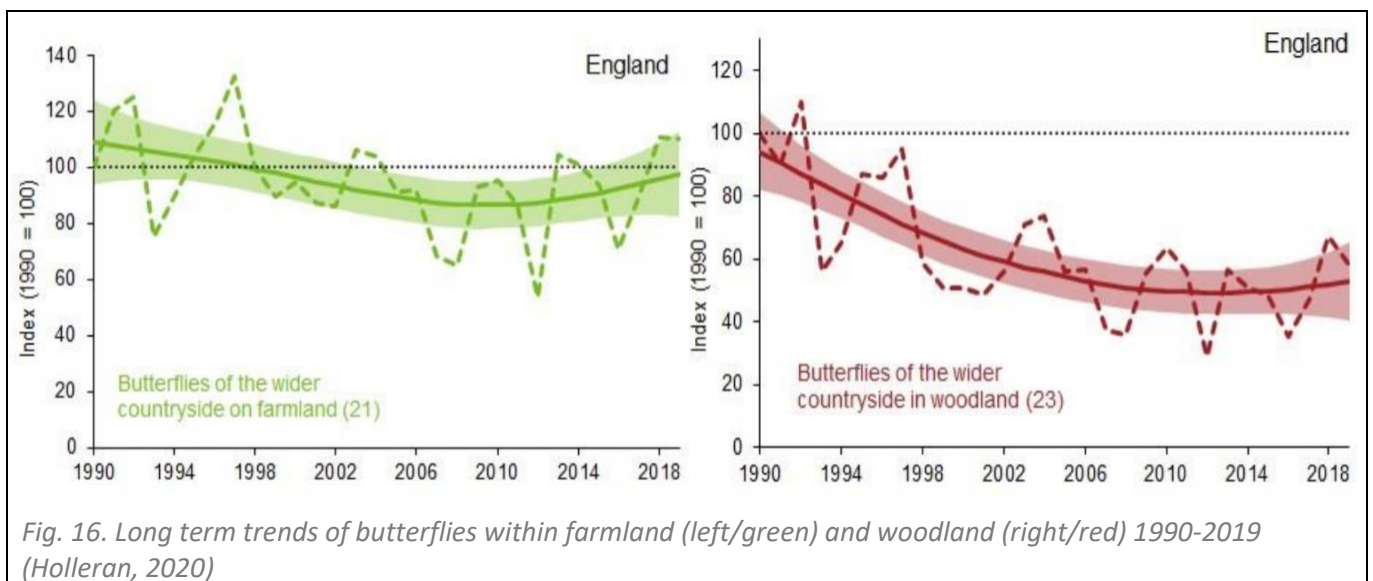


Gatekeeper

With more butterflies, there is more pollination, healthier populations higher up the food chain and pest species are under better control, as these butterflies provide extensive habitat services making them immensely valuable members of the ecosystem.

Epping Forest District Council hosts at least 27 species of Butterflies: this is due to the range of habitats present, the amount of protected land and the habitat management that occurs. Seen as the recent "State of butterflies" in 2015 stated a 76% decline in abundance of UK butterflies (Butterfly Conservation, 2015); the species richness and populations of butterfly that have been recorded or observed is exciting and encouraging for the habitat management taking place.

The Department for Environment, Food and Rural Affairs published an index in 2020 looking at long term butterfly trends; the study period covered 1990-2019 and showed that in 2019 the index was 10% higher than when it began (Holleran, 2020). However, in 2012 the lowest point was recorded, which matches time period considered in the most recent "state of butterflies." The report focuses mainly on farmland and woodland and therefore is particularly relevant considering the sites in question and their location. Surprisingly, although some long-term decline is observed within farmland with a more recent recovery, when looking at woodland the long-term decline is shocking (Fig. 16).



Within the farmland and woodlands habitats the species which struggled included the: small tortoiseshell, gatekeeper, small/Essex skipper, ringlet, brimstone and small copper (to name just a few) (Holleran, 2020). Unlike yearly fluctuations, these long-term trends are more likely to be due to habitat changes and conditions for example farming practices and lack of woodland management resulting in the loss of open spaces in woodlands. However, between the two sites examined here, all of the species just listed are present and most have strong populations. Proving that strong habitat management, despite local farmland, is allowing the butterflies to thrive and utilise these two sites. Which begs the question of: what could be found at other places throughout the district?

References

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- UKBMS. 2. (2020). Updated statement for UKBMS recorders relating to Coronavirus Covid-19. *UK Butterfly Monitoring Scheme*.

Picture References

- Photos sourced from z:drive:
- Cover page Small Copper: Countrycare, 2018
- Cover page Brown Argus: Colin Banks, 2018.
- Cover page Marbled White: Colin Banks, 2018
- Common Blue: Chigwell Row Wood, 140918
- Clouded Yellow: Bobbingworth, 210920
- Orange Tip: Female, Thornwood Common, 030519
- Purple Hairstreak: Norton Heath, 050719
- Silver-washed fritillary: Mick Chatman
- Gatekeeper: Old Shire Lane, 300719