BUTTERFLY CONSERVATION UPPER THAMES BRANCH

Small Blue Report 2023

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Introduction

This report, my second since I took on the Small Blue species champ role in 2020, uses as its starting point the report template suggested by Nick Bowles, in his email of 15 February 2024 sent to species champs. The report is completely based upon analysis of a validated data set of Upper Thames Branch (UTB) Small Blue records from the Butterfly Conservation database. I used a single "species champ tool" spreadsheet to do both the data validation and the analysis. It was designed to be general-purpose and could readily be used to do the same for other species. A separate report deals with the data validation and analysis details.

The data basis for the report

The raw data set used for analysis has the following features:

- 4,033 records (3,927 of adult, 106 of immature lifecycle stages)
- 29 years included (1995-2023)
- 328 1km squares represented (4% of UTB territory)

This report is based on 1km squares[1] as the smallest unit of analysis, rather than the 2km x 2km "tetrad" that has historically been standard. For brevity, therefore, whenever the word "square" is used without scale qualification, it should be understood to mean "1km square".

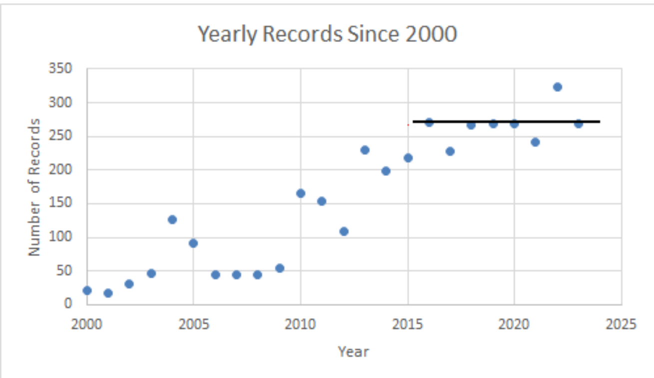

Figure 1: Small Blue annual record count since 2000

There were 268 UTB Small Blue records in 2023, compared to an average of 267 for the previous 7 years, as shown in **Figure *1***. Prior to 2016, the number of records increased steadily from a very low baseline, but this likely indicates an increase in recording effort rather than an increase in Small Blue distribution or abundance. Because of the stable number of records for the last 8 years, where the report concerns itself with trying to compare current years with recent years, the period 2020-2023 is compared with the period 2016-2019.

[1] Of the 328 squares represented in the full data set, only 213 are represented for the period 2016-2023. We should not read too much into this, particularly not that the species is decreasing in distribution. It is normal for all but the most heavily recorded squares to have years with no records; however, where a square is represented for 1995-2023 but not for 2016-2023, the cause is usually a single and *probably* erroneous record.

Preparing the data

There are two successive stages to preparing the data: validation, and "clustering".

Validation is, or should be, a standard preparatory step for data analysis. The species champ tool spreadsheet is designed to assist a species champ to carry out data validation thoroughly and easily (if not necessarily quickly). Three data validation options are available: none, level one, and level two. For the purposes of this report, it suffices to say that after level two data validation, a total of 49 records (1.2%) were excluded from analysis:

- 10: because they had a duplicate (or in one case, two duplicates)
- 11: because the site name and grid reference were inconsistent
- 28: because of insufficient corroborative evidence (no more than three records from the associated 10km square)

I developed clustering this year, specifically for the purpose of analysis. It is also built in to the species champ tool spreadsheet. In summary: every square represented in the data set is allocated one of three statuses:

- Connected[2] (belongs to a cluster of squares in the data set that are connected to each other and disconnected from all the others).
- Isolated (a disconnected square with at least one record from each of more than one year, or more than one record from a single year).
- One-off (a disconnected square with just one record from one year).

In this data set, approximately[3] two-thirds of squares are connected, and one-third disconnected. The one-third of disconnected squares in turn divide approximately into one-quarter isolated squares and three-quarters one-off squares. The clustering algorithm implemented in the species champ tool spreadsheet was used to allocate all the connected squares to a smaller number of clusters, approximately 50 i.e. the typical cluster includes four squares.

We can expect to have most confidence in the data that belongs to the clusters (less so for the ones with fewer squares and records), less confidence in data that belongs to the isolated squares (even less for the ones with fewer records), and least confidence in the single records that each belong to a one-off square.

[2] To visualise what "connected" means, imagine making a map on which all the squares in the data set are to be filled in with a pencil. All the squares in a cluster are connected to each other, because they can be filled in *without lifting the pencil*. To fill in another cluster, the pencil must be lifted from the paper and the process repeated. A disconnected square has no neighbouring squares with any records.
[3] The exact split between connected and disconnected squares, and of disconnected squares into isolated squares and one-off squares, depends on which of two definitions of connected is used.

Small Blue UTB distribution

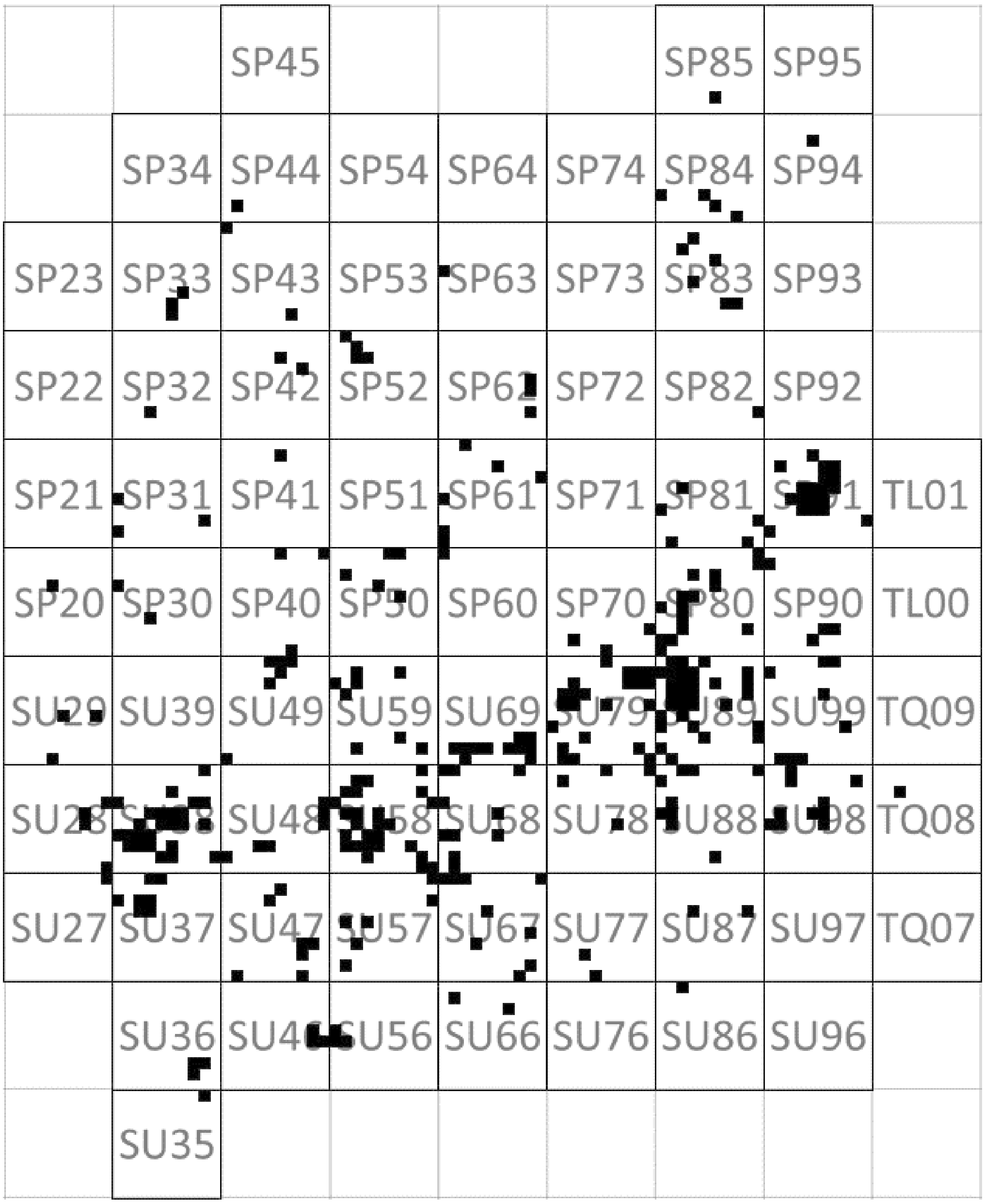

Figure 2: All UTB squares with at least one Small Blue record 1995-2023

Figure 2 simply shows, coloured black, every square represented in the data set i.e. with at least one record from the period 1995-2023, superimposed on the 10km squares that constitute UTB territory.

Some features can be identified, notably the way the occupied squares tend to cluster along the Chilterns “backbone” … but it’s a bit of a mess, and the high numbers of isolated and one-off squares are readily apparent. **Figure *2*** gives equal emphasis to every square.

In contrast, **Figure *3*** illustrates the clusters, isolated squares and one-off squares that were identified in the data after data validation, using 8-connectivity to define the clusters, and **Table *1*** to illustrate the results:

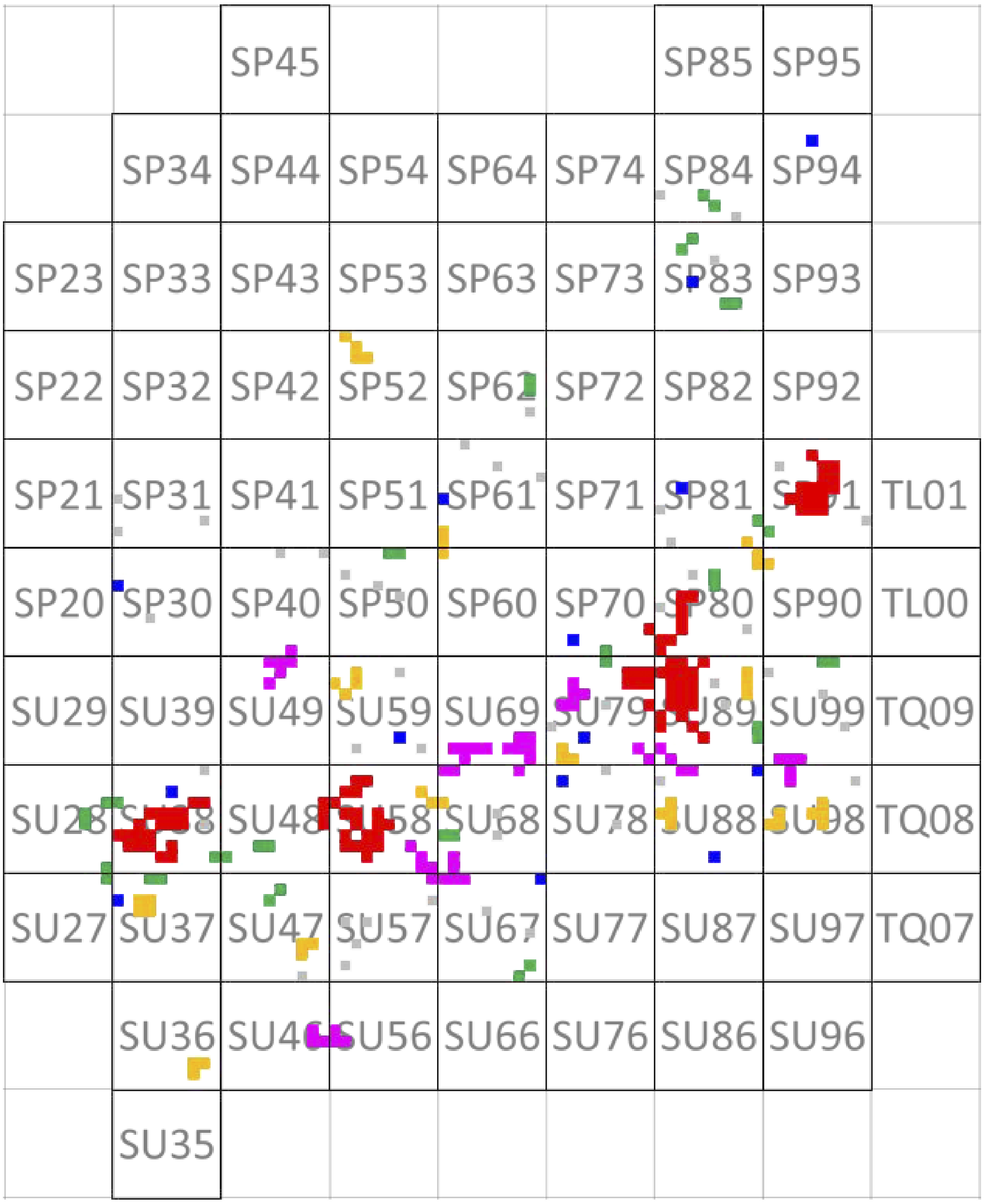

Figure 3: Small Blue UTB population clusters 1995-2023 after data validation, using 8-connectivity

Number of squares	*More than 10*	*5-10*	*3-4*	*2*	*1 (isolated)*	*1 (one-off)*
Colour						

Table 1: Colour key used to illustrate clusters, isolated squares and one-off squares

The noise reduction resulting from data validation can be clearly seen. The exact effect of data validation is quantified in **Table 2** below. The number of one-off squares has been reduced by approximately one-third, but remains unwieldy, with likely still a lot of false positives (and we likewise cannot rule out having already eliminated some true positives); such are the perils of championing the UK's most misidentified species. Note, however, that the unused records have not been deleted, only ignored; if and when more corroborative evidence becomes available, such records will be re-evaluated in new analysis.

			Data validation	
			Without	**With**
Clusters			46	44
Squares			328	293
	Connected		239	230
	Disconnected		89	63
		Isolated	16	14
		One-off	73	49

Table 2: Clustering demography without and with data validation

In terms of square count, the Bradenham cluster, third from left in **Figure *3***, is the biggest. It comprises 37 squares, and includes Bradenham, Small Dean Lane Bank, Buttlers Hangings and wider environs. Although diffuse, it is extensive, spanning more than 10km south to north, and nearly 10km west to east. The other three clusters are comparable in size to each other, and about half the size of the Bradenham cluster:

- The Hagbourne cluster (second from left) comprises 22 squares, and includes Hagbourne Cemetery & Ramps, Aston Upthorpe, Blewbury, Chilton Cutting and environs.
- The Seven Barrows cluster (the leftmost one) comprises 20 squares with a lot of site name diversity, and includes Crog Hill, Seven Barrows, Sheepdrove Farm, Devil's Punchbowl, Hackpen Hill and Pigtrough Bottom.
- The Pitstone cluster (the rightmost one) comprises 16 squares, and includes Pitstone Quarry, College Lake and Incombe Hole.

All the records can be identified, and the data aggregated, separately for each cluster and isolated square.

For reference, summary tables are provided in the Appendix for all the clusters (**Table *10***), isolated squares (**Table *11***) and one-off squares (**Table *12***) that were identified by the analysis. As well as a name and a list of site name keywords for each one, the following are provided where relevant:

- <u>1kID</u>: (not for clusters) the four-figure 1km Ordnance Survey grid reference
- <u>1k square N</u>: (for clusters only) the number of 1k squares in the cluster
- <u>Record N</u>: (not for one-off squares) the number of records in the data set
- <u>First and Last Record</u>: years in which Small Blue was first and last recorded (the same thing for one-off squares, for which it is called Record From).

Some thoughts on misidentification rates

Data validation for the Small Blue is especially valuable, and also wearisome, because the Small Blue is arguably the most misidentified of our threatened species. The rationale amongst well-meaning amateurs appears to be ”If it’s small, and blue, it must be a Small Blue”. A reasonable handle on the potential incidence of misidentification can be gained by comparing the results of the Small Blue clustering analysis with corresponding results for the Chalkhill Blue, for which I had a comparable data set to hand (4,700 records covering the years 2005-2019), and which is relatively unlikely to be misidentified.

Table *3* shows the results of analysing the Small Blue and Chalkhill Blue data sets, for the same 10 year period (2010-2019), using the same definition of connectivity (8-connected), and the same level of data validation (level two) i.e. it is the closest that can be achieved to a like-for-like comparison. There is a difference in overall recorded occupancy (188 squares for Small Blue vs 119 for Chalkhill Blue). Half of that difference is accounted for by the connected squares. The other half is accounted for by the one-off squares, which are as good as absent for the Chalkhill Blue; the number of isolated squares is scarcely different between the two species. Even with level two data validation, the Small Blue is plagued with one-off records of dubious plausibility!

Species	**Squares**	**Connected**	**Disconnected**	**Isolated**	**One-off**	**Clusters**
Small Blue	188	136	52	16	36	31
Chalkhill Blue	119	103	16	14	2	20

Table 3: Distribution demography for Small Blue compared to Chalkhill Blue

Flight time

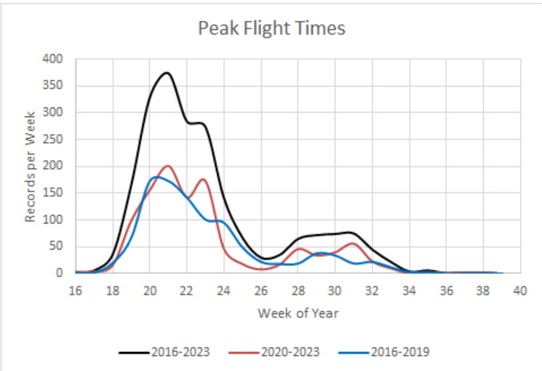

Figure 4: Small Blue peak flight times

The Small Blue is usually a twin-brooded species, as shown by **Figure *4***, in which the data has been aggregated into weeks to smooth it. The primary peak in numbers, roughly between weeks 20-24 is clearly evident. Also apparent is a much smaller second peak roughly between weeks 28-32.

By inspection of the raw data for 2023, the first sighting was May 03 and the last was September 07, with (apparently) an inter-brood lull of two weeks or so with no records between June 24 and July 08. However, extreme values (maximum and minimum) are notoriously unreliable measurements in statistics, and appearances can be deceptive; the data plotted in **Figure *4*** show the fewest sightings overall occurring in weeks 26 and 27 (the first two weeks of July).

More robust analysis of the flight time ignores the small number of extreme values at either end of a distribution, and quotes “percentiles”: the values that divide the data set up into standard fractions. Typically the 5th and 95th percentiles, written as p_{05} and p_{95}, are used.

These are the values below which 5% and 95% of the data lie, hence between them they include 90% of the data. Using week 26 as the dividing line between the two broods, the results in **Table *4*** were obtained for flight time over the last eight years.

	First brood dates				Second brood dates			
Year	**~~First~~**	**p_{05}**	**p_{95}**	**~~Last~~**	**~~First~~**	**p_{05}**	**p_{95}**	**~~Last~~**
2023	~~03-May~~	18-May	15-Jun	~~24-Jun~~	~~08-Jul~~	15-Jul	20-Aug	~~07-Sep~~
2022	~~28-Apr~~	13-May	22-Jun	~~07-Jul~~	~~10-Jul~~	15-Jul	16-Aug	~~26-Sep~~
2021	~~07-May~~	26-May	28-Jun	~~07-Jul~~	~~08-Jul~~	14-Jul	05-Sep	~~19-Sep~~
2020	~~24-Apr~~	14-May	13-Jun	~~30-Jun~~	~~07-Jul~~	11-Jul	13-Aug	~~28-Aug~~
2019	~~30-Apr~~	14-May	28-Jun	~~06-Jul~~	~~11-Jul~~	14-Jul	23-Aug	~~01-Sep~~
2018	~~22-Apr~~	15-May	25-Jun	~~06-Jul~~	~~08-Jul~~	11-Jul	21-Aug	~~04-Sep~~
2017	~~05-May~~	10-May	20-Jun	~~03-Jul~~	~~12-Jul~~	15-Jul	18-Aug	~~02-Sep~~
2016	~~07-May~~	14-May	27-Jun	~~06-Jul~~	~~09-Jul~~	11-Jul	23-Aug	~~01-Sep~~

Table 4: Small Blue flight time extremes 2016-2023

The following observations can be made:

- The first brood p_{05} and p_{95} dates both vary by about two weeks. It is clear that they do not move in synchrony, however.
- The second brood p_{05} date is very stable, varying by less than a week; however, the second brood p_{95} date varies by nearly three weeks.
- The second brood p_{95} dates are, with one late exception, in the second half of August. However, the corresponding last dates are, with one early exception, in September, and in two cases, in the second half of September. This is consistent with the species having been reported unusually late more often in recent years, and the suggestion that a *third* brood is emerging in some years.
- No evidence is apparent of a trend with time in the p_{05} or p_{95} dates of either brood.

The data can be used to calculate three measures of the flight time:

- First brood duration (first brood p_{95} – first brood p_{05})
- Inter-brood gap (second brood p_{05} – first brood p_{95})
- Second brood duration (second brood p_{95} – second brood p_{05})

These have been plotted in **Figure *5***, which suggests that the two brood durations *may* be decreasing, and that the inter-brood gap *may* be increasing … but it is far from conclusive!

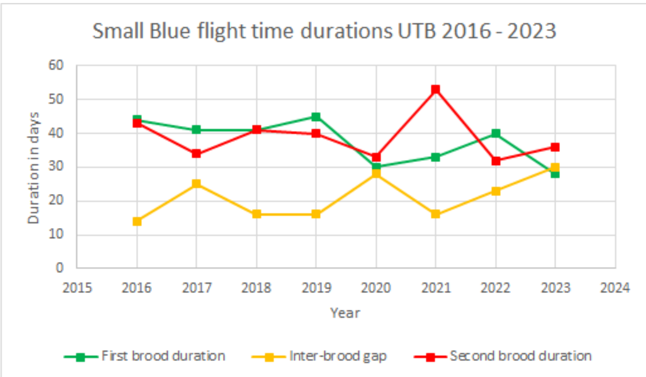

Figure 5: Small Blue flight time durations UTB 2016-2023

Overall population size (compared with recent years)

To try and get a handle on population size, we first have to decide what we are going to define as "the population". The best measure of population size we can calculate straightforwardly is the average "abundance" (reported number of adult specimens). But how to form a meaningful average? The art of good averaging is to identify a good basis: to include values that we have reason to believe should be similar to each other, while excluding the rest (which may include other groups of values that are similar to each other).

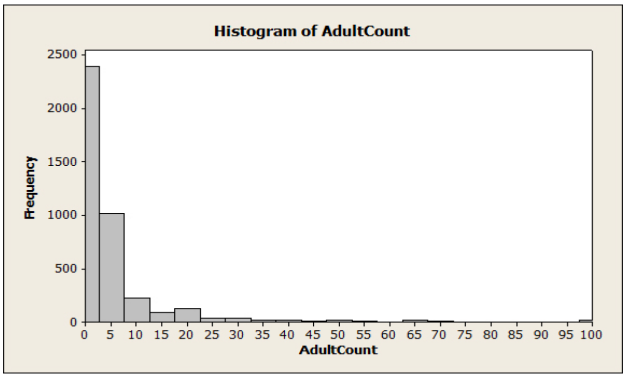

Figure 6: Small Blue adult count histogram, all records 1995-2023

The difficulty with abundance as a population measure is that the data features not only a lot of records of single specimens (approximately half of all records are of single specimens), but also a sprinkling of very high numbers. **Figure *6***, a histogram of all the adult counts, includes single records of up to 100 specimens, but the highest value in the data set is 320!

Any calculated averages based only on a few records are thus liable to be meaningless, because they are too dependent on chance. With a sufficient number of records, however, the result of the averaging becomes plausible. This is a major selling point of the newly-created ability to aggregate data over the substantial number of squares in the bigger clusters.

Apart from the Bradenham cluster, the other cluster with the most consistent data is the Pitstone cluster. These two clusters together have an average of 55 records for each year in the period being examined. (The Seven Barrows cluster has 20 records or fewer for each year from 2017-2019, and the Hagbourne cluster has fewer than 10 records for 2022 and 2023.) For both clusters, I calculated the average abundance for each year. The data are tabulated in **Table *5*** and plotted in **Figure *7***.

Cluster Name	**2023**	**2022**	**2021**	**2020**	**2019**	**2018**	**2017**	**2016**
Bradenham	10.8	3.9	2.0	3.7	5.5	5.7	3.7	13.8
Pitstone	9.6	5.0	5.2	11.6	19.7	22.6	8.9	19.8

Table 5: Small Blue average abundance 2016-2023 for the two main UTB clusters

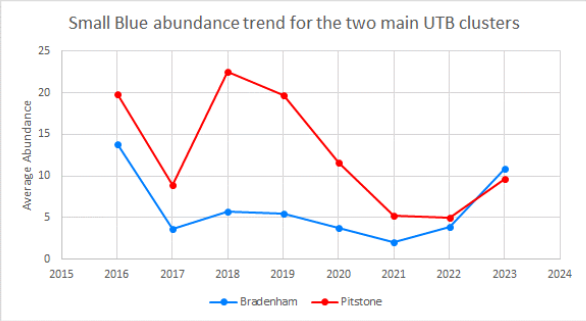

Figure 7: Small Blue abundance trend for the two main UTB clusters

Both clusters had a bumper year in 2016, followed by a population crash in 2017, and a rebound in 2018, spectacularly so for the Pitstone cluster. The provisional good news is that in both cases, the population appears to be on an upward trend again, after having declined for the previous three or four years.

The reservations about the data for the Seven Barrows cluster are relatively minor, and the cluster has an adequate number of records for five out of the eight years from 2016-2023. I haven't plotted the data in **Figure *7*** because the story is very different from Bradenham and Pitstone, and it would make for a confusing graph. The Seven Barrows cluster appears to have undergone an order of magnitude increase in abundance in 2019, and to have sustained it since, albeit at not quite the 2019 level. Here are the numbers, and a plot of them, in **Table *6*** and **Figure *8***.

Cluster Name	2023	2022	2021	2020	2019	2018	2017	2016
Seven Barrows	14.7	19.7	16.1	22.0	28.3	2.1	4.9	3.6

Table 6: Small Blue average abundance 2016-2023 for the Seven Barrows cluster

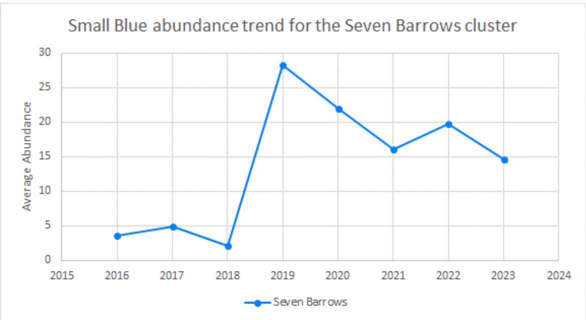

Figure 8: Small Blue abundance trend for the Seven Barrows cluster

The average abundance for the Seven Barrows cluster was at a low level, in the range one to five, for the years 2016-2018, and indeed the average abundance for the whole period 2000-2018 was only 4.5. It appears to have been a well-established and steady, if unspectacular, site. Then suddenly, something unprecedented appears to have happened!

Distribution and any changes (new sites and lost sites)

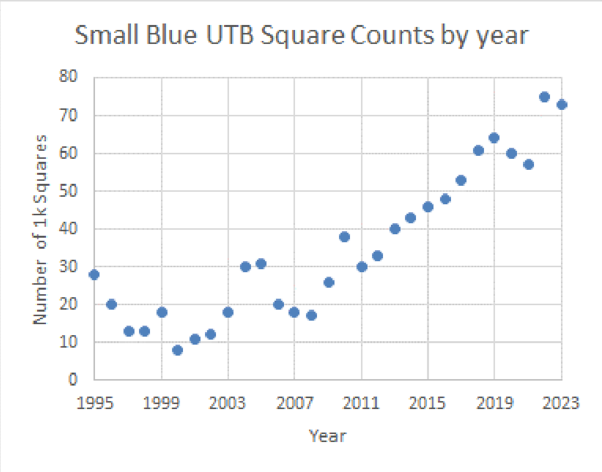

Figure 9: Number of squares in which the Small Blue has been recorded, by year

It was noted in the first section, **The data basis for the report**, that the number of records per year has been increasingly steadily from a very low baseline, and the number per year has only stabilised in the last eight years or so. Hence, record count per year is not a good indicator of how widely distributed the Small Blue is, only really of how many people have been out recording it.

Better measures of how widely distributed the Small Blue is are given by the number of 1k squares (**Figure *9***), and the number of clusters (**Figure *10***), in which the Small Blue has been recorded every year. These counts are not sensitive to increased recording effort; it doesn't matter whether one person or one hundred people recorded the Small Blue in a given square or cluster.

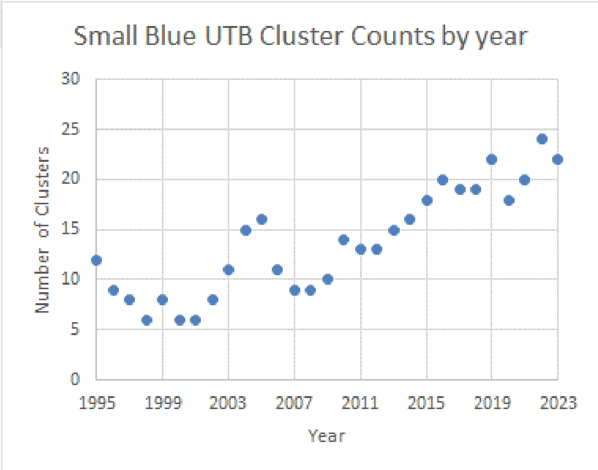

Figure 10: Number of clusters in which the Small Blue has been recorded, by year

By both these measures, the Small Blue's distribution does seem still to be extending steadily, although we now have to grapple with a new question: is it actually increasing its range, or is it only being discovered in places where it always was, but previously unknown?

Almost by definition, barring catastrophe, (and depending how new is defined to be "new" and how long ago is defined to be "lost"), new sites and lost sites are likely to be either isolated squares, or small clusters. Because the Small Blue is not heavily recorded, it is to be expected that even established sites will not necessarily have records for every year. Hence, we need to be careful when trying to identify new or lost sites. Another selling point of the ability to aggregate data across clusters is that it facilitates the hunt for new and lost sites, by smoothing out some of the noise in individual squares.

Lost sites

The most reliable way to identify lost sites seems to be to scrutinise isolated squares, and small clusters, with a reasonable number of records. We're looking for sustained plausible evidence of occupation over several years, followed by low or zero record count recently. On this basis, three clusters merit survey attention in 2024, as illustrated in **Table *7***, and I will be trying to engage the relevant 10k champs, where they exist. The Blue Lagoon cluster is in particular need of checking.

Cluster	# of 1k squares	10km square(s)	Records 2012-15	Records 2016-19	Records 2020-22	Records 2023
Cothill Pitt	6	SU49 SP40	12	12	2	0
Chinnor Pits	2	SU79 SP70	2	21	5	0
Blue Lagoon NR	2	SP83	7	8	0	0

Table 7: Potentially lost clusters for survey attention in 2024

No isolated squares offer sufficiently convincing evidence of being recently lost sites to suggest that survey effort is merited in 2024. SU3587 has six records spread over three different years, but the most recent year was 2006.

New sites

To identify new sites, we still need to be looking for small clusters or isolated squares, but with the opposite profile: sustained absence of evidence of occupation (infrequent or no records) over several years, followed by a small number of records in each of recent years. Three clusters stand out, identified in **Table *8***.

Greenfield is an interesting one. I had been under the impression that I had discovered a new site when I discovered the Small Blue in SU7191 in 2020, and confirmed its presence in 2021 and 2022, albeit only with low single figure counts. Only when preparing this report did I discover that the Greenfield cluster had actually been first identified by Karen Saxl in 2016, with a record of 60 adults from Pishill Bottom (SU7190)!

Walbury Hill is "one to watch", with records in 2022 and 2023, and no previous records:

Cluster	# of 1k squares	10km square	Records 2012-15	Records 2016-19	Records 2020-23
Medmenham	4	SU88	0	4	8
Greenfield	3	SU79	0	1	7
Walbury Hill	5	SU36	0	0	3

Table 8: Potentially new clusters for survey attention in 2024

One isolated square (SU8581, Maidenhead Thicket) has 33 records and stands out head and shoulders above the others, which all have fewer than 10 records. First identified with a single record in 2017, and confirmed with another in 2018, it has several records for each year of 2020-2023. Swains Wood (SU7932) is also “one to watch”. This is not a new site in the general sense - many of our threatened species are known to be established there - but the Small Blue was only recorded there for the first time in 2022. **Table *9*** gives the details.

Isolated Square	10k square	Records 2012-15	Records 2016-19	Records 2020-23
Maidenhead Thicket	SU88	0	2	31
Swains Wood	SU79	0	0	3

Table 9: Potentially new isolated squares for survey attention in 2024

Other sites of note

The Swyncombe Downs cluster of seven squares is clinging on. Its glory years, notably the years 2010-2016 with record count into double figures every year but one, seem to be behind it; however, only in one year of 2019-2023 has it not had from one to three records.

The Small Blue was first recorded in the Greenham Common cluster of six squares in 2000, and subsequently in all but three of the years 2001-2016. Five recordless years followed from 2017-2021, but if the species was indeed lost, it appears to have re-established itself healthily, with ten records from 2022-2023.

The first record in the eight squares making up the Nineacres cluster was in 2003. Since then, it has been an unpredictable “feast and famine” cluster, with periods of two or three years with several records, interspersed by periods of two to three years with none. So we should not be too alarmed at the absence of records for 2023.

The Small Blue was first recorded in the Uffington cluster of two squares in 2008, and in only three years in 2009-2022, and only one or two records in each case … and then five records in 2023! Apparently not a new site, but maybe one that is starting to flourish?

The Small Blue was first recorded in the Abingdon east cluster of four squares in 2011, since when it has clocked up seven records over five different years, including one in 2023. This cluster appears to be another part of UTB territory where the species is either present at low level or repeatedly trying to establish itself.

Any observations on egg laying, foodplants, larval and pupal development

A small proportion (3%) of the records in the data set relate to the immature life-cycle stages (egg, larva or pupa), typically a low single figure number of records in any given year. The number of such records was unusually high from 2017-2021, but dwindled to just one in 2022, and there were none in 2023. It would be great if members with keen eyesight could try and record the Small Blue in any immature lifecycle stages in 2024! Karen Saxl, who was Small Blue champ before me and is the single biggest contributor of UTB records of the Small Blue in its immature lifecycle stages, has added the following observations from her experience which others may find helpful:

Last year I observed a number of eggs being laid on leaves of kidney vetch rather than in the head. I did wonder if it was related to the previous dry summers and the kidney vetch going over much earlier.

I generally find it much easier to find eggs than adults - less weather dependent - and it's as much about checking connected small colonies rather than a large colony. The challenge is more getting your eye in, and spotting the most likely heads. At one location it generally isn't worth checking kidney vetch that isn't pure yellow.

Other fascinating snippets.

For a species that reputedly is unwilling or unable to fly more than a few hundred meters from its hatching place, the Small Blue has an unerring ability to appear far beyond known locations. Maybe it is unusually prone to being picked up by the wind and deposited far from home, or maybe its status as the UK's smallest species means there are still many small, localised (and possibly transient) populations to be discovered on an ongoing basis. Here are two examples I know about from 2023.

David Hastings saw a specimen in his Oxfordshire garden this year, sadly with no photograph, and in a 10k square (SP30) with no records in the previous 10 years. Butterfly Conservation Head Office challenge such reports. Maybe they will be mollified by the news that there are four SP30 records from 2010, all from the same 100m square. These four records prevented David's record from being excluded from the analysis.

Figure 11: Small Blue at SU848923 on 29-05-23

Figure *11* shows the specimen I saw on my local patch, Desborough Local Nature Reserve (SU848923) on 29 May, never recorded there before, but the square in question is now included in the sprawling Bradenham cluster. The nearest known site is Sands Bank in the diagonally adjacent square SU8393, and hence of the order of 1km distant.

Appendix

Table 10: Summary table of Small Blue UTB clusters

Index	Name	Key Words	1k Square N	Record N	First Record	Last Record
1	Bradenham	Bradenham, Small Dean Lane Bank, Buttlers Hangings and wider environs	37	715	1995	2023
2	Pitstone	Pitstone Quarry, College Lake, Incombe Hole	16	612	1995	2023
3	Seven Barrows	Crog Hill, Seven Barrows, Sheepdrove Farm, Devil's Punchbowl, Hackpen Hill, Pigtrough Bottom	20	555	1995	2023
4	Hagbourne	Hagbourne Cemetery & Ramps, Aston Upthorpe, Blewbury, Chilton Cutting and environs	22	467	1995	2023
5	Lardon Chase	Lardon Chase, Hartslock NR and environs	10	272	1995	2023
6	Swyncombe Downs	Swyncombe Downs	7	265	1995	2023
7	Holtspur Bottom	Holtspur Bottom	5	215	1995	2023
8	Watts Bank	Watts Bank, Lambourn Woodlands and environs	4	134	2002	2023
9	Greenham Common	Greenham Common, Crookham Pools	6	65	2000	2023
10	Stonepit Field	Stonepit Field	2	39	2012	2023
11	Nineacres	Nineacres, Frieth, Shillingridge Wood and Copy Green	6	38	2003	2022
12	Crong	Dancers End, Crong, Aston Clinton Ragpits	4	34	2004	2023
13	Cothill Pitt	Cothill Pitt, Dry Sandford Pit	6	33	1995	2022
14	Chinnor Pits	Chinnor Pits, Oakley Hill	2	30	2009	2022
15	Drayton Beauchamp	Wendover Arm Drayton Beauchamp, A41 layby Tring bypass	2	30	2013	2023
16	Aston Rowant NNR	Aston Rowant, Shirburn Hill	5	26	1995	2023
17	Blue Lagoon NR	Blue Lagoon NR, Bletchley	2	19	1998	2019
18	Wallingford & Ewelme	Wallingford Castle Meadows, Ewelme Watercress Beds & environs	7	15	1999	2023
19	Burnham Beeches	Burnham Beeches	4	13	1995	2013

20	Medmenham	Homefield Wood, Kings Barn Farm, Medmenham	4	13	2006	2023
21	Fritwell	Fritwell, Ardley Quarry, Portway Farm	4	12	1998	2009
22	Southcote	Southcote to South West (odd location!)	2	12	2004	2008
23	Uffington	White Horse Hill, Uffington	2	11	2008	2023
24	North Stoke	Cholsey, North Stoke	3	10	2013	2023
25	Cliveden	Cliveden	3	9	2017	2023
26	Greenfield	Greenfield Wood & environs	3	8	2016	2022
27	Abingdon east	Barton Fields, Radley	4	7	2011	2023
28	Fognam Pit	Fognam Pit	2	7	2011	2015
29	Sydlings Copse	Sydlings Copse	2	7	1995	2003
30	Odstone Hill	Odstone Hill	2	7	1996	2021
31	Bernwood Meadows	Bernwood Meadows	3	5	2005	2017
32	Walbury Hill	Walbury Hill	3	5	1998	2023
33	Fawley	Fawley, Woolley Down	2	4	2007	2010
34	Bacombe Hill	Bacombe Hill, Coombe Hill	2	4	2010	2022
35	Rowdown Farm	Rowdown Farm	2	4	2012	2015
36	Chieveley	Chieveley	3	3	2016	2020
37	Great Kingshill	Great Kingshill	3	3	2018	2023
38	Farnborough	Farnborough	2	3	1995	2018
39	Gomms Wood	Gomms Wood, Gomm Valley	2	3	2004	2011
40	Lambourn	Lambourn to East	2	3	2004	2018
41	South Stoke	South Stoke	2	3	2019	2022
42	Chesham Bois	Chesham Bois	2	2	1996	2018
43	Calvert Jubilee	Calvert Jubilee	2	2	2019	2019
44	Lodge Lake	Crownhill, Lodge Lake, Loughton	2	2	2019	2023

Table 11: Summary table of Small Blue UTB isolated squares

Index	Name	Key Words	1k ID	Record N	First Record	Last Record
1	Maidenhead Thicket	Maidenhead Thicket, Pinkneys Green	SU8581	33	2017	2023
2	Eastmanton Farm	Eastmanton Farm	SU3587	6	1998	2006
3	Howe Park Wood	Howe Park Wood	SP8334	6	2023	2023
4	Astwood	Astwood	SP9447	5	2018	2022
5	Brize Norton	Brize Norton	SP3006	4	2010	2010
6	Swains Wood	Swains Wood	SU7392	3	2022	2023
7	Flackwell Heath	Flackwell Heath	SU8989	3	2022	2022
8	Whitecross Green Wood	Whitecross Green Wood	SP6014	2	2001	2022
9	Watermead	Watermead	SP8215	2	2014	2023
10	Warburg	Warburg	SU7188	2	2020	2023
11	Lodge Down	Farncombe, Lodge Down	SU3077	2	2019	2020
12	Little Wittenham	Little Wittenham, Hill Farm	SU5692	2	2014	2015
13	Sydenham	Sydenham	SP7201	2	2006	2006
14	Kidmore End	Kidmore End	SU6979	2	1999	1999

Table 12: Summary table of Small Blue UTB one-off squares

Index	Name	1k ID	Record From
1	Chalfont St Giles to west	SU9793	2023
2	Floodplain Forest - S2	SP8042	2023
3	Shotover	SP5605	2023
4	Lower Hartwell to north-east	SP8013	2023
5	Aston	SP3303	2023
6	Cheddington	SP9117	2023
7	Road Farm	SP8802	2022
8	Hughendon manor	SU8695	2022
9	Grove Business Park	SU3889	2022
10	Pangbourne	SU6476	2022
11	Bottom Wood	SU7595	2021
12	Chisbridge Farm	SU8088	2021
13	Willen	SP8740	2021
14	Monks Risborough	SP8004	2020
15	Hampstead Norreys	SU5375	2020
16	North Leigh	SP3812	2019
17	Elfield Nature Park	SP8536	2019
18	Bushy Bank	SU5891	2019
19	New Headington	SP5406	2019

20	Seer Wood	SU8597	2019
21	Amersham	SU9596	2019
22	Worsham	SP3011	2019
23	Scours Lane Allotments	SU6874	2018
24	Ashridge	SP9912	2018
25	Blackthorn	SP6219	2018
26	Braziers Common	SU6583	2018
27	Woodside	SU4770	2018
28	Harley Hill Wood	SU5977	2018
29	Segsbury/Letcombe Castle	SU3884	2017
30	Fawley Court Farm/Remenham	SU7684	2017
31	Chilton-Didcot railway embankment	SU5291	2015
32	Little Boys Heath	SU9098	2015
33	Fence Lane	SU5171	2015
34	Marston Meadows	SP5107	2015
35	Fordwells Bank	SP3014	2013
36	Ellesborough	SP8307	2013
37	Wolvercote Common	SP4909	2013
38	Bishopstone to east	SP8110	2012
39	Southend	SU7589	2010
40	Little Baldon farm to north	SU5698	2010
41	Thames Path north of Ten Acre Copse	SP4509	2010
42	Warren Bank BBOWT	SU6585	2009
43	Watlington Hill	SU7093	2005
44	Wheeler End	SP6517	2004
45	Edgcott	SP6822	1999
46	Westcott	SP6916	1996
47	Bulstrode	SU9888	1995
48	Hampstead Norreys	SU5175	1995
49	Wellhouse, Hermitage	SU5273	1995