

Addingham Environment Group



Bumblebee and Butterfly Observations - 2019 Season Report

Malcolm Secrett and Rick Battarbee



*Tree bee on purple toadflax,
Transect 6, Zone A (Jessica Penrose)*



*Ringlet on Bramble,
Transect 3, Zone C (Diane Morris)*

Contents

1. Executive summary.....	2
2. Introduction.....	2
3. Methods	3
4. Transect summary analysis and reports.....	4
5. Plans for 2020.....	8
6. Acknowledgements	9
Appendix 1 – Bumblebee recording sheet	10
Appendix 2 – Butterfly recording sheet	11
Appendix 3 – Transect maps	12
Appendix 4 - Detailed numerical analysis	20

1. Executive summary

- A recording scheme for bumblebees and butterflies in Addingham was set up in the summer of 2019 with the help of external advisers.
- Eight transects, each taking between 30 minutes and 1 hour to walk, have been established within the village. The routes were designed to pass through the main wildflower rich habitats in the village including the new wildflower sites being created by the Environment Group.
- Following training in species identification, volunteers conducted between three and twelve walks along the transects during the 2019 recording season, which started rather late on 1st July. (The 2020 season will start on 1st April.)
- Five species of bumblebee and eleven species of butterfly were recorded. The most common bumblebees were the white-tailed, the buff-tailed and the tree bee, and the most common butterflies were the large white, the ringlet and the meadow brown.
- The richest transects for both bumblebees and butterflies were Transects 3 (especially zone C, the Old First School) and 6 (especially zone F, Newtown Allotment).
- Learning from the experience of 2019 modifications will be made to the routes of Transect 4 (to include sites within the Primary School grounds) and Transect 5 (to include Crossbank Road) and two new transects (Skipton Road Bank/Golf Course and The Street) will be established. A pollinator survey protocol for village gardens will also be developed.

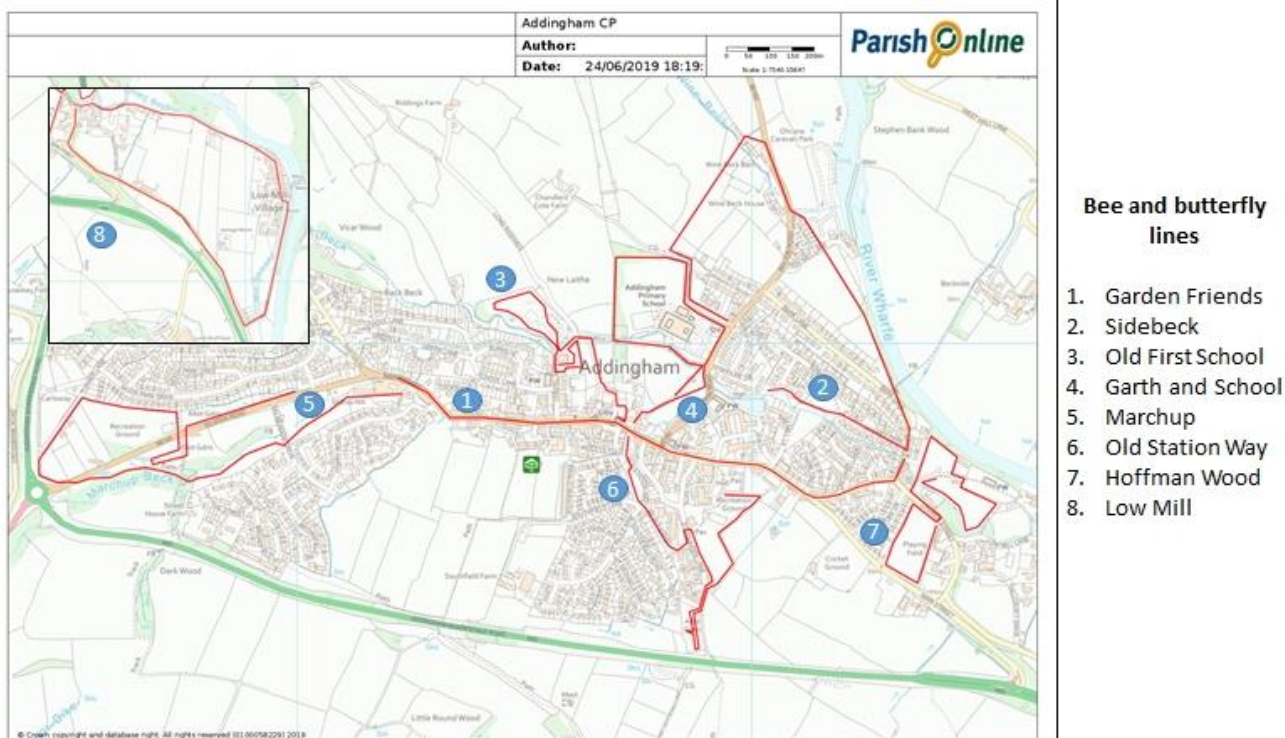
2. Introduction

The Addingham Environment Group, set up by the Civic Society in April 2016, is a 200-strong group of villagers committed to protecting the natural environment of the village and surrounding countryside.

One of the principal aims of the Group is to record village wildlife populations. The Group began recording birds and butterflies in 2017. In May 2019 following discussions with experienced bee recorder Maurice White and a successful volunteer recruitment drive we started a joint bumblebee and – with the assistance of expert Diane Morris – butterfly recording scheme.

Having established a number of small wildflower sites within our village Green Spaces our recording scheme was designed not only to document the abundance and composition of bees and butterflies in the village but also to assess the effectiveness of our wildflower projects in attracting pollinators.

This is our first report. It describes the fixed routes (transects) through the village taken by volunteers in conducting their regular surveys and the results from our first season of observations. It also considers plans for 2020 and how the scheme might be improved.



Map of the 2019 transects

3. Methods

Volunteer training for bumblebee recording was provided by Catherine Mercer from the Yorkshire Dales Millennium Trust and Maurice White. Training involved classroom sessions on bumblebee life-cycles, an introduction to the identification of common bumblebee species and a walk to demonstrate field survey techniques.

Diane Morris provided guidance on butterfly identification.

Each transect was divided into zones by its own observer, each division representing a change of habitat.



Maurice White and Gill Battarbee

Observers were provided with proforma forms on which to record their sightings, see [Appendix 1 – Bumblebee recording sheet](#) and [Appendix 2 – Butterfly recording sheet](#).

Observers were invited to walk their transect once a week if they could, and all were walked several times.

A simple online spreadsheet mirroring the record forms was used, one for each transect, on which observations could be entered. Observers without online access handed their printed forms to the recording co-ordinator for data entry. Numerical analysis was carried out in Excel.

4. Transect summary analysis and reports

A summary analysis by transect and zone follows, and each summary has a link to its transect map at [Appendix 3](#). More detailed analysis by transect and zone is at [Appendix 4 - Detailed numerical analysis](#).

Transect 1

Transect 1 has not yet been adopted. It connects the series of small pocket gardens that run along the Main St. that are managed by Addingham Garden Friends.

It is expected that bee and butterfly recording will take place at these sites beginning in 2020.

Transect 2 ([See map in Appendix 3](#))

Observer - Julia Tomlinson

Species observed by zone:

Transect: 2		Zones				
Bees	Total	A	B	C	D	E
Buff-tailed	1		1			
Common carder	1		1			
Tree	2	2				
Red-tailed	15	15				
White/Buff-tailed	19	13	6			
Total	38	30	8			

Transect 2 starts on Side Beck. Zone A is a stretch of wild flowers sown in 2019 by the builders of the new Side Beck housing estate. The majority of the Transect 2 bees (30 in total) were recorded in this zone and were mostly Red-tailed and White/Buff tailed.

Zone B includes cultivated gardens along Wharfe Park and the end of Bark Lane and the Dalesway path above the river up to High Mill. Lavender in some of the gardens attracted bees, eight were recorded, six of which were White/Buff tailed. No bees were recorded along the path above the river possibly because of its tree cover and lack of wildflowers.

Zone C from High Mill to Winebeck is mostly short grass on road verges, no bees were recorded.

No bees were recorded in Zone D from Winebeck to the Primary School which is short pasture grassland, and no bees were recorded in Zone E along the school perimeter up to Bolton road. This zone is a rubble path with some shrubs including blackberries.

In 2020 Zone B will be divided into two to separate the road-side garden stretch from the wood/river path. Butterflies as well as bees will be counted.

Transect 3 ([See map in Appendix 3](#))

Observer: Peter Miller

Species observed by zone:

Transect: 3		Zones				
Bees	Total	A	B	C	D	E
Red-tailed	1	1				
Buff-tailed	3		1	1	1	
White/Buff-tailed	6	2		4		
Total	10	3	1	5	1	

Transect: 3		Zones				
Butterflies	Total	A	B	C	D	E
Small Skipper	1			1		
Large White	7			7		
Meadow Brown	28	1		25		2
Ringlet	35			35		
Total	71	1		68		2

Transect 3 is divided into five zones. The first (A) starts where Sugar Hill joins Main Street. The grassed area here includes a section of old railway embankment. B follows the Sugar Hill roadway to join Back Beck Lane and then turns left to enter the Old First School site. This is zone C. It includes an area to the north designated as a Local Green Space, valued for its biodiversity. Zone D is along Chapel Street until the entrance of the Methodist Church graveyard (Zone E). A part of this area, mainly along the eastern wall, has been set aside to promote wildflower populations.

The Old First School site was by far the zone most favoured by butterflies. Some Bumblebees were recorded in all zones except Zone E.

Four butterfly species were seen on the Old School site (Zone C) with large numbers of Ringlets and Meadow Brown. It is possible that the presence of tall grasses and brambles present suit these two species. Part of Zone A has a sunny grass bank where two species of bumblebee were recorded. This bank could be made more attractive to pollinators if more native plants were present. The Methodist Church graveyard (Zone E) recorded two Meadow Brown butterflies and no Bumblebees. If more wildflowers can be established in the graveyard as a result of current AEG planting an increased number of pollinators can be expected over time.

Transect 4 ([See map in Appendix 3](#))

Observer – Malcolm Secrett

Species observed by zone:

Transect: 4		Zones						
Bees	Total	A	B	C	D	E	F	G
White-tailed	1					1		
Unknown	3					2		1
Total	4					3		1

Transect: 4		Zones						
Butterflies	Total	A	B	C	D	E	F	G
Comma	1							1
Red Admiral	1			1				
Small Tortoiseshel	1							1
Speckled Wood	3				2			1
Small White	7	2	3				1	1
Unidentified	8		3		3	2		
Total	21	2	6	1	5	3	4	

Transect 4 starts at the Main Street end of Manor Garth, runs alongside Town Beck, in front of and then around the school perimeter on the public footpath to Bridge 55 then down Back Beck Lane into the track across Manor Garth. It is divided into seven zones A – G at the points between the main habitat types.

None of the zones has many plants to attract pollinators, and the counts were very low. In nine bee walks only four bumblebees were seen. However, there were more butterflies with 21 seen in eight walks.

The most prominent identified butterflies were Small Whites in zones A, B, E and F.

There is clearly an opportunity to improve the habitat for both bees and butterflies along Transect 4.

The route of the transect will be modified in 2020 to include zones within the school's grounds. Of special interest will be the response of pollinators to plans to leave the margins of the school playing field uncut and the response of butterflies to the shrubs already planted in the north-east corner of the field.

Transect 5 ([See map in Appendix 3](#))

Observer: Alison Dixon

Species observed by zone:

Transect: 5	Zones							
Bees	Total	A	B	C	D	E	F	G
Tree	1			1				
Buff-tailed	13			2		5	1	5
White-tailed	34	2		5	1	1	21	4
Total	48	2		8	1	6	22	9

Transect 5 starts at Townhead Mill beside Marchup Beck, it goes up to the Daniel Palmer Nature Reserve across to the top of Turner Lane, through the Silsden Road Recreation Ground and down through the allotments on Silsden Road. It is divided into 6 zones. No bees were observed in Zone B and only one in Zone D. The greatest number of bees were recorded in the allotments (Zones F and G). These were mainly white and buff-tailed bees.

In 2020 butterflies will be added to the survey and the route will be modified to include Crossbeck Road to include more varied habitats.

Transect 6 ([See map in Appendix 3](#))

Observer: Jessica Penrose

Species observed by zone:

Transect: 6	Zones								
Bees	Total	A	B	C	D	E	F	G	H
Red-tailed	2		2						
Unknown	2	2							
Buff-tailed	5						5		
Common carder	9	6					3		
Tree	25	12	5	3	4	1			
White/Buff-tailed	26	10	3	6			7		
White-tailed	30	9	5	6	4		6		
Total	99	39	15	15	8	1	21		

Transect: 6	Zones								
Butterflies	Total	A	B	C	D	E	F	G	H
Meadow Brown	1		1						
Red Admiral	4						2	1	1
Painted Lady	5		4		1				
Small Tortoiseshel	6		1		1		4		
Peacock	7		6				1		
Speckled Wood	8	1					2		5
Unidentified	10		1		5	2	2		
Ringlet	13			3	7	2	1		
Large White	63	4	6	7	7	8	28	3	
Total	117	5	19	10	21	12	40	4	6

Transect 6 starts at the bottom of Old Station Way (Zone A), goes up past the AEG wildflower area (Zone B), then across on to Mount Pleasant (Zone C). It follows Mt Pleasant all the way around the corner, then doubles back a little to enter the football field (Zone D). It goes along the western edge of the field including the AEG wildflower bank and through a pathway at the back (Zone E) to join the top of Stockinger Lane. From there it goes into and around Newtown Allotments (Zone F), doubles back to the field, down the eastern edge of the field (Zone G), dropping behind the MUGA down into the bottom corner of the Memorial Hall Recreation Ground (Zone H), through the AEG wildflower triangle.

There were several hotspots with flowering plants – at the very beginning of the walk, in Zone A, a stand of purple toadflax always had lots of bees on it, and a hedge at the beginning of Zone B had bramble (popular with bees) and buddleia (popular with butterflies). The wildflower area in Zone B didn't have many sightings, but that may have been because the walks didn't start till after mid-summer, so there was only the remains of clover and little else. Mt Pleasant had a long, well-established bank of bramble which afforded many sightings, but unfortunately this has now been completely cleared. Zone D had dandelions and meadowsweet, and most of the sightings in Zone F were in one area of the allotments where there was a large bed of borage, and some cultivated flowers and shrubs (such as hebe and sea holly).

Zone A had the greatest number of sightings of bees, mainly Tree and White/Buff-tailed, which were almost entirely on the toadflax, with few butterfly sightings. Zone B and C had the same number of bee sightings (15 in each), mainly White-tailed. Zone B had good numbers of Peacock, Painted Lady and Large White butterflies, mostly found on the buddleia. Most of the butterfly numbers for B, C, D and E were Large White, which were usually in flight. Zone F was particularly rich in flying Large White, presumably because of all the vegetable patches on the allotments. Zones G and H were both low in sightings (and in flowering plants), even in the wildflower area, but again this might have been because of it being late summer.

Transect 7 ([See map in Appendix 3](#))

Observer: Margaret Longden

Species observed by zone:

Transect: 7		Zones						
Bees	Total	A	B	C	D	E	F	G
Unknown	1				1			
Red-tailed	2				2			
Tree	5	1	1				2	1
White/Buff-tailed	10	3			7			
Total	18	4	1		10		2	1

Transect: 7		Zones						
Butterflies	Total	A	B	C	D	E	F	G
Ringlet	1				1			
Unidentified	1	1						
Meadow Brown	2	2						
Small White	2				1			1
Speckled Wood	2	1		1				
Painted Lady	4				4			
Red Admiral	6	4	2					
Peacock	7	2			3		2	
Large White	23	16	1		4		2	
Total	48	26	3	1	13		4	1

This transect starts at the entrance to the Church Field and follows the entire perimeter of the field, a short section of Church Street crossing over to the Hoffman Wood Field, and again follows the entire perimeter of this field.

The great majority of sightings of both bees and butterflies were in sections of the Church Field, and in particular in the two sections where the gardens of houses adjoined the field (A and D). Some good patches of brambles were also helpful.

The Hoffman Wood Field has little to offer to pollinators at present, and the few sightings there were occurred generally on plants in the domestic gardens bordering the field (F). AEG has now started introducing wildflowers along the margins of the field. It will be interesting to see whether this initiative and the hedge planting in November 2019 along the south-western border of the field will increase sightings in future.

Transect 8 ([See map in Appendix 3](#))

Observer: Mark Penny

Species observed by zone:

Transect: 8		Zones						
Bees	Total	A	B	C	D	E	F	G
Red-tailed	1			1				
Tree	1		1					
Buff-tailed	2			2				
White/Buff-tailed	8	2		5		1		
White-tailed	9			6	2	1		
Total	21	2	1	14	2	2		

Transect 8 starts at the end of Low Mill Lane next to the field at St. Peters Church and continues past the Rectory, through Low Mill Village, along Old Lane and back along Ilkley Road to form a circular route totalling just over two kilometres. It is divided into seven zones A – G of approximately equal length at points of microhabitat change, although some contiguous zones such as along Low Mill Lane and Ilkley Road were found to be relatively uniform so that it may be ideal to merge these zones for future monitoring.

Total bee counts were very low, with white- and buff-tailed bumblebees being the most frequently observed. There generally appeared to be relatively few suitable host plants on this transect, especially along Low Mill Lane and Ilkley Road where there were considerable unvegetated stretches. The verges along Old Lane were also cut by the council in late July, which may have had further implications for habitat suitability. Common host plants included brambles, alongside cultivated mint and lavender outside the houses in the village.

5. Plans for 2020

Following a review meeting of all observers on the 28th November 2019 the following plans for 2020 were agreed:

- The 2020 season will start on 1st April, running until 30th September for bumblebees and 31st October for butterflies.
- The processes for recording and analysing observations will be the same as for 2019.
- Transect 1, which was not walked during 2019, will be divided up into zones corresponding to the individual Garden Friends plots.
- Transect 4 will be modified to include a route within the school grounds.
- Transect 5 will be modified to include a route along Crossbank Road and Moor Lane.
- For Transect 8 the Low Mill field by the R. Wharfe will be included.

- A new Transect 9 will be added incorporating the Skipton Road wildflower site and the golf club.
- A new Transect 10 based on The Street will be added.
- Consideration will be given to introducing a gardens-based project.

Training and guidance

Although observers gained confidence in their identification skills during the year the need for further training and help was noted. Maurice White offered to walk each transect with observers to provide bee ID guidance and Diane Morris agreed to provide butterfly ID guidance. The importance of identifying the flowers used by pollinators was also recognised, and Mark Penny offered to provide wildflower ID training during spring and early summer 2020.

Recruitment of observers

All of the 2019 observers have kindly offered to continue walking their transects in 2020, and new volunteers Maire O'Donnell, Sara Arrowsmith, Claire Godden and Pam Wells have also offered to help with existing and new transects. Our thanks to everyone. If necessary, we will conduct a further recruitment at the 2020 Environment Weekend (16/17th May) focussing especially on the proposed new Garden project.

6. Acknowledgements

The support and guidance of the following people is gratefully acknowledged:

- Maurice White – AEG bee advisor.
- Diane Morris – AEG butterfly advisor.
- Nicky Vernon – AEG flower advisor.
- Catherine Mercer – Yorkshire Dales Millennium Trust, 'Bee Together' project.

Appendix 1 – Bumblebee recording sheet

AEG Bumblebee Recording Sheet

Recorder(s)		Date	
Transect No.		Start time	:
Temp (°c)		Finish time	:
Average wind speed (0-6)	0 smoke rises vertically; 1 slight smoke drift; 2 wind felt on face; 3 leaves in slight motion; 4 dust raised & small branches move; 5 small trees in leaf sway; 6 large branches move & trees sway		
Weather conditions	Sunny	Sunny/Cloudy	Cloudy

Note: To begin with you may find bumblebee identification tricky, however all recordings are valuable so please enter any unidentified species as **‘bumblebee unknown’**.

Zone	Species*	Caste** (M/Q/W/U)	No. seen	Flower	Comments

* To begin with you may find bumblebee identification tricky, however all recordings are valuable so please enter any unidentified species as ‘Unknown’. Unless you get a definite ID, record two banded white tails as White / Buff tailed.

** Caste – (Male, Queen, Worker, Unknown)

Appendix 2 – Butterfly recording sheet

AEG Butterfly Recording Sheet

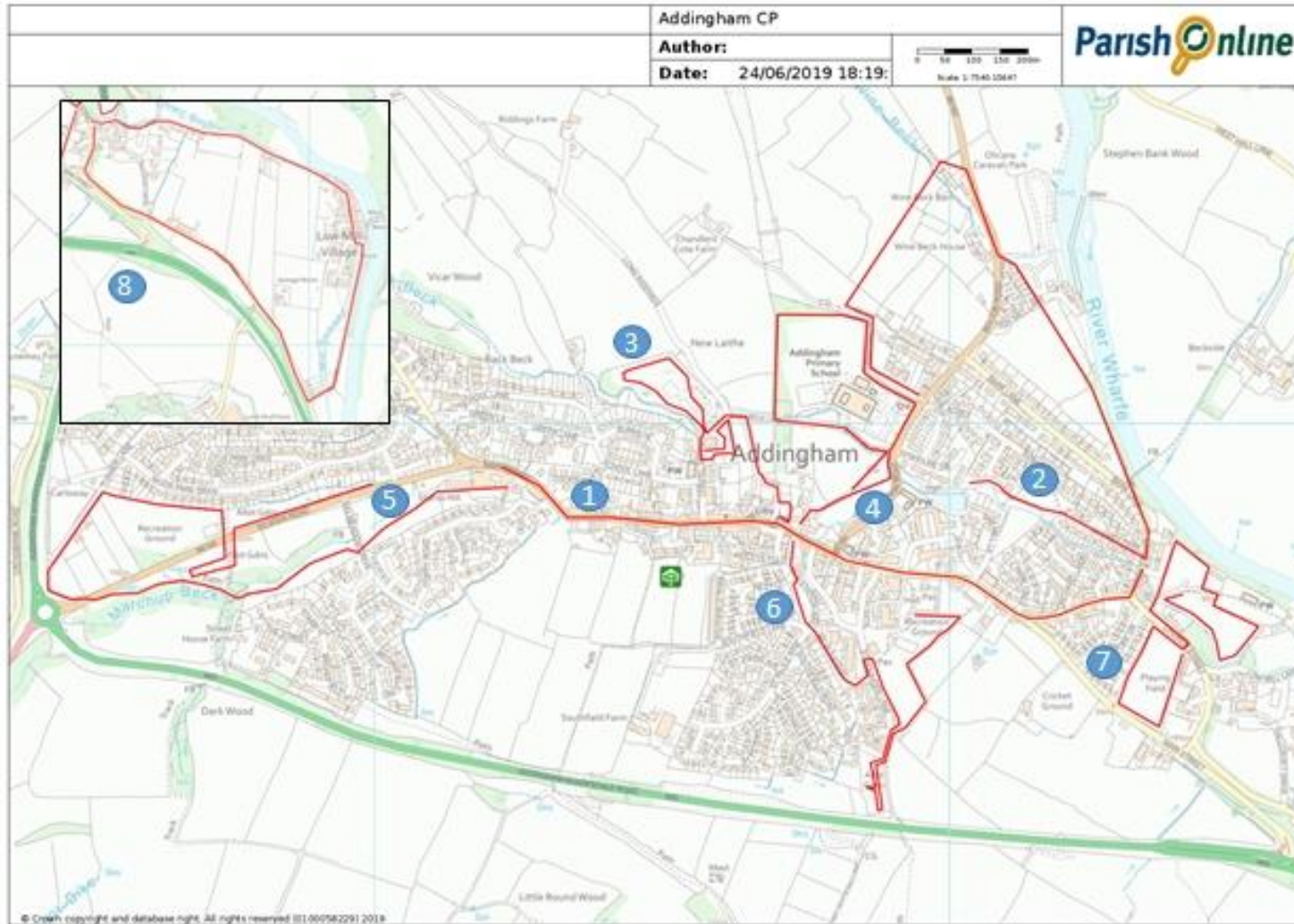
Recorder(s)		Date	
Transect No.		Start time	:
Temp (°c)		Finish time	:
Average wind speed (0-6)	0 smoke rises vertically; 1 slight smoke drift; 2 wind felt on face; 3 leaves in slight motion; 4 dust raised & small branches move; 5 small trees in leaf sway; 6 large branches move & trees sway		
Weather conditions	Sunny	Sunny/Cloudy	Cloudy

Zone	Species*	No. seen	Flower	Comments

* Only enter species name if you are certain you have identified it correctly

Appendix 3 – Transect maps

Map of transects created for the 2019 season, of which Transects 2 - 8 were walked.

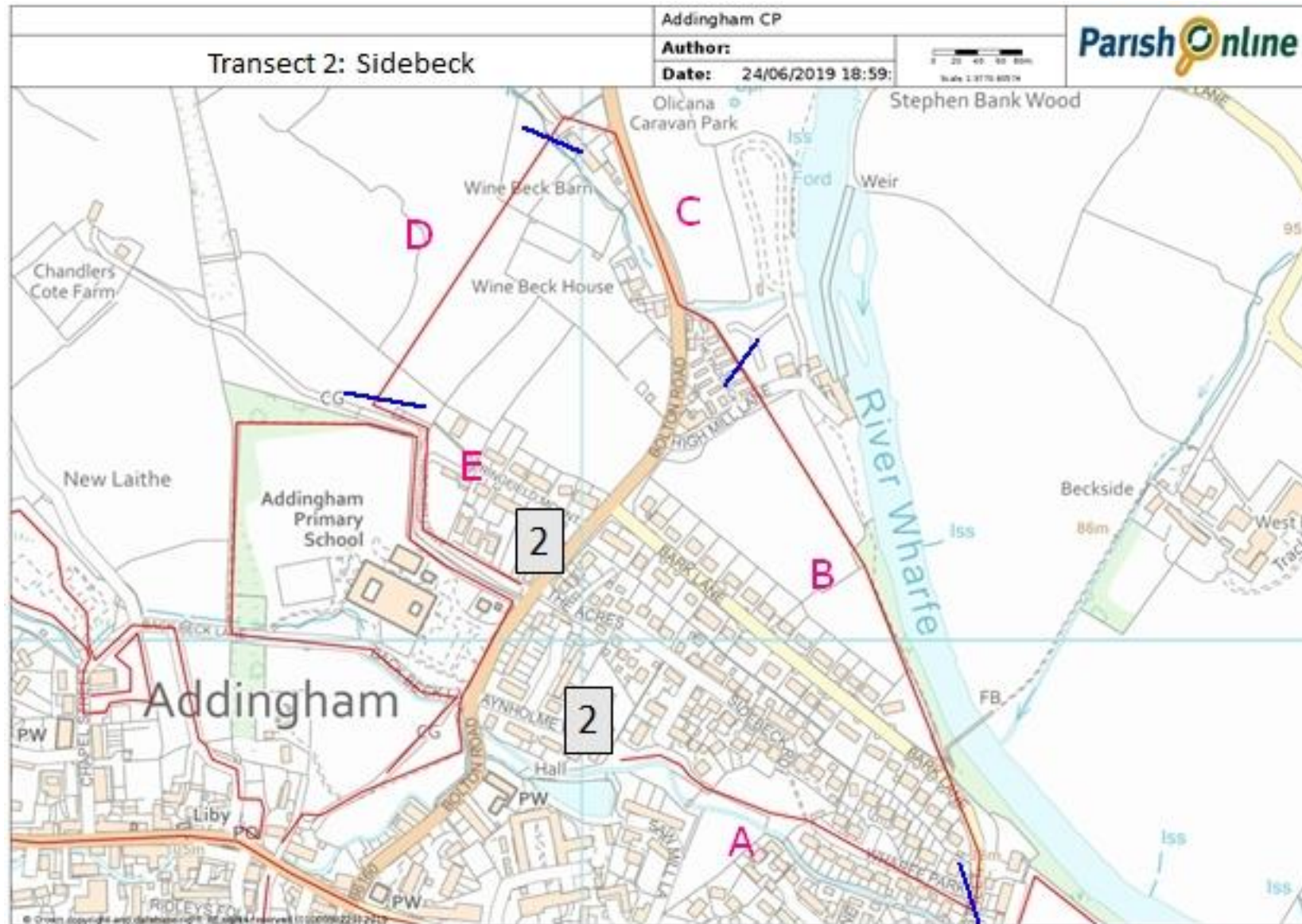


Bee and butterfly lines

1. Garden Friends
2. Sidebeck
3. Old First School
4. Garth and School
5. Marchup
6. Old Station Way
7. Hoffman Wood
8. Low Mill

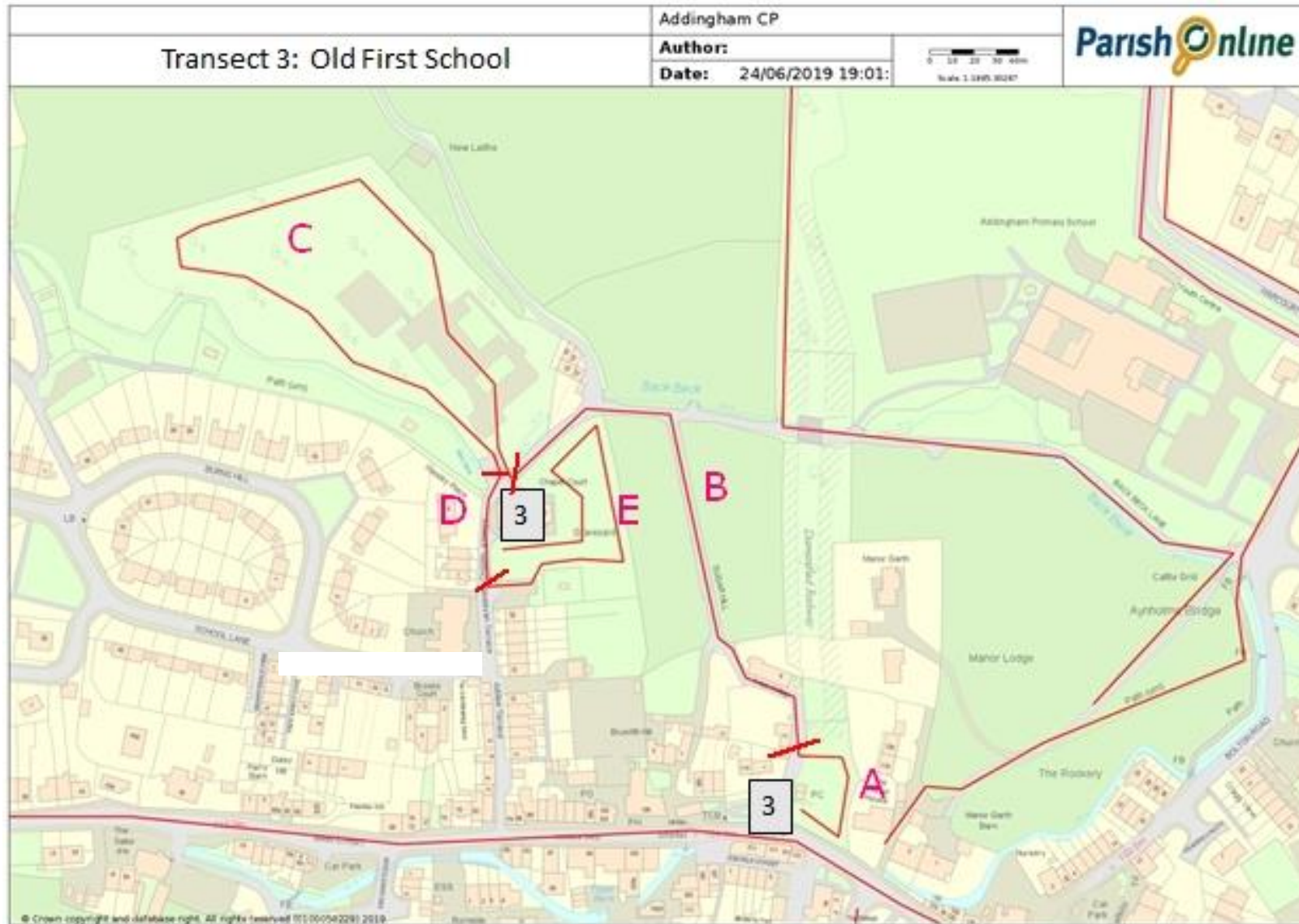
Transect 2

[Return to transect summary](#)



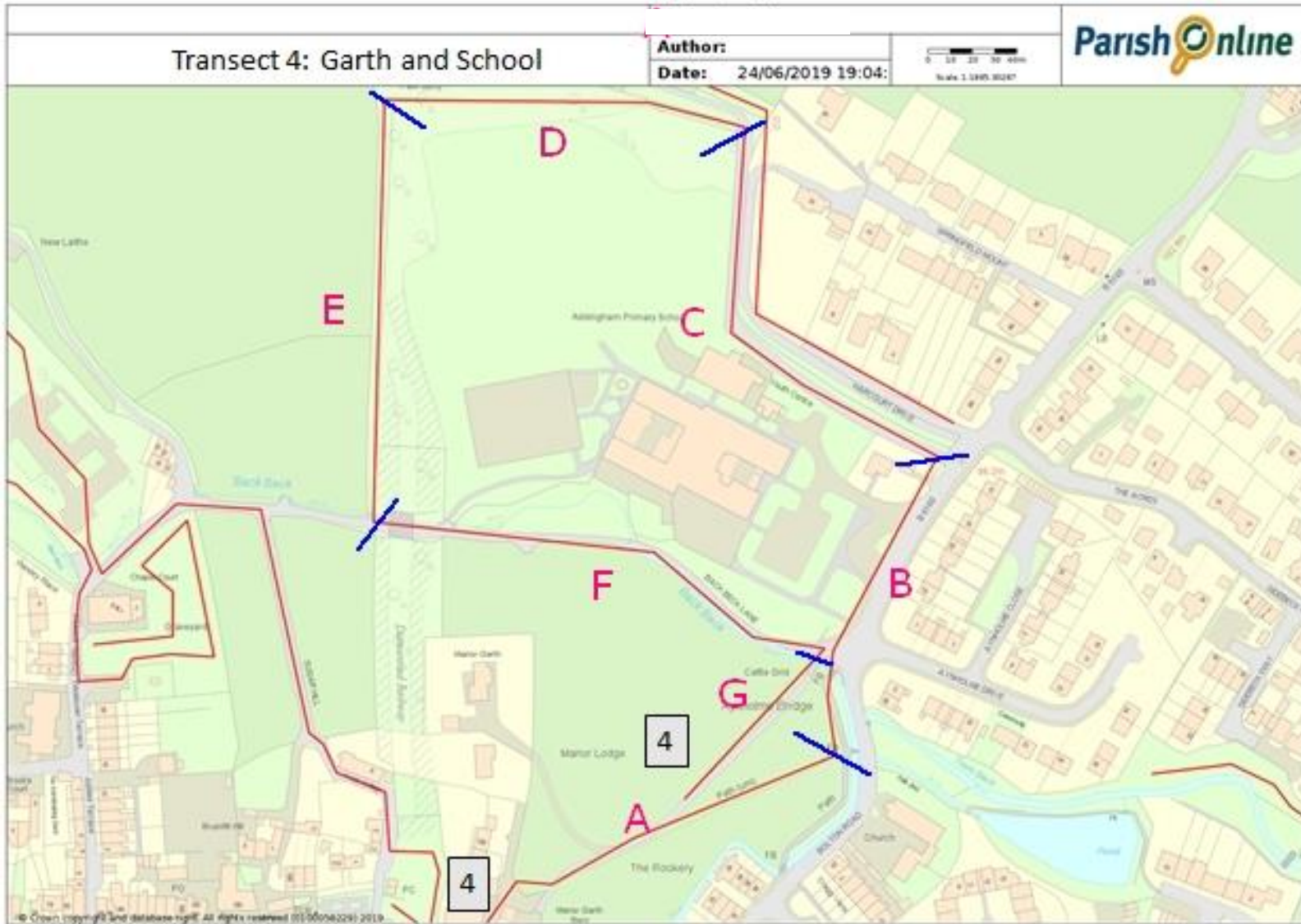
Transect 3

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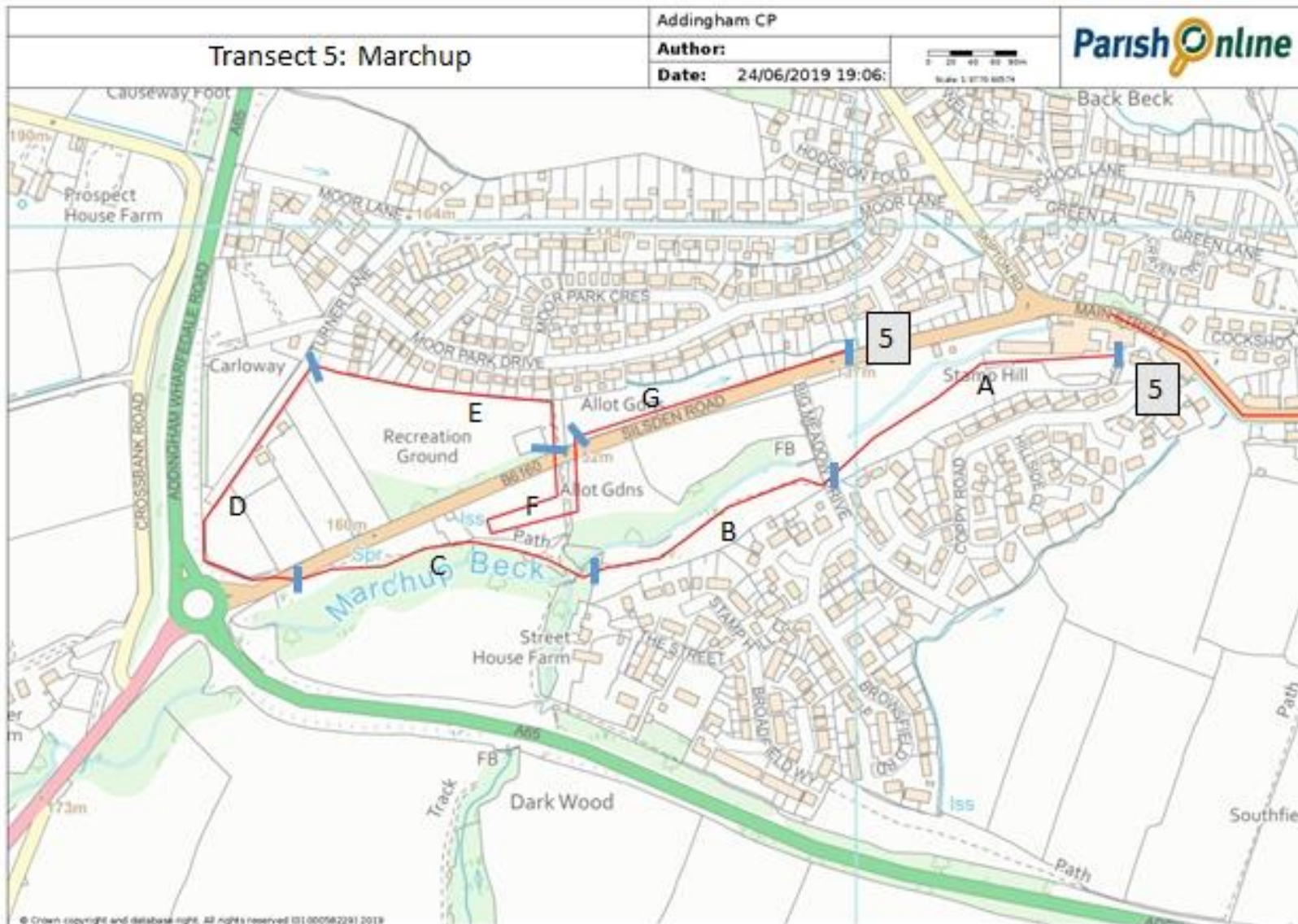
Transect 4

[Return to transect summary](#)



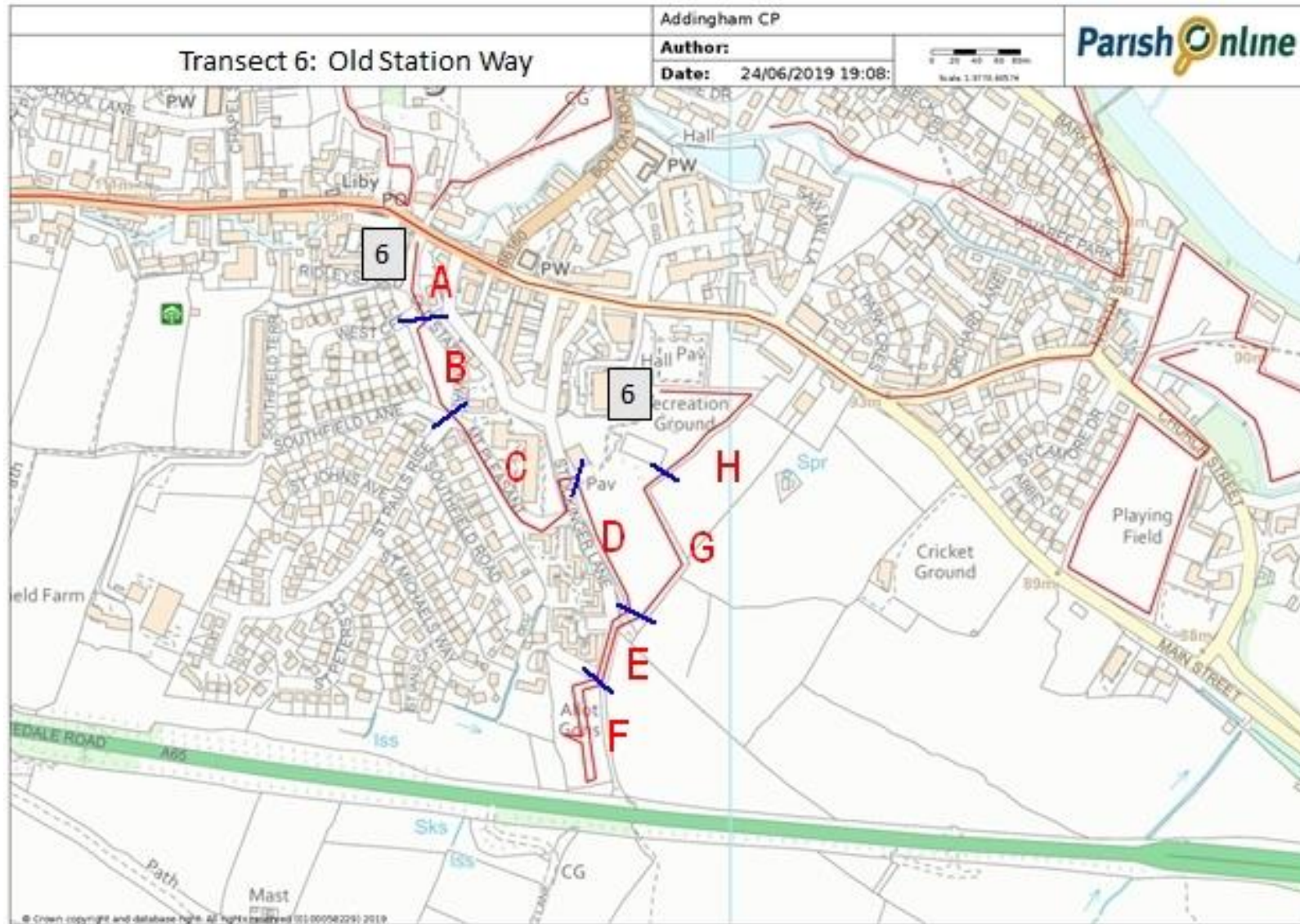
Transect 5

[Return to transect summary](#)



Transect 6

[Return to transect summary](#)



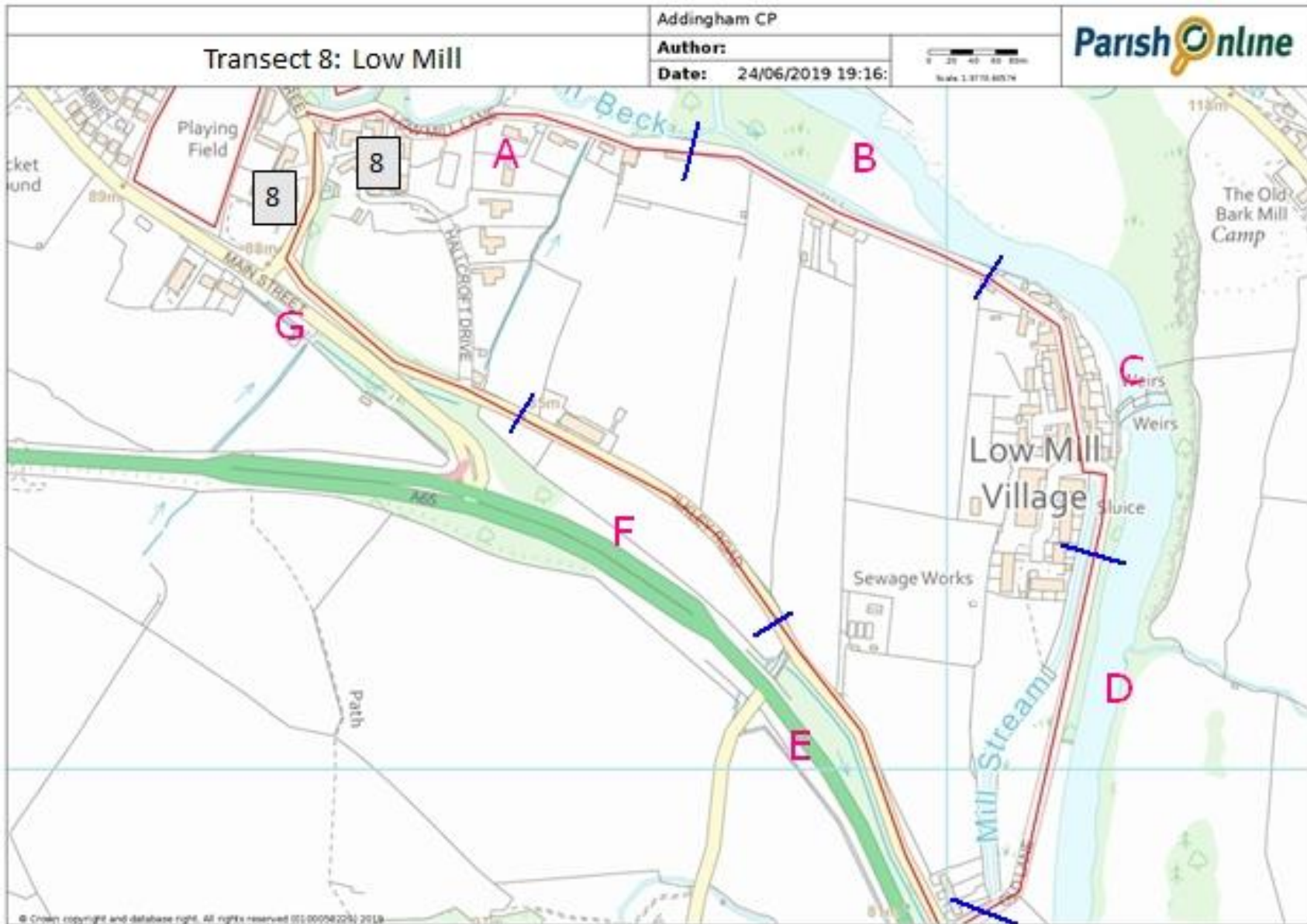
Transect 7

[Return to transect summary](#)



Transect 8

[Return to transect summary](#)



Appendix 4 - Detailed numerical analysis

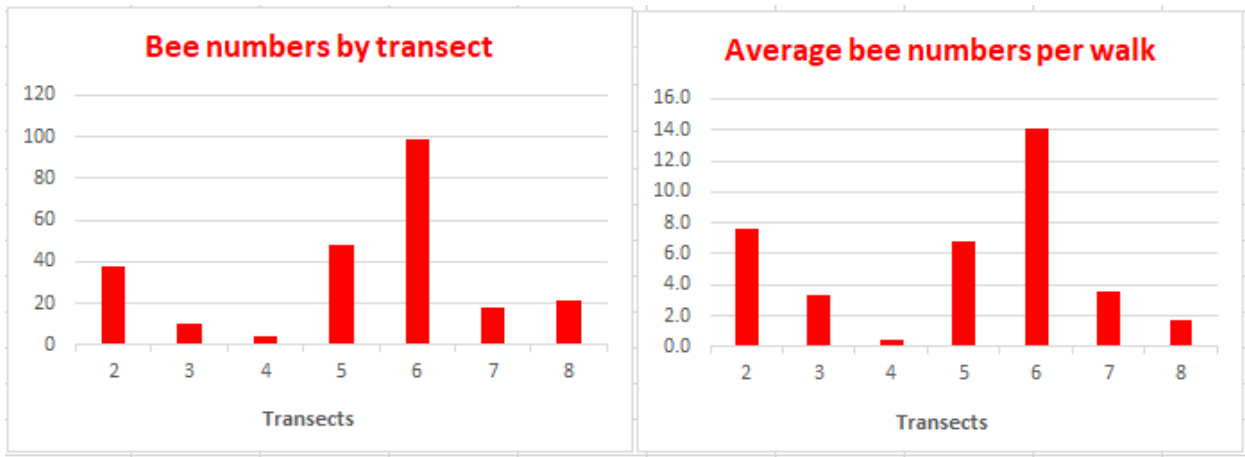
Bees

Analysis at end of September 2019

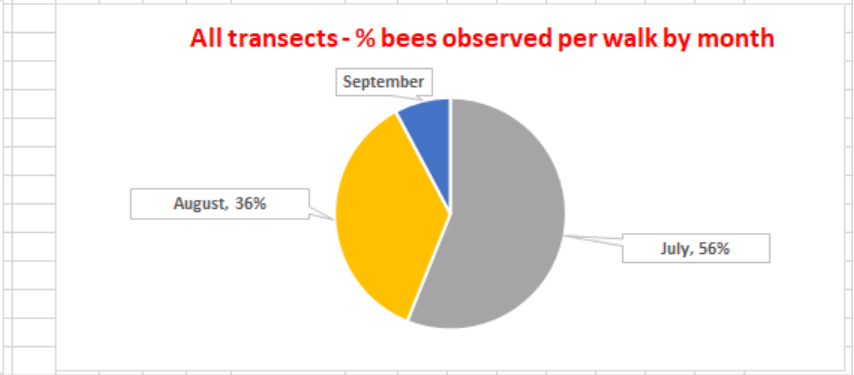
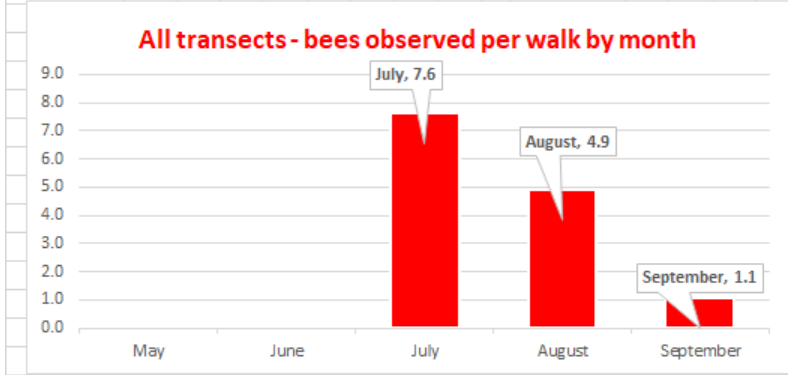
Overall analysis		TRANSECTS							
		2	3	4	5	6	7	8	
Numbers and species observed									
Bees									
Species	Totals	BY TRANSECTS							
		2	3	4	5	6	7	8	
Blaeberry									
Buff-tailed	24	1	3		13	5		2	
Common carder	10	1				9			
Early									
Garden									
Red-tailed	21	15	1			2	2	1	
Tree	34	2			1	25	5	1	
Unknown	6			3		2	1		
White/Buff-tailed	69	19	6			26	10	8	
White-tailed	74			1	34	30		9	
Total	238	38	10	4	48	99	18	21	
Transect walks	48	5	3	9	7	7	5	12	
Average per walk		7.6	3.3	0.4	6.9	14.1	3.6	1.8	

Bee species

Species	Count	Percentage
White-tailed	74	31.1%
White/Buff-tailed	69	29.0%
Tree	34	14.3%
Red-tailed	21	8.8%
Buff-tailed	24	10.1%
Common carder	10	4.2%
Unknown	6	2.5%

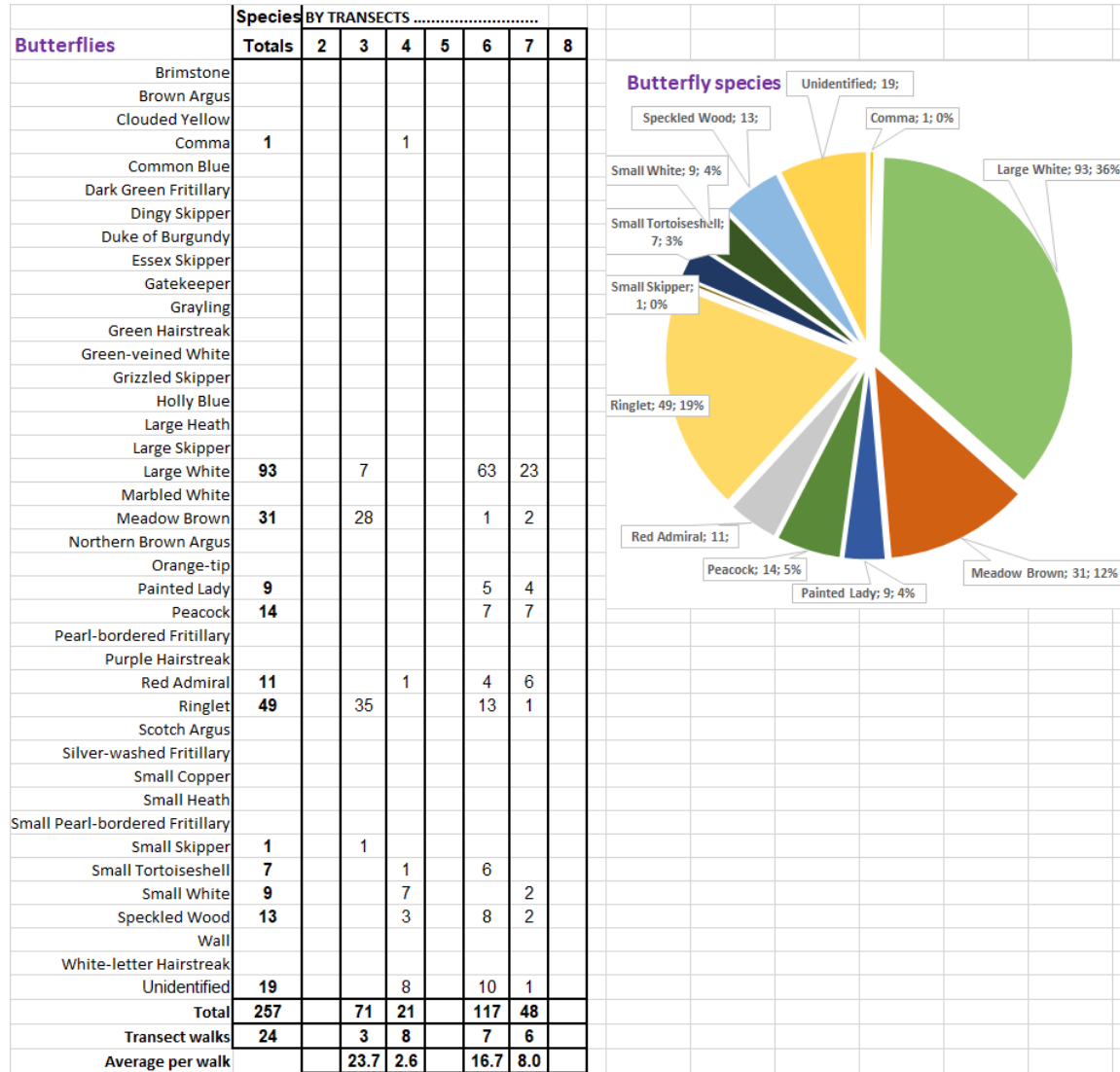


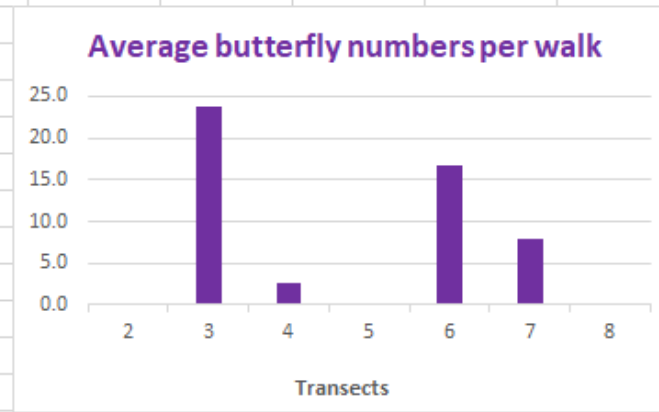
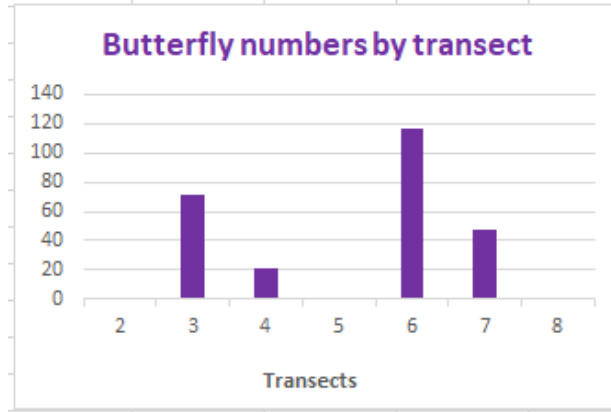
Observations by month																										
Bees	BY TRANSECTS								Walks	BY TRANSECTS								Observed per walk	BY TRANSECTS							
	Observed	2	3	4	5	6	7	8		2	3	4	5	6	7	8	2		3	4	5	6	7	8		
May									May									May								
June									June									June								
July	168	29	8	4	34	71	8	14	July	22	2	2	5	3	3	2	5	July	7.6	15	4	0.8	11	24	4	2.8
August	54	9			13	16	10	6	August	11	1		1	2	2	2	3	August	4.9	9			6.5	8	5	2
September	16		2		1	12		1	September	15	2	1	3	2	2	1	4	September	1.1		2		0.5	6		0.3
Totals	238	38	10	4	48	99	18	21	Totals	48	5	3	9	7	7	5	12	Totals	5.0	7.6	3.3	0.4	6.9	14	3.6	1.8



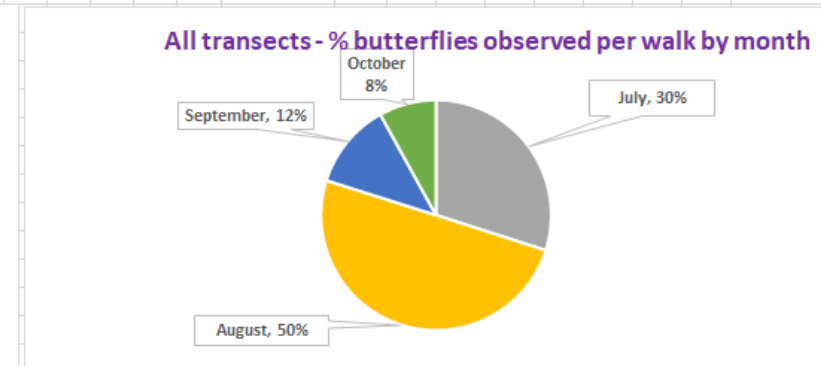
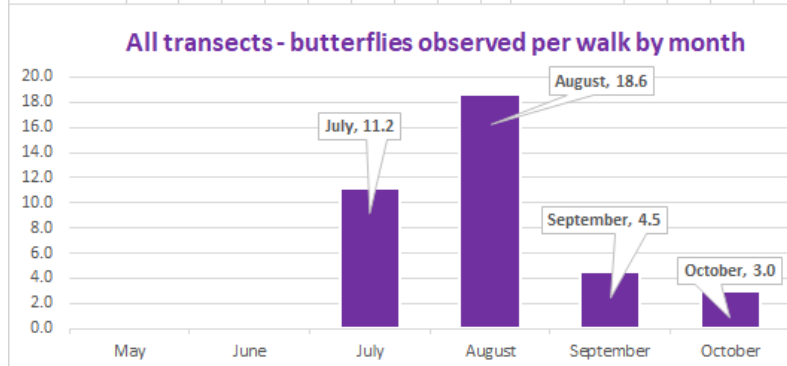
Butterflies

Analysis at end of October 2019





Butterflies	BY TRANSECTS								Walks	BY TRANSECTS								Observed per walk	BY TRANSECTS							
	Observed	2	3	4	5	6	7	8		2	3	4	5	6	7	8	2		3	4	5	6	7	8		
May									May									May								
June									June									June								
July	134		71	19		44			July	12	2	5		3	2		July	11.2	36	3.8		15				
August	93					54	39		August	5		1		2	2		August	18.6				27	20			
September	27			2		19	6		September	6	1	2		2	1		September	4.5		1		9.5	6			
October	3						3		October	1					1		October	3.0					3			
Totals	257		71	21		117	48		Totals	24	3	8		7	6		Totals	10.7	24	2.6		17	8			



Bees and Butterflies by transect

Numbers				Species			
Bees		Butterflies		Bees		Butterflies	
Total >	38	Total >		Total >	38	Total >	
Zone	No.	Zone	No.	Species	No.	Species	No.
A	30	A		Blaeberry		Brimstone	
B	8	B		Buff-tailed	1	Brown Argus	
C		C		Common carder	1	Clouded Yellow	
D		D		Early		Comma	
E		E		Garden		Common Blue	
				Red-tailed	15	Dark Green Fritill	
				Tree	2	Dingy Skipper	
				Unknown		Duke of Burgund	
				White/Buff-tailed	19	Essex Skipper	
				White-tailed		Gatekeeper	
						Grayling	
						Green Hairstreak	
						Green-veined Wh	
						Grizzled Skipper	
						Holly Blue	
						Large Heath	
						Large Skipper	
						Large White	
						Marbled White	
						Meadow Brown	
						Northern Brown A	
						Orange-tip	
						Painted Lady	
						Peacock	
						Pearl-bordered F	
						Purple Hairstreak	
						Red Admiral	
						Ringlet	
						Scotch Argus	
						Silver-washed Fr	
						Small Copper	
						Small Heath	
						Small Pearl-bord	
						Small Skipper	
						Small Tortoisesh	
						Small White	
						Speckled Wood	
						Wall	
						White-letter Hairs	
						Unidentified	

Bee walks		Butterfly walks	
Zone	Avg	Zone	Avg
A	6.0	A	
B	1.6	B	
C		C	
D		D	
E		E	

Formulae here

Transect: 2

Zones: A B C D E

Total bees seen: 38

Total butterflies seen: 0

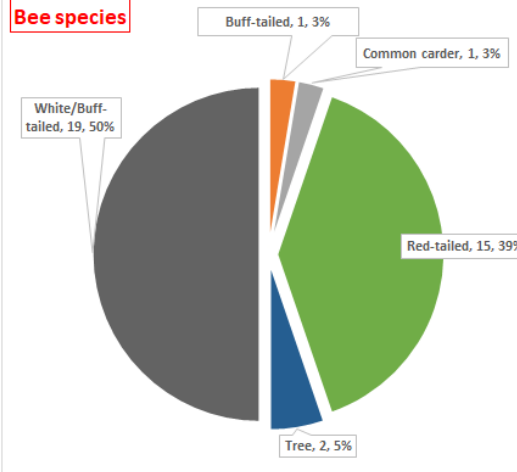
Bee walks: 5

Butterfly walks: 0

Average temperature °C: 19.2

Average wind strength: 2.2

Bee species



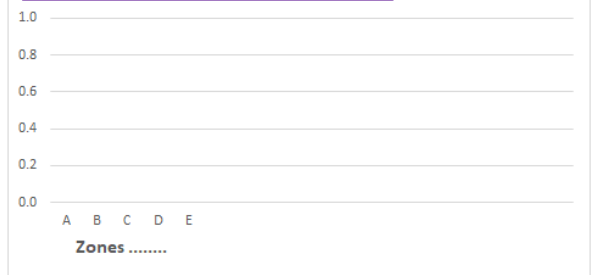
Average bee numbers by walk and zone



Butterfly species

Species	Count
Brimstone	0
Brown Argus	0
Clouded Yellow	0
Comma	0
Common Blue	0
Dark Green Fritill	0
Dingy Skipper	0
Duke of Burgund	0
Essex Skipper	0
Gatekeeper	0
Grayling	0
Green Hairstreak	0
Green-veined Wh	0
Grizzled Skipper	0
Holly Blue	0
Large Heath	0
Large Skipper	0
Large White	0
Marbled White	0
Meadow Brown	0
Northern Brown A	0
Orange-tip	0
Painted Lady	0
Peacock	0
Pearl-bordered F	0
Purple Hairstreak	0
Red Admiral	0
Ringlet	0
Scotch Argus	0
Silver-washed Fr	0
Small Copper	0
Small Heath	0
Small Pearl-bord	0
Small Skipper	0
Small Tortoisesh	0
Small White	0
Speckled Wood	0
Wall	0
White-letter Hairs	0
Unidentified	0

Average butterfly numbers by walk and zone



Numbers				Species			
Bees		Butterflies		Bees		Butterflies	
Total >	10	Total >	71	Total >	10	Total >	71
Zone	No.	Zone	No.	Species	No.	Species	No.
A	3	A	1	Blaeberry		Brimstone	
B	1	B		Buff-tailed	3	Brown Argus	
C	5	C	68	Common carder		Clouded Yellow	
D	1	D		Early		Comma	
E		E	2	Garden		Common Blue	
				Red-tailed	1	Dark Green Fritill	
				Tree		Dingy Skipper	
				Unknown		Duke of Burgundy	
				White/Buff-tailed	6	Essex Skipper	
				White-tailed		Gatekeeper	
						Grayling	
						Green Hairstreak	
						Green-veined White	
						Grizzled Skipper	
						Holly Blue	
						Large Heath	
						Large Skipper	
						Large White	7
						Marbled White	
						Meadow Brown	28
						Northern Brown A	
						Orange-tip	
						Painted Lady	
						Peacock	
						Pearl-bordered F	
						Purple Hairstreak	
						Red Admiral	
						Ringlet	35
						Scotch Argus	
						Silver-washed F	
						Small Copper	
						Small Heath	
						Small Pearl-bord	
						Small Skipper	1
						Small Tortoisesh	
						Small White	
						Speckled Wood	
						Wall	
						White-letter Hairs	
						Unidentified	

Bees		Butterflies	
Zone	Avg	Zone	Avg
A	1.0	A	0.3
B	0.3	B	
C	1.7	C	22.7
D	0.3	D	
E		E	0.7

Bees		Butterflies	
Zone	Avg	Zone	Avg
A	1.0	A	0.3
B	0.3	B	
C	1.7	C	22.7
D	0.3	D	
E		E	0.7

Bee walks		Butterfly walks	
Zone	No.	Zone	No.
A	3	A	1
B	1	B	
C	5	C	68
D	1	D	
E		E	2

Bee walks		Butterfly walks	
Zone	Avg	Zone	Avg
A	1.0	A	0.3
B	0.3	B	
C	1.7	C	22.7
D	0.3	D	
E		E	0.7

Formulæ here

Transect: 3

Bee walks: 3

Butterfly walks: 3

Zones: A B C D E

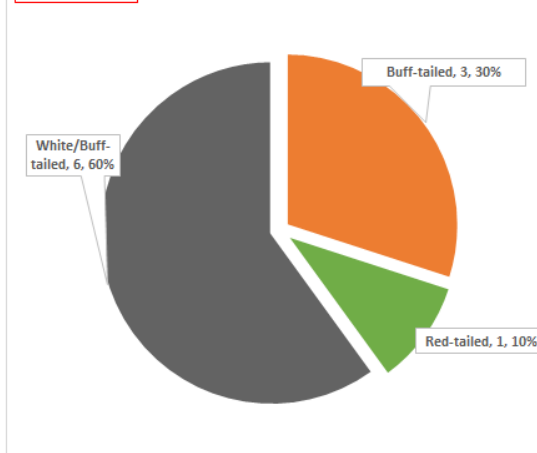
Average temperature °C: 21.9

Total bees seen: 10

Total butterflies seen: 71

Average wind strength: 2.0

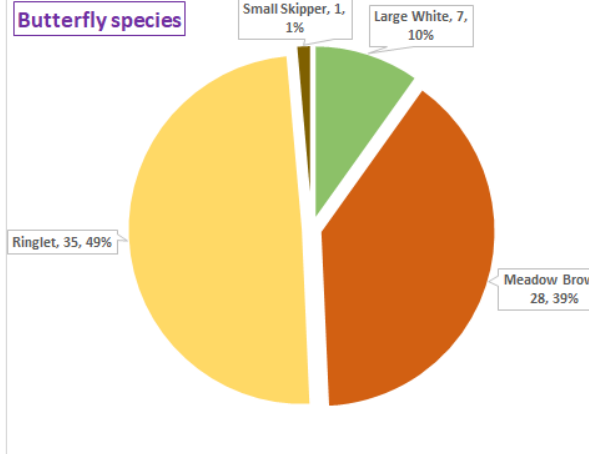
Bee species



Average bee numbers by walk and zone



Butterfly species



Average butterfly numbers by walk and zone



Numbers				Species			
Bees		Butterflies		Bees		Butterflies	
Total >	4	Total >	21	Total >	4	Total >	21
Zone	No.	Zone	No.	Species	No.	Species	No.
A		A	2	Blaeberry		Brimstone	
B		B	6	Buff-tailed		Brown Argus	
C		C	1	Common carder		Clouded Yellow	
D		D	5	Early		Comma	1
E	3	E	3	Garden		Common Blue	
F		F	4	Red-tailed		Dark Green Fritill	
G	1	G		Tree		Dingy Skipper	
				Unknown	3	Duke of Burgund	
				White/Buf-tailed		Essex Skipper	
				White-tailed	1	Gatekeeper	
						Grayling	
						Green Hairstreak	
						Green-veined Wf	
						Grizzled Skipper	
						Holly Blue	
						Large Heath	
						Large Skipper	
						Large White	
						Marbled White	
						Meadow Brown	
						Northern Brown A	
						Orange-tip	
						Painted Lady	
						Peacock	
						Pearl-bordered F	
						Purple Hairstreak	
						Red Admiral	1
						Ringlet	
						Scotch Argus	
						Silver-washed Fr	
						Small Copper	
						Small Heath	
						Small Pearl-bord	
						Small Skipper	
						Small Tortoisesh	1
						Small White	7
						Speckled Wood	3
						Wall	
						White-letter Hairs	
						Unidentified	

Bee walks		Butterfly walks	
Zone	Avg	Zone	Avg
A		A	0.2
B		B	0.7
C		C	0.1
D		D	0.6
E	0.3	E	0.3
F		F	0.4
G	0.1	G	

Bee		Butterfly	
walks		walks	
9		8	

Formulae here

Transect: 4

Zones: A B C D E F G

Bee walks: 9

Butterfly walks: 8

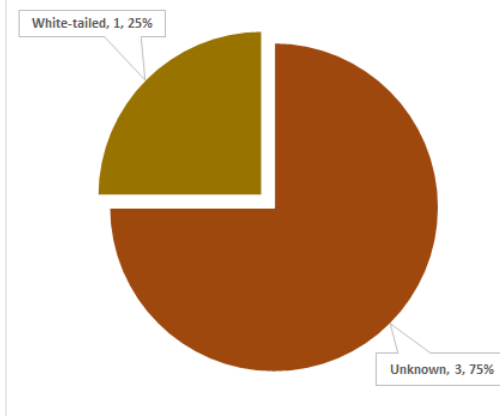
Average temperature °C: 18.4

Total bees seen: 4

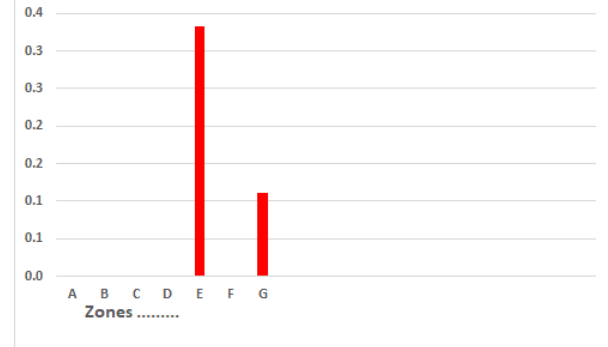
Total butterflies seen: 21

Average wind strength: 3.5

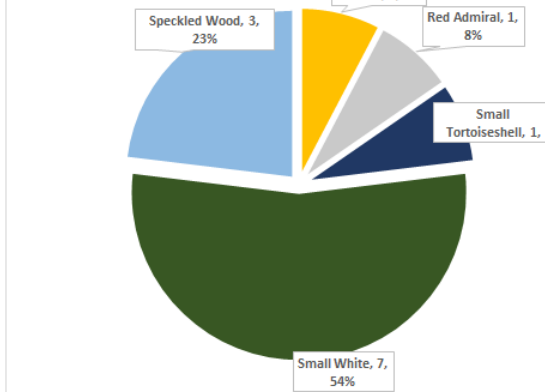
Bee species



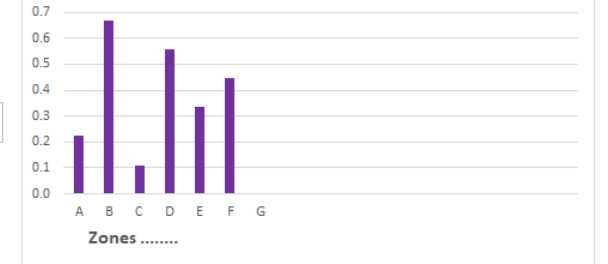
Average bee numbers by walk and zone



Butterfly species



Average butterfly numbers by walk and zone



Numbers				Species			
Bees		Butterflies		Bees		Butterflies	
Total >		Total >		Total >		Total >	
Zone	No.	Zone	No.	Species	No.	Species	No.
A	2	A		Blaeberry		Brimstone	
B		B		Buff-tailed	13	Brown Argus	
C	8	C		Common carder		Clouded Yellow	
D	1	D		Early		Comma	
E	6	E		Garden		Common Blue	
F	22	F		Red-tailed		Dark Green Fritill	
G	9	G		Tree	1	Dingy Skipper	
				Unknown		Duke of Burgundy	
				White/Buff-tailed		Essex Skipper	
				White-tailed	34	Gatekeeper	
						Grayling	
						Green Hairstreak	
						Green-veined White	
						Grizzled Skipper	
						Holly Blue	
						Large Heath	
						Large Skipper	
						Large White	
						Marbled White	
						Meadow Brown	
						Northern Brown A	
						Orange-tip	
						Painted Lady	
						Peacock	
						Pearl-bordered F	
						Purple Hairstreak	
						Red Admiral	
						Ringlet	
						Scotch Argus	
						Silver-washed Fr	
						Small Copper	
						Small Heath	
						Small Pearl-bord	
						Small Skipper	
						Small Tortoisesh	
						Small White	
						Speckled Wood	
						Wall	
						White-letter Hairs	
						Unidentified	

Bee walks		Butterfly walks	
7			

Bees		Butterflies	
Zone	Avg	Zone	Avg
A	0.3	A	
B		B	
C	1.1	C	
D	0.1	D	
E	0.9	E	
F	3.1	F	
G	1.3	G	

Formulae here

Transect: 5

Bee walks: 7

Butterfly walks: 0

Zones: A B C D E F G

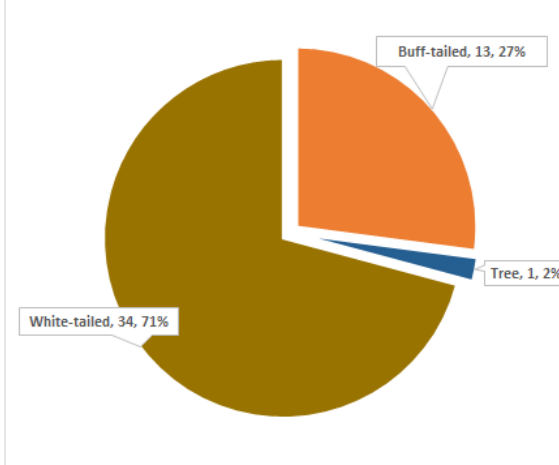
Average temperature °C: 17.3

Total bees seen: 48

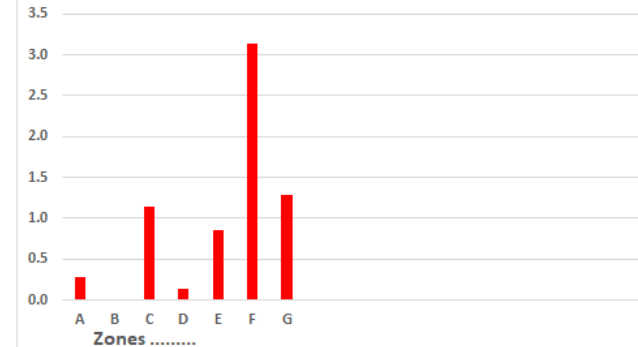
Total butterflies seen: 0

Average wind strength: 2.0

Bee species



Average bee numbers by walk and zone



Butterfly species

Average butterfly numbers by walk and zone



Transect: 6

Zones: A B C D E F G H

Total bees seen: 99 Total butterflies seen: 117

Bee walks: 7 Butterfly walks: 7

Average temperature °C: 19.2

Average wind strength: 2.1

Numbers			
Bees		Butterflies	
Total >	99	Total >	117
Zone	No.	Zone	No.
A	39	A	5
B	15	B	19
C	15	C	10
D	8	D	21
E	1	E	12
F	21	F	40
G		G	4
H		H	6

Species			
Bees		Butterflies	
Total >	99	Total >	117
Species	No.	Species	No.
Blaeberry		Brimstone	
Buff-tailed	5	Brown Argus	
Common carder	9	Clouded Yellow	
Early		Comma	
Garden		Common Blue	
Red-tailed	2	Dark Green Fritill	
Tree	25	Dingy Skipper	
Unknown	2	Duke of Burgund	
White/Buff-tailed	26	Essex Skipper	
White-tailed	30	Gatekeeper	
		Grayling	
		Green Hairstreak	
		Green-veined Wh	
		Grizzled Skipper	
		Holly Blue	
		Large Heath	
		Large Skipper	
		Large White	63
		Marbled White	
		Meadow Brown	1
		Northern Brown A	
		Orange-tip	
		Painted Lady	5
		Peacock	7
		Pearl-bordered F	
		Purple Hairstreak	
		Red Admiral	4
		Ringlet	13
		Scotch Argus	
		Silver-washed Fr	
		Small Copper	
		Small Heath	
		Small Pearl-bord	
		Small Skipper	
		Small Tortoisesh	6
		Small White	
		Speckled Wood	8
		Wall	
		White-letter Hairs	
		Unidentified	10

Bee walks
7

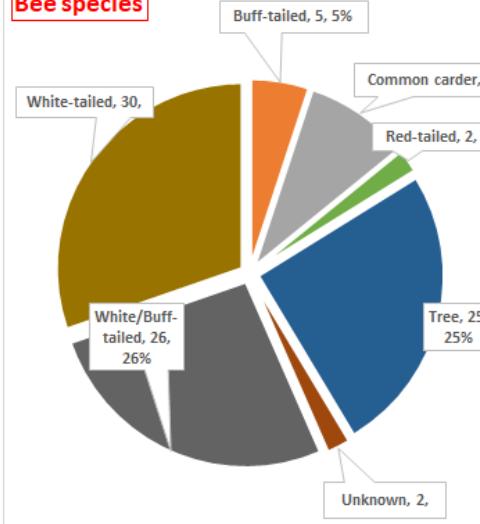
Butterfly walks
7

Bees	
Zone	Avg
A	5.6
B	2.1
C	2.1
D	1.1
E	0.1
F	3.0
G	
H	

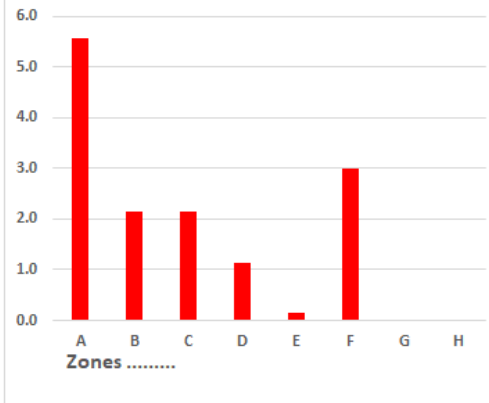
Butterflies	
Zone	Avg
A	0.7
B	2.7
C	1.4
D	3.0
E	1.7
F	5.7
G	0.6
H	0.9

Unidentified
Formulae here

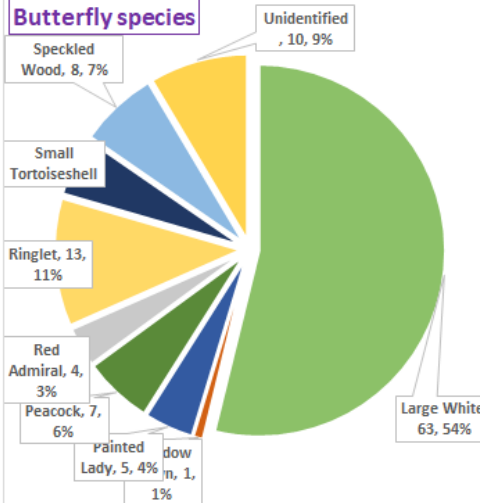
Bee species



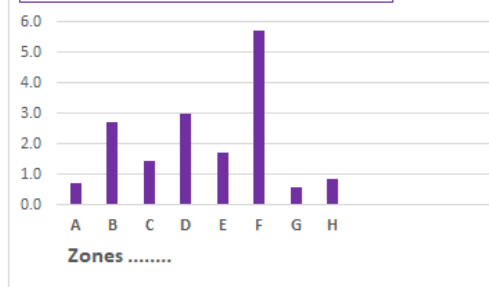
Average bee numbers by walk and zone



Butterfly species



Average butterfly numbers by walk and zone



Numbers				Species			
Bees		Butterflies		Bees		Butterflies	
Total >	18	Total >	48	Total >	18	Total >	48
Zone	No.	Zone	No.	Species	No.	Species	No.
A	4	A	26	Blaeberry		Brimstone	
B	1	B	3	Buff-tailed		Brown Argus	
C		C	1	Common carder		Clouded Yellow	
D	10	D	13	Early		Comma	
E		E		Garden		Common Blue	
F	2	F	4	Red-tailed	2	Dark Green Fritill	
G	1	G	1	Tree	5	Dingy Skipper	
				Unknown	1	Duke of Burgund	
				White/Buff-tailed	10	Essex Skipper	
				White-tailed		Gatekeeper	
						Grayling	
						Green Hairstreak	
						Green-veined White	
						Grizzled Skipper	
						Holly Blue	
						Large Heath	
						Large Skipper	
						Large White	23
						Marbled White	
						Meadow Brown	2
						Northern Brown A	
						Orange-tip	
						Painted Lady	4
						Peacock	7
						Pearl-bordered F	
						Purple Hairstreak	
						Red Admiral	6
						Ringlet	1
						Scotch Argus	
						Silver-washed Fr	
						Small Copper	
						Small Heath	
						Small Pearl-bord	
						Small Skipper	
						Small Tortoisesh	
						Small White	2
						Speckled Wood	2
						Wall	
						White-letter Hairs	
						Unidentified	

Bee walks		Butterfly walks	
Zone	Avg	Zone	Avg
A	0.8	A	5.2
B	0.2	B	0.6
C		C	0.2
D	2.0	D	2.6
E		E	
F	0.4	F	0.8
G	0.2	G	0.2

Bees		Butterflies	
Zone	Avg	Zone	Avg
A	0.8	A	5.2
B	0.2	B	0.6
C		C	0.2
D	2.0	D	2.6
E		E	
F	0.4	F	0.8
G	0.2	G	0.2

Formulae here

Transect: 7

Zones: A B C D E F G

Total bees seen: 18 Total butterflies seen: 48

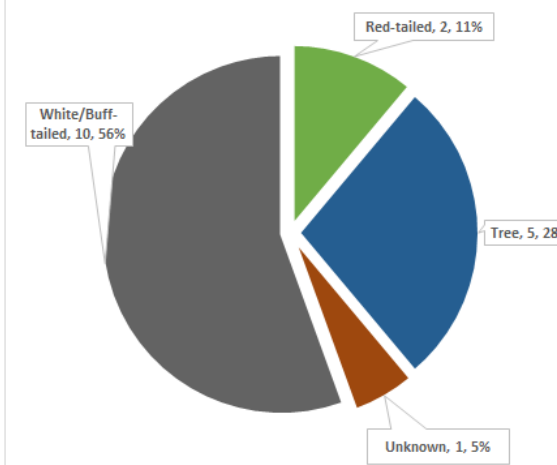
Bee walks: 5

Butterfly walks: 6

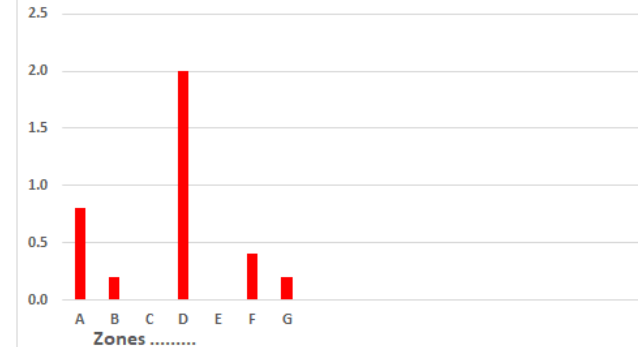
Average temperature °C: 19.4

Average wind strength: 0.8

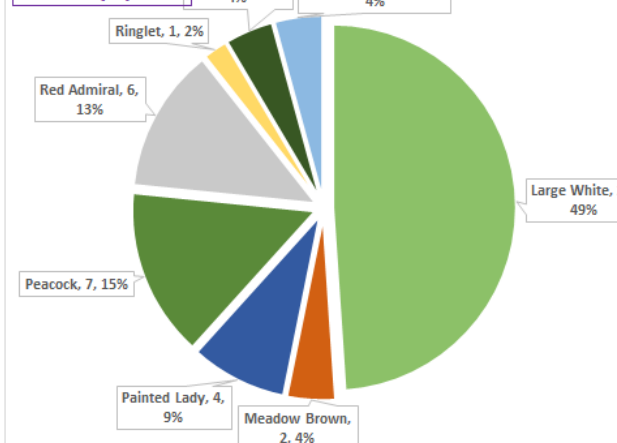
Bee species



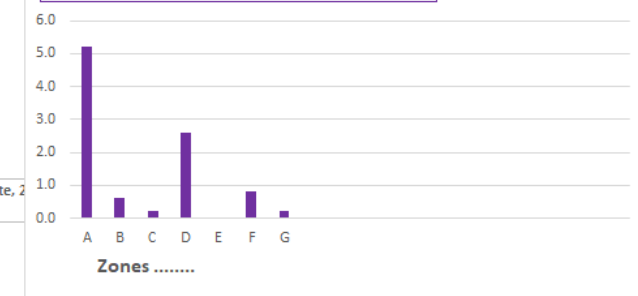
Average bee numbers by walk and zone



Butterfly species



Average butterfly numbers by walk and zone



Numbers				Species			
Bees		Butterflies		Bees		Butterflies	
Total >		Total >		Total >		Total >	
Zone	No.	Zone	No.	Species	No.	Species	No.
A	2	A		Blaeberry		Brimstone	
B	1	B		Buff-tailed	2	Brown Argus	
C	14	C		Common carder		Clouded Yellow	
D	2	D		Early		Comma	
E	2	E		Garden		Common Blue	
F		F		Red-tailed	1	Dark Green Fritill	
G		G		Tree	1	Dingy Skipper	
				Unknown		Duke of Burgund	
				White/Buff-tailed	8	Essex Skipper	
				White-tailed	9	Gatekeeper	
						Grayling	
						Green Hairstreak	
						Green-veined WH	
						Grizzled Skipper	
						Holly Blue	
						Large Heath	
						Large Skipper	
						Large White	
						Marbled White	
						Meadow Brown	
						Northern Brown A	
						Orange-tip	
						Painted Lady	
						Peacock	
						Pearl-bordered F	
						Purple Hairstreak	
						Red Admiral	
						Ringlet	
						Scotch Argus	
						Silver-washed Fr	
						Small Copper	
						Small Heath	
						Small Pearl-bord	
						Small Skipper	
						Small Tortoisesh	
						Small White	
						Speckled Wood	
						Wall	
						White-letter Hairs	
						Unidentified	

Bee walks		Butterfly walks	
Zone	No.	Zone	No.
A	2	A	
B	1	B	
C	14	C	
D	2	D	
E	2	E	
F		F	
G		G	

Bee		Butterflies	
Zone	Avg	Zone	Avg
A	0.2	A	
B	0.1	B	
C	1.2	C	
D	0.2	D	
E	0.2	E	
F		F	
G		G	

Formulae here

Transect: 8

Zones: A B C D E F G

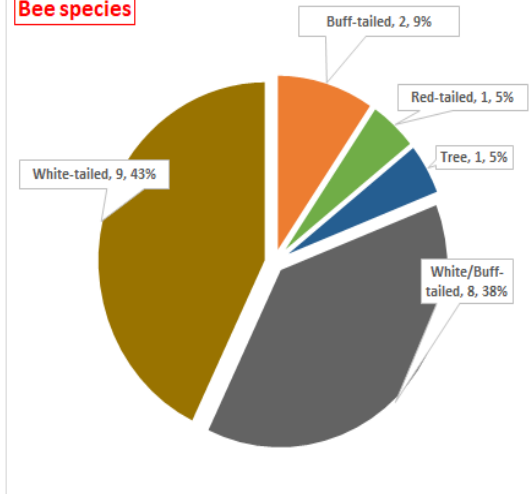
Total bees seen: 21 Total butterflies seen: 0

Bee walks: 12 Butterfly walks: 0

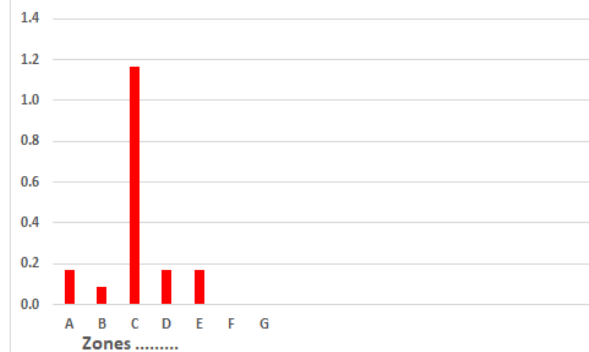
Average temperature °C: 19.1

Average wind strength: 1.2

Bee species



Average bee numbers by walk and zone



Butterfly species

Average butterfly numbers by walk and zone

