

**BUTTERFLY SURVEY
of
TOMMY THE MILLER'S FIELD**

BERWICK UPON TWEED

April to September 2006

**by
Berwick Wildlife Group**

A Report on the 2006 Butterfly Survey

SUMMARY

Between the beginning of April and the end of September 2006 a butterfly survey of Tommy the Miller's field in Berwick was undertaken by volunteers from Berwick Wildlife Group.

The purpose of this survey was to gather observations of butterfly species and numbers for inclusion in the databases of both Butterfly Conservation and the National Biodiversity Network.

The field is situated on the north shore of the River Tweed just upstream of the Royal Border Railway Bridge. It is south facing and is sheltered from north winds and is exposed to the sun throughout the day.

A total of 1472 butterflies of 13 species were observed over the 26 week period.

For details of the habits, distribution and status of these (and other) butterflies, go to http://www.ukbms.org/speciesLists/species_by_family.htm and click on the required species name.

Looking at the various sections of the transect walked –

Section 1

This Section crossed steep terrain, patches of more open grassland among hawthorn scrub, with nettles and thistles prominent in places. Mainly Sm. Whites, Ringlet, Meadow Brown, Large Whites, Sm. Tortoiseshell, Orange Tip, Peacock and Wall were recorded here.

Section 2

Section two led past a rush-dominated marsh bounded on its northern edge by a bluff covered in grasses, knapweed, scabious, harebells and yarrow. Green-veined whites predominated in the wetter area, while the dry banks held good numbers of Meadow Browns, Sm. Whites, Ringlet, Orange Tip, Peacock Sm. Tortoiseshell and Large White, among others.

Section 3

The third section runs across a small grassy headland, the wind always playing a part in recording here. Grasses, sorrel, thistles and yarrow were plentiful, and Small Coppers were seen here well into September sipping nectar from yarrow heads in the warm sun. Again large numbers of Meadow Browns were observed together with Sm. White, Ringlet, Large white and Common Blue.

Section 4

'The New Road', a footpath along the bank of the Tweed made section four; a sheltered sunny section but often disturbed by walkers. Small and Large Whites were predominant here together with Orange Tip, Meadow Brown, Ringlet and Peacock.

Section 5

The final section runs through Tommy the Miller's Field again, from the Tweed back up to the top. Throughout the summer the grasses, knapweed and thistles proliferated, - Meadow Brown, Ringlet, Sm. Tortoiseshell, Large White and Orange Tip were seen here.

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ACKNOWLEDGEMENTS

Elizabeth Bamford for conceiving and organising the survey.

The following members of the Group who took part in the field work:

Group 1 - Malcolm Hutcheson, John Inglis, Andrew and Lorna Crystal, Enid Turnbull, Liz Houghton.

Group 2 - Philomena Johnston, Dave Johnstone, Janet Chubb, Sue Fells, John & Sally Rae.

Group 3 - Elizabeth Bamford, Sue Maddox, Molly Hardie, Leslie Cook, Anne Thompson, Mabel Taylor.

Credit should go to all who took part in the survey, as in places the field is very steep, with uneven footing and the undergrowth and nettles later in the year made walking the transect extremely difficult. Despite this apart from 2 weeks at the very beginning of April when the weather was not suitable, a count was completed for all the other 24 weeks of the survey.

Fiona Aungier undertook fieldwork when commitments prevented regular group members from participating, carried out the habitat survey and drew the maps. John Rae transferred the data to the database, tabulated and analysed it. John and Fiona wrote this report.

Finally Mr and Mrs MacPherson, Castle Hills Farm, the owners of the land, who readily gave permission for the survey to go ahead.

Picture 1 – Volunteers in section 1 walking the transect.



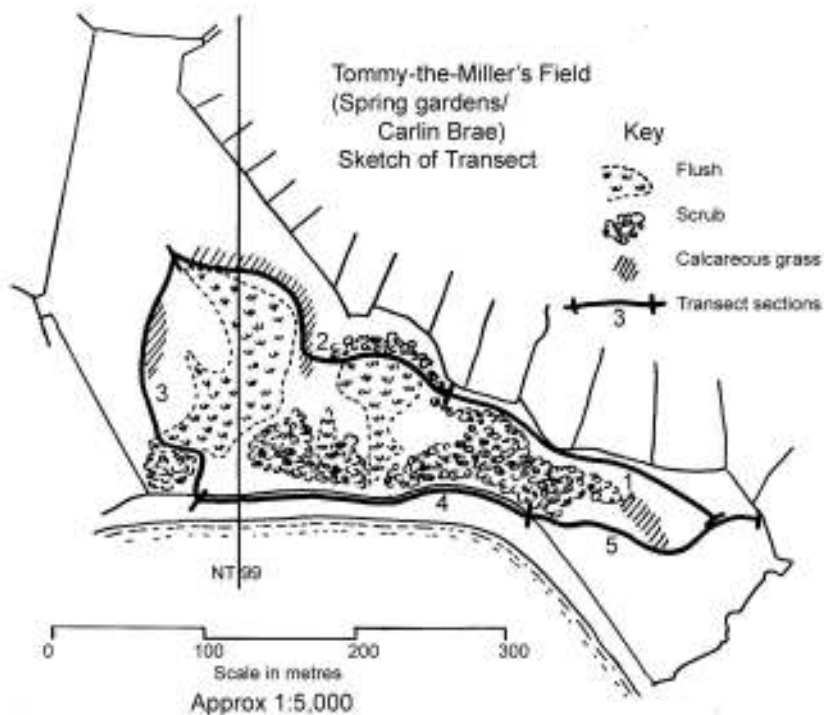
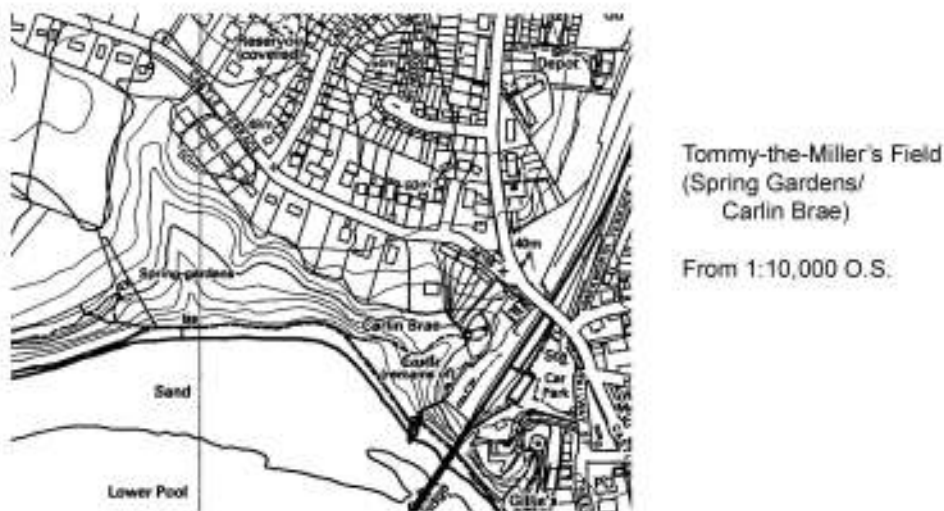
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INTRODUCTION

Between the beginning of April and the end of September 2006 a butterfly survey of Tommy the Miller's field in Berwick was undertaken by volunteers from Berwick Wildlife Group.

The work grew out of the interest of Elizabeth Bamford who contacted Butterfly Conservation, gained permission from the field owners, organised the volunteers and together with Fiona Aungier laid out the transect and undertook an initial habitat survey.

Maps 1 & 2, an overview of Tommy the Miller's field and detail of the survey transect.



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The field is situated on the north shore of the River Tweed just upstream of the Royal Border Railway Bridge, and below Castle Terrace. Much of the ground underfoot has been pitted by the hooves of grazing cattle. No grazing took place over the period of the survey. The habitat consisted of dry semi-improved grass and scrub land with wet flushes on a steep south-facing slope.

Picture 2 – An overall view of Tommy the Miller’s field and the area surveyed, looking east towards the Royal Border Bridge.



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METHOD

Butterfly transects are a way of measuring changes in the abundance and variety of butterflies present at a site from year to year. This requires a commitment to record weekly throughout the main six-month period in which butterflies fly in the UK.

The method adopted for this survey is as laid down by the Butterfly Conservation.

Full (all species) transects are labour intensive and require a commitment to carry out weekly recording throughout the duration of the survey.

Establishing the Transect.

- The Transect was identified by Elizabeth and Fiona and consisted of a route 1025m in length that gave a fair representation of the habitats and other features present in the field.
- This transect was 'fixed' so the same route could be followed each week.
- It was subdivided into 5 sections, approximately equal in length with each section representing a change in habitat or management type.

When to Record.

- Recording took place once a week from April 1st to the end of September.
- Transect counts were ideally made between 10:45 and 15:45 hours.
- Transect walks were only carried out in warm (13 °C or more) bright weather.
- The minimum criteria were 17°C if overcast or 13°C if at least 60% sunshine.

How to Record.

- To aid species identification each group had a "Guide to the Butterflies of Britain" produced by the Field Studies Council.
- The transect was walked at a slow, steady pace counting all butterflies seen within a fixed distance of 2.5m either side of the transect line and 5m ahead.
- The same route along the Transect was followed each time.
- Before starting record was taken of Week No, Section No, Date, Recorders and both before and after walking the Transect the Time, Wind, Weather, % Sun etc.
- The Transect was walked recording count numbers of the various species of butterfly seen on that section of the transect.

After the Transect had been walked the observations were given to Fiona who entered them into a standard Excel spreadsheet, one for each weeks survey, and John transferred this to the main database.

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OBSERVATIONS

Summary of Observations

By Date

Date	Common Blue	Green-veined White	Large White	Meadow Brown	Orange Tip	Painted Lady	Peacock	Red Admiral	Ringlet	Small Copper	Small Tortoise shell	Small White	Wall	Total Adult
15-Apr							9				5			14
24-Apr							7				7			14
4-May					3						3			6
10-May					9		10				7	2		28
17-May		1			8		2				1	1		13
25-May					4							2		6
31-May		1	1		34		1					19		56
6-Jun					10					2		4		16
11-Jun			7		10							4		21
20-Jun			1	3	1				2			4		11
27-Jun	2	1	10	8					39			3		63
7-Jul	9		1	83					121		9	1		224
10-Jul	9		3	90					64		3			169
18-Jul		5	29	78					8					120
26-Jul	3		15	79			3	1	14		12	54		181
3-Aug	2	2	14	42		2	8		1	8	3	106		188
10-Aug		3	7	5		2			1	5		42	2	67
16-Aug		4	13	1		3	6			8		58		93
21-Aug			1	2		1		1		3	1	71		80
29-Aug			26				2			7		19		54
4-Sep		1	8			1				3	1	7		21
11-Sep	1						1			3		15		20
18-Sep										1		5		6
28-Sep	1													1
Grand Total	27	18	136	391	79	9	49	2	250	40	52	417	2	1472

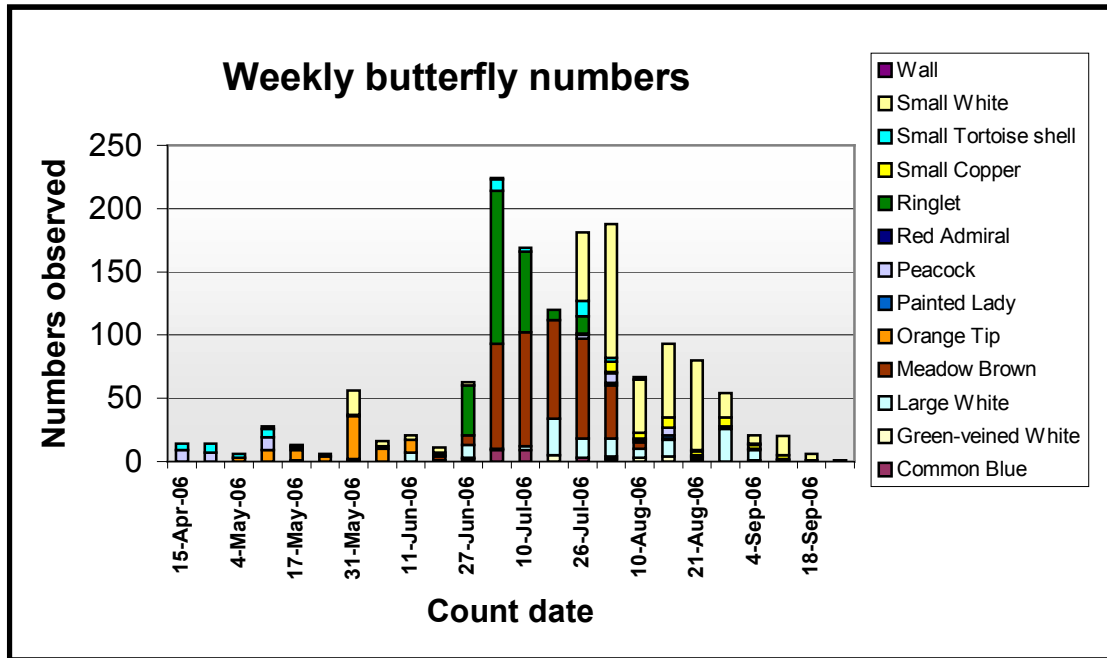
By Section

Section	Common Blue	Green-veined White	Large White	Meadow Brown	Orange Tip	Painted Lady	Peacock	Red Admiral	Ringlet	Small Copper	Small Tortoise shell	Small White	Wall	Total Adults
Section 1	5	6	63	111	17	2	15		133	11	22	152	2	539
Section 2	7	6	15	115	30	1	18	1	57	10	15	68		343
Section 3	15	3	15	123	8	5	6		41	17	2	46		281
Section 4		2	35	11	16		7		9	1	4	87		172
Section 5		1	8	31	8	1	3	1	10	1	9	64		137
Grand Total	27	18	136	391	79	9	49	2	250	40	52	417	2	1472

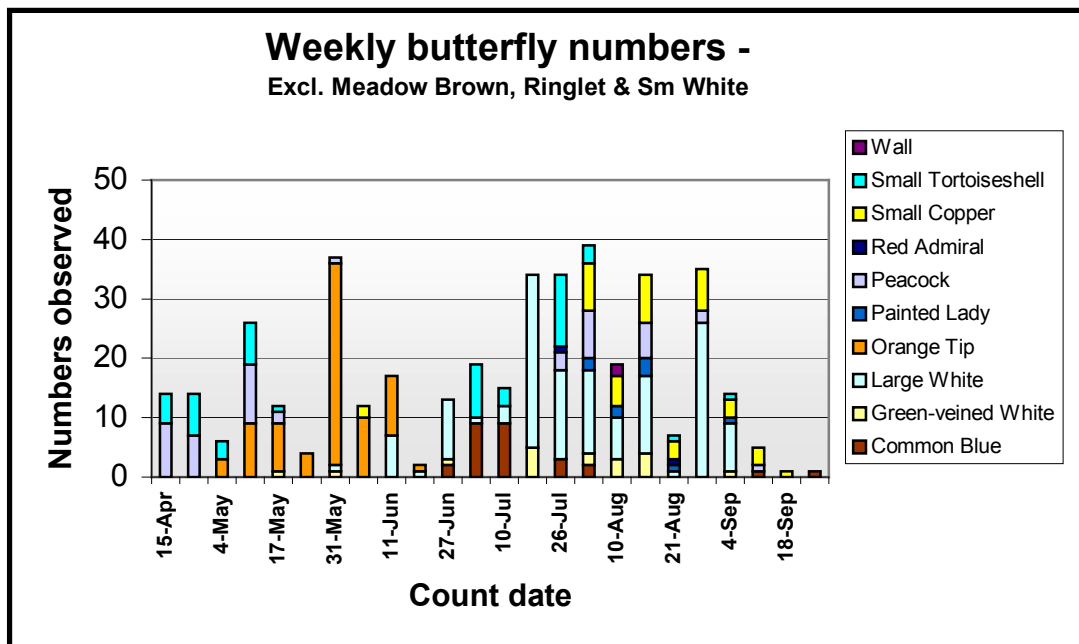
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GRAPHS – By Weeks

Total Butterfly Count Graphed by Weeks

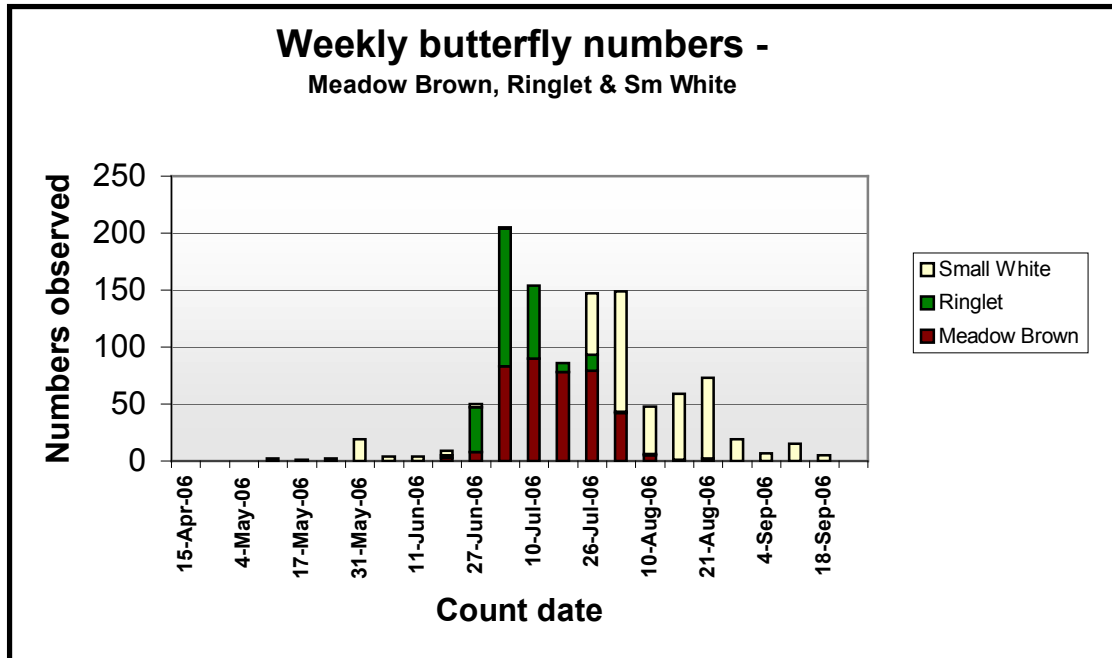


Total Butterfly Count (Excl. Meadow Browns, Ringlets and Small Whites)
Graphed by Weeks.



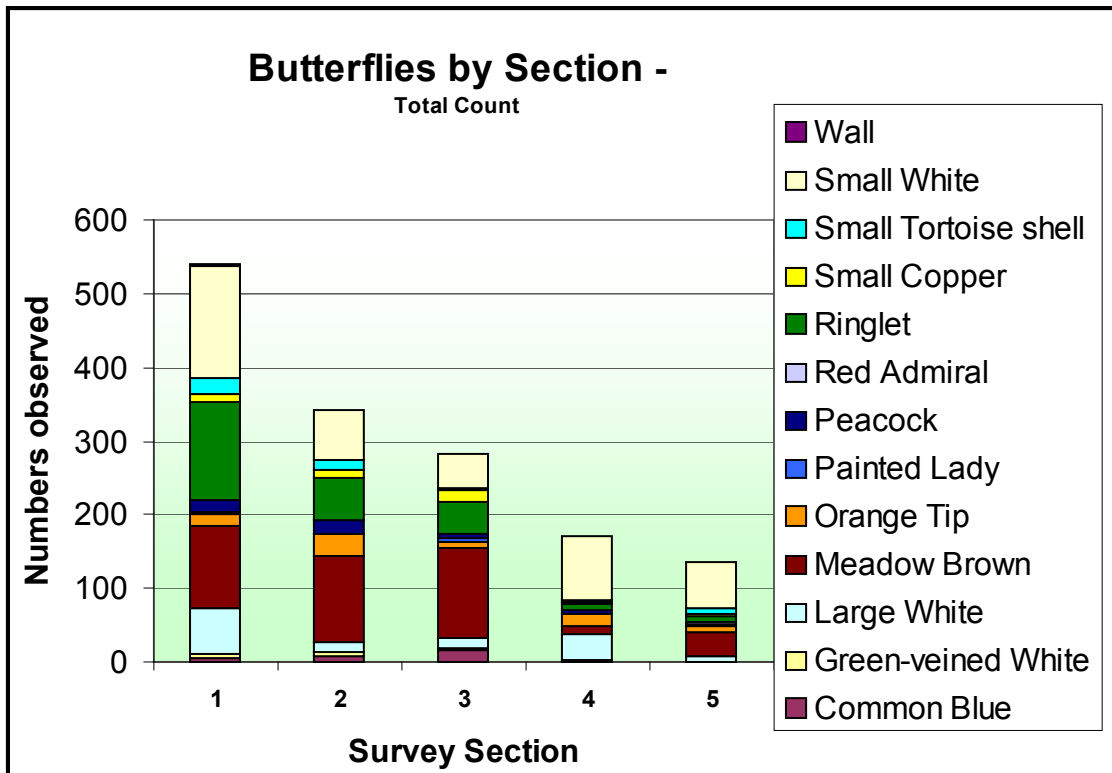
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Total Butterfly Count of Meadow Browns, Ringlets and Small Whites Graphed by Weeks.



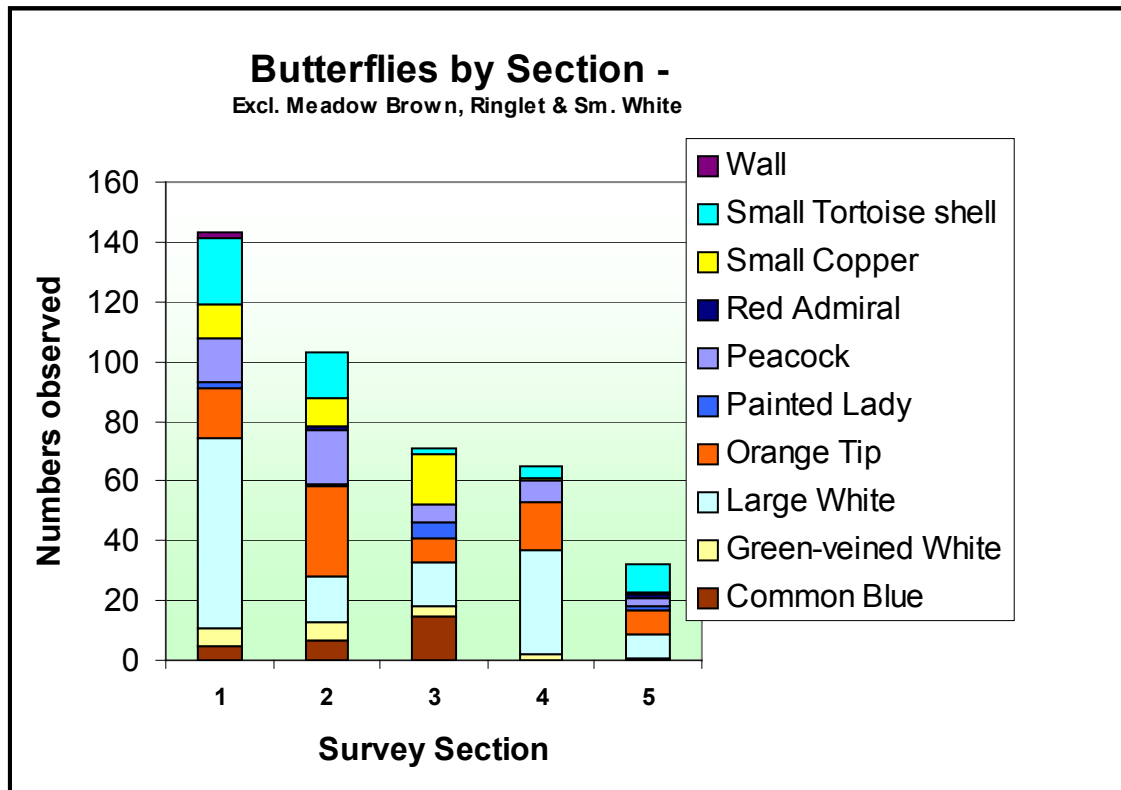
GRAPHS – By Section

Total Butterfly Count Graphed by Section.

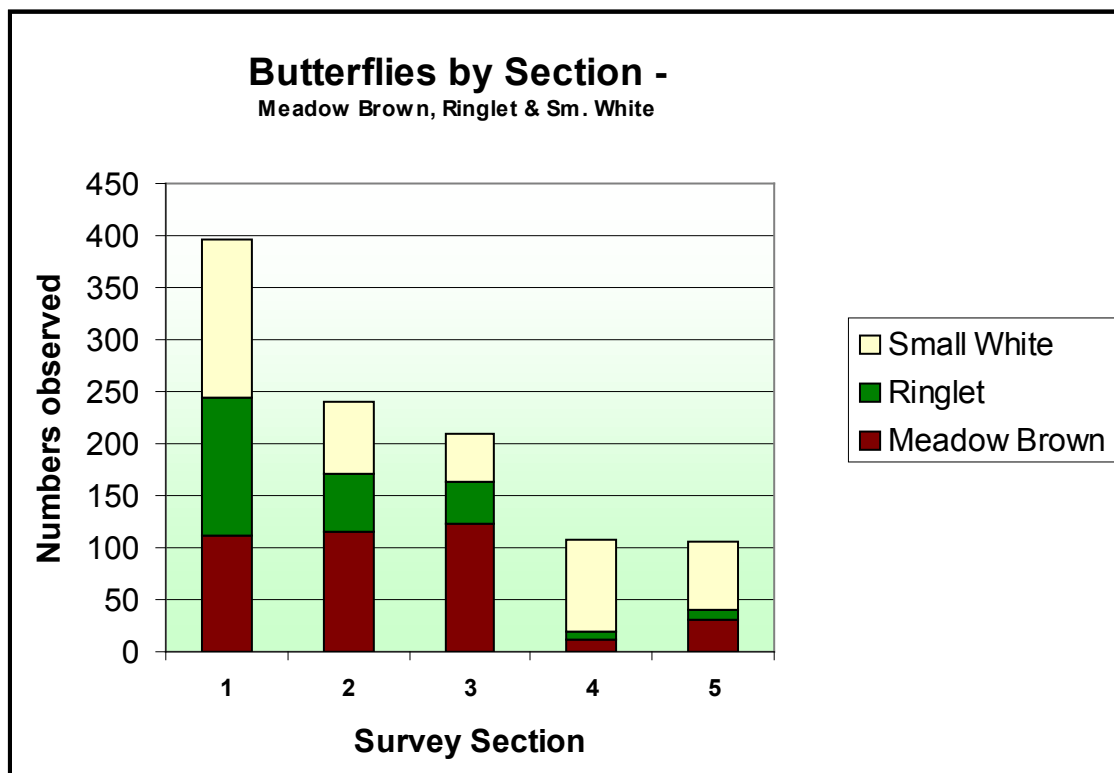


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Total Butterfly Count (Excl. Meadow Browns, Ringlets and Small Whites)
Graphed by Section.

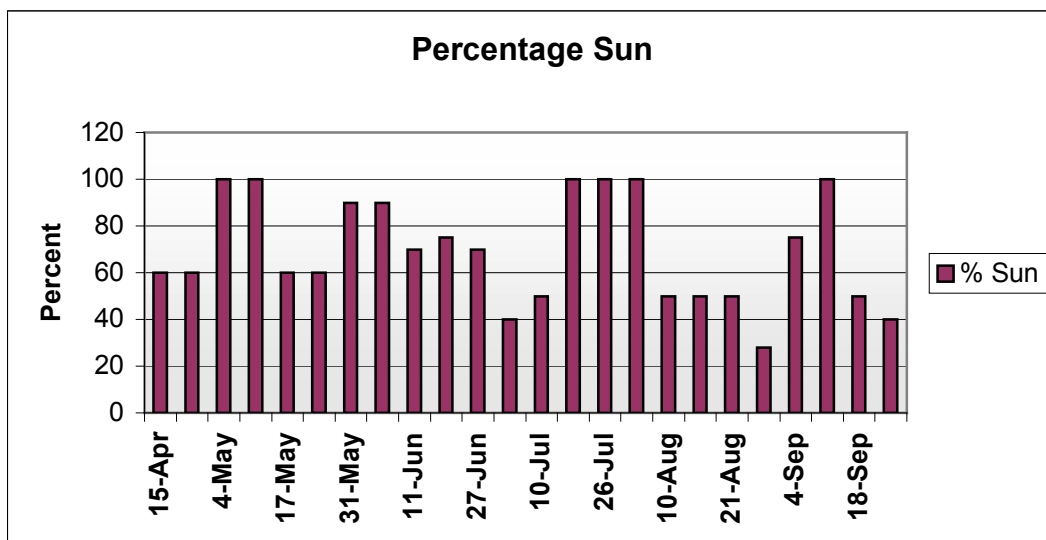
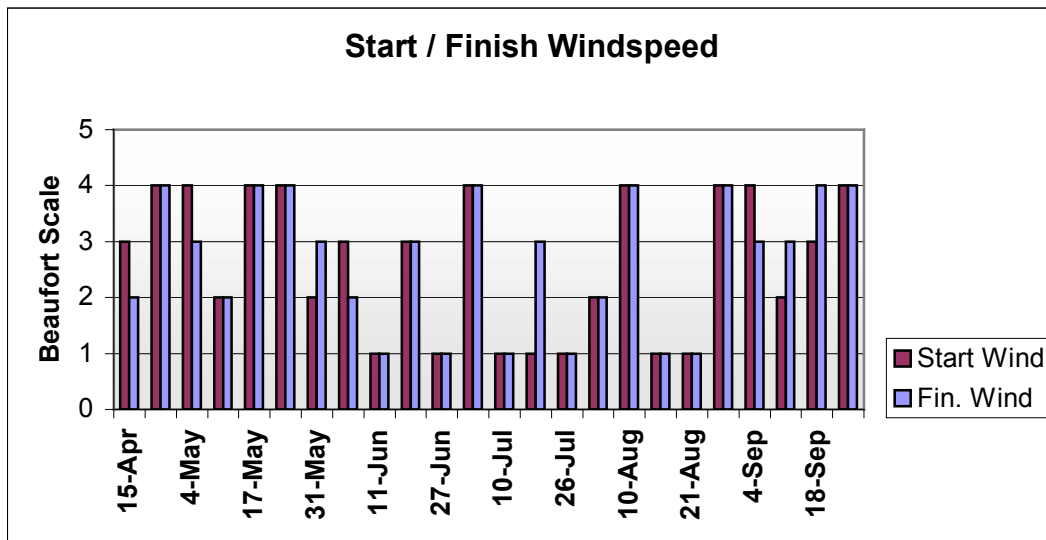
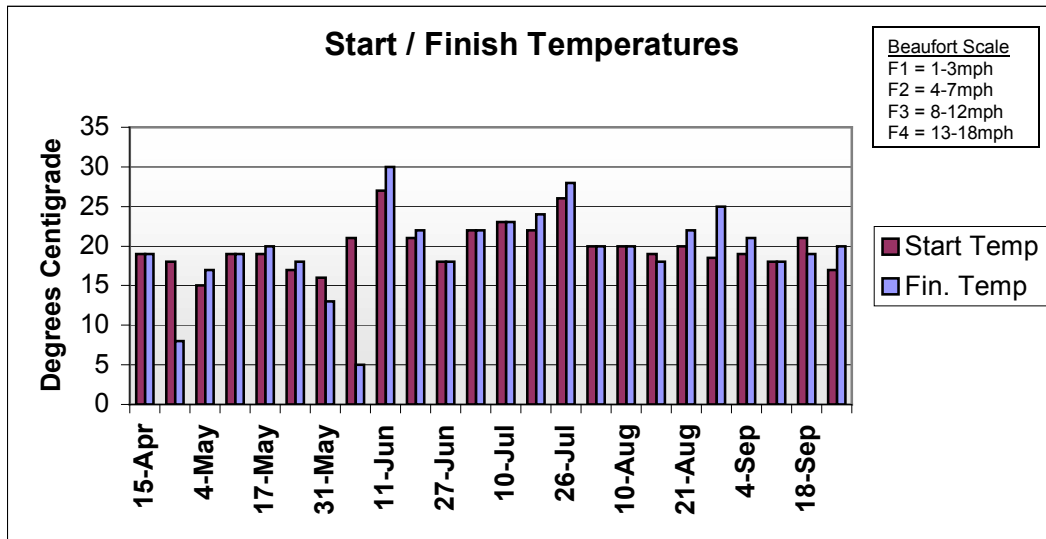


Total Butterfly Count of Meadow Browns, Ringlets and Small Whites Graphed by Section.



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WEATHER



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DISCUSSION

Butterfly monitoring.

We often think of butterflies as the attractive, brightly coloured, highly visible adult insects, but of course they occur as herbivorous caterpillars or pupae for much of the year, and conservation of these stages is vital. Typical of other insects they have high breeding rates, short life cycles, often specialised habitat requirements and some are highly sensitive to weather conditions. Insects account for the majority of animal species in the UK (and the world), and as butterflies respond rapidly to ecological change yet are (comparatively) easy to recognise, observe and record they are ideal "indicator" species. (Brereton *et al*, 2006; Greatorex-Davies *et al* 2006).

The United Kingdom Butterfly Monitoring Scheme (UKBMS, www.ukbms.org) is a recently formed (spring 2006) merger of the Butterfly Monitoring Scheme (BMS) and the "independent" transects co-ordinated by Butterfly Conservation. Detailed monitoring of butterfly numbers under the BMS commenced in the UK in 1976 (Pollard and Yates, 1993), the wealth of data available from counts from many sites (134 in 2004) allowing assessment of the effects of landscape, land-use, habitat changes and global warming on butterfly (and, by implication, other) populations. By the late 1970s "independent" transects (outside the BMS scheme) were being developed, "giving recorders an opportunity to engage in an activity that is not only fun but also generates data of high conservation value" (Brereton *et al*, 2006). Many of these have been recently started, so there is no long time-series of data, but the large number of monitored sites (over 500 in 2003) has enabled coverage of a wider geographical spread and reliable indices for rare and threatened species.

Butterfly transect data continues to be in high demand for research and habitat management. The UKBMS annual report for 2005 (Greatorex-Davies *et al*, 2006) lists 27 projects using the data for that year alone. Many papers (e.g. Thomas, 2005) show that data from butterfly transects give a true indication of change in species numbers. (Changes in distribution are better revealed by data collected in other ways, e.g. the Butterflies for the New Millennium recording scheme, launched in 1995 and comprising over 3 million records by 2004. BNM records utilise sightings of identified butterfly species at any location described using a standard grid reference, collected by thousands of groups and individuals (including BWG members) and collated and verified by local co-ordinators – Fox *et al*, 2006).

Changing status of butterflies in the UK.

"The original aim of the Butterfly Monitoring Scheme was to provide objective information on changes in the abundance of butterflies" (Brereton *et al*, 2006). When the scheme began in 1976, there had for many years been a noticeable decline in butterfly numbers as a result of agricultural intensification. Many of the rarest species were by then almost confined to nature reserves and other protected sites, and it was important to discover how changes in habitat (as a result of chance, neglect or deliberate management) were affecting butterfly populations, with a view to conservation. Latterly, many more studies have

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been concerned with the effects of climate change. Data from butterfly transects have shown that, on the whole, numbers of the more mobile butterfly species with a range of food plants (generalists) have increased slightly in the last 30 years, and the species limited to particular food plants in specific habitats have declined (Warren *et al*, 2001). However there is so much variation between the responses of individual species that it is difficult to generalise (Pollard, Moss and Yates, 1995). There are indications that as a result of habitat improvement on protected sites at least some specialist species are no longer in decline, but that the initial benefit to generalist populations resulting from warmer conditions may not be sustained as climate change develops (www.ukbms.org). There is obviously a great deal more to learn about insect conservation from established butterfly transects, as well as a need to expand the study further into the "wider countryside" (as planned by the UKBMS, Greatorex-Davies *et al*, 2006).

Butterflies and the weather.

There is usually a marked correlation between butterfly numbers and local weather conditions, although again generalisations are difficult. For example, Roy *et al* (2001) show warm weather in June and July tends to lead to an increase in numbers of flying adults for single-brooded species (like Ringlets and Meadow Browns), but high June temperatures in the previous year suppress numbers of adult Ringlets appearing the following year. Where there may be more generations in one year (such as with the Common Blue), high summer temperatures are more beneficial than in the single-brooded species, perhaps because they allow a higher proportion of the population to go through the life cycle again before winter. In species that overwinter as adults (such as Peacock and Small Tortoiseshell) high summer temperatures in the previous summer are beneficial, possibly because a long feeding-time for caterpillars improves adult survival the next winter. On the whole wet weather is associated with lower adult populations (possibly because of a detrimental effect on the larval stage), but a damp spring was strongly associated with high numbers of Ringlet and Green-veined White adults the following year – perhaps because of good development of food-plants for the summer caterpillars (Pollard, 1988).

Tommy the Miller's Field.

Of course results from a single site for a single field season are almost meaningless – we need to continue the butterfly transect for several years. However it is comforting to note that (although most of us were entirely new to butterfly surveying) our data are broadly similar to those from St Abbs, a nearby site with somewhat similar habitat types. (Records for all sites can be viewed on www.ukbms.org/map.htm). The very high numbers of Ringlets and Meadow Browns recorded in Tommy-the-Miller's for a few weeks around July are entirely consistent with findings on other sites. The recording of good numbers of Orange Tips, and the two Wall Browns sighted, are indicative of the general northward and eastward movement of these species, probably in response to climate change (Parmesan *et al*, 1999).

One thing is, however, already apparent: Tommy the Miller's field is an excellent butterfly habitat. It is south facing (hence with beneficial warmer summer

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temperatures leading to faster larval growth rates, earlier flight periods and increased abundance as discussed by Warren *et al*, 2001). It is undulating, backed by hedges and with plentiful scrub and brambles (giving shelter in almost all wind conditions, the importance of which is described by Dover *et al*, 1997).

Above all the field contains a wide variety of grassland types. These include damp areas with cuckoo flower utilised by Green-veined Whites and Orange Tips, long neutral grassland suitable for Meadow Browns and Ringlets, short grassland with sorrel, the food plant of the Small Copper caterpillar, calcareous grassland with bird's-foot trefoil for Common Blues, patches of bare ground used for basking (and which attracted the Wall Browns), nettle patches for Peacocks, Red Admirals and Small Tortoiseshells to lay eggs and a variety of flowering plants, notably cuckoo flower, thistles and knapweed providing nectar in early spring and well into the autumn, beneficial for all species.

It is, however, extremely important that the field is more heavily grazed in future to maintain this variety of habitat and stop the current rapid advancement of the hawthorn scrub and coarser grasses. Our transect is the ideal monitoring tool for any changes in management.

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APPENDIX 1

Details of Survey Area as supplied to Butterfly Conservation

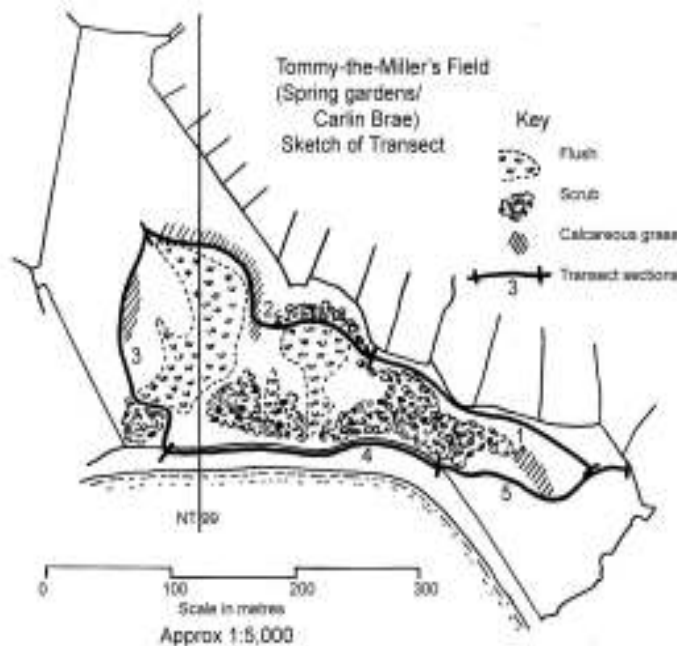
Site Name	Carlin Brae / Spring Gardens (names on OS map) (Tommy-the-Miller's Field usual local name)		County	Northumberland	
OS Grid ref. (6 fig.)	NT 991 535	OS map no. (1:50 000)	75	Year transect established	2006
Transect length (m)	1,025m		Transect width	5M	
Overall habitat description	Dry semi-improved grassland with wet flushes on steep south-facing slope				
Sites conservation status	None				
Owner details	Mr and Mrs MacPherson, Castle Hills Farm, Berwick upon Tweed, TD15 1PB				

SITE MAP: 1;10 000 or 1:12 500 photocopy based on an OS map, showing scale and sections



Tommy-the-Miller's Field
(Spring Gardens/
Carlin Brae)

From 1:10,000 O.S.



TARGET NOTES

As you can see, the area slopes steeply towards the south, sheltered from cold winds.

The main habitat is semi-improved, dry, flower-rich neutral grassland (E2.1) with rush-dominated flushes (D4) (Sections 1&2), but there are areas of more calcareous grassland (E1.2) (Sections 1&3), substantial amounts of impenetrable hawthorn scrub (F3.1) which were necessarily skirted by the transect route (Sections 1,2&4) and Section 4 runs near the Tweed Estuary (A2) on one side (although also including bramble scrub and a warm, sunny wall). To the north of the field (outside the transect) are large mature gardens (privet, buddleja, cabbages, etc).

The field is grazed very rarely by beef cattle – much higher grazing densities would benefit the butterflies' food-plants (e.g. Sorrel, Birdsfoot Trefoil). Hardheads was an excellent nectar source later in the year, as were the numerous thistles.

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Summary of Habitat

			<u>HABITAT</u>	<u>MANAGEMENT</u>
Section No.	Grid Ref.	Section Length (m)	Description/notes & main species	Description/notes
1	NT 992 535	200	Semi-improved grassland – a mix of neutral (on drift) and calcareous (on shallower soils) with dense hawthorn scrub invading rapidly. Mature gardens to north.	Very occasional grazing by cattle, scrub invading rapidly
2	NT 990 536	225	Steep bluffs with shallow calcareous soils and flower-rich grassland, deeper neutral soils mostly semi-improved, and flushes with rushes and willow herb on spring line.	Very occasional grazing by cattle.
3	NT 989 536	200	Dry neutral grassland (finer grasses and sorrel), steep bluffs with calcareous soils (birdsfoot trefoil, etc) and flushed areas adjacent (outside transect)	Very occasional grazing by cattle
4	NT 991 535	225	Tarred path (frequently used), with old sunny wall to north separating off dense bramble scrub. To south is rough grass and salt marsh on edge of estuary.	Ungrazed. Verges of path sometimes strimmed, very occasionally weed-killed (I always complain to council!).
5	NT 993 535	175	Narrow, well-used tarred path through field with mostly neutral grassland. Some flower-rich calcareous grass and invading hawthorn scrub nearby.	Very occasional grazing by cattle

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Appendix 2

Observed species details and status in the United Kingdom Butterfly Monitoring Scheme database.

Common Blue - <http://www.ukbms.org/species106/description.htm>

Green-Veined White - <http://www.ukbms.org/species99/description.htm>

Large White - <http://www.ukbms.org/species98/description.htm>

Meadow Brown - <http://www.ukbms.org/species75/description.htm>

Orange Tip - <http://www.ukbms.org/species4/description.htm>

Painted Lady - <http://www.ukbms.org/species123/description.htm>

Peacock - <http://www.ukbms.org/species84/description.htm>

Red Admiral - <http://www.ukbms.org/species122/description.htm>

Ringlet - <http://www.ukbms.org/species8/description.htm>

Small Copper - <http://www.ukbms.org/species68/description.htm>

Small Tortoiseshell - <http://www.ukbms.org/species2/description.htm>

Small White - <http://www.ukbms.org/species100/description.htm>

Wall - <http://www.ukbms.org/species94/description.htm>