Butterfly Surveys, Knepp Castle Estate, 2014

Transect Survey, Northern & Middle Blocks (with reference to surveys July 2005 – 2013)

Introduction

Butterflies have been the subject of annual surveys, usually in July, for a total of ten years (2005 - 2014 inclusive), as part of the overall monitoring programme to assess the effects of the naturalistic grazing regime first implemented in 2001 and since expanded over much of the Knepp Castle Estate. These surveys of the Northern and Middle Blocks were initially conducted by Rich Howorth of the Sussex Wildlife Trust, but in 2012 the task of monitoring butterflies over the wider Wildland project area was taken on by Neil Hulme, Conservation Adviser for the Sussex Branch of Butterfly Conservation.

The methodology previously employed by Howorth has been maintained for the Northern and Middle Blocks; namely the standard UKBMS Transect technique, the details of which have been described in earlier reports. The key feature to note is the subdivision of the Transect route into 26 recording parcels.

This year the Transect was again walked over two days, as it has proven increasingly difficult to complete the route within a single day, during the hours when butterflies are likely to be on the wing, due largely to significant increases in abundance and diversity. This year the Transect was walked on 17th and 18th July.

Summary

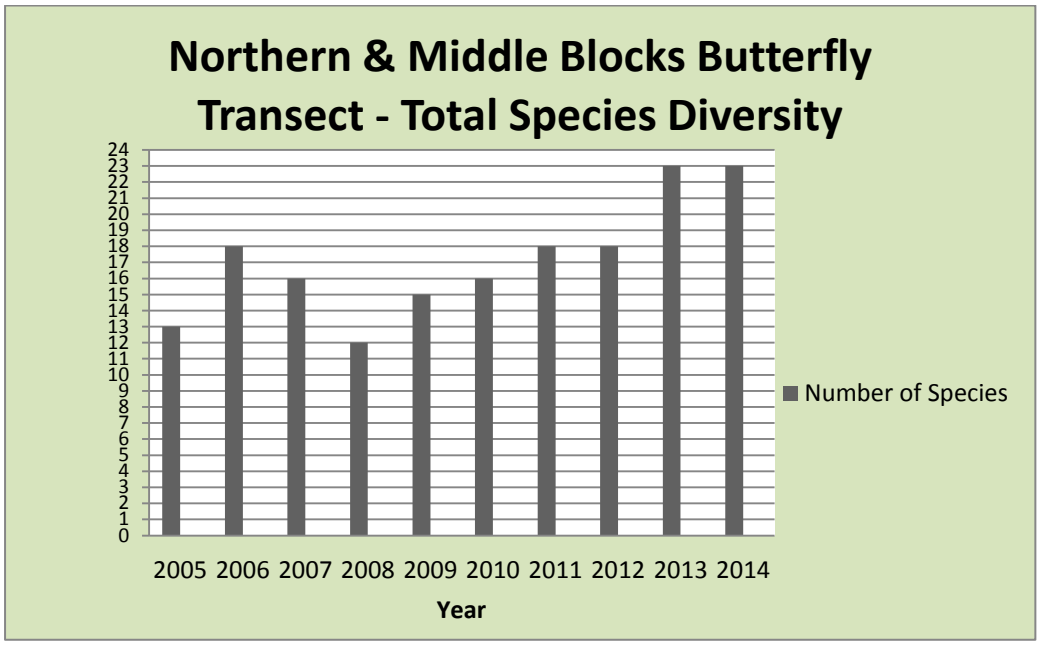
Species diversity was maintained at its highest level (23 species) since surveying commenced in 2005, equalling the 2013 best. This is almost double the figure of 12 species recorded in 2008. Data collected over a ten year period are now providing a firm indication that some species are reacting positively to habitat change across the Northern and Middle Blocks.

An overall improvement in habitat quality across this part of the project area is tentatively suggested by total abundance data. The 2014 count of 2499 individual butterflies represents a 175.5% increase over the figure for 2013, itself a good year. It is also more than double the previous best total count of 1192, made in 2007. However, it will be some time before the possible influence of favourable weather patterns can be assessed.

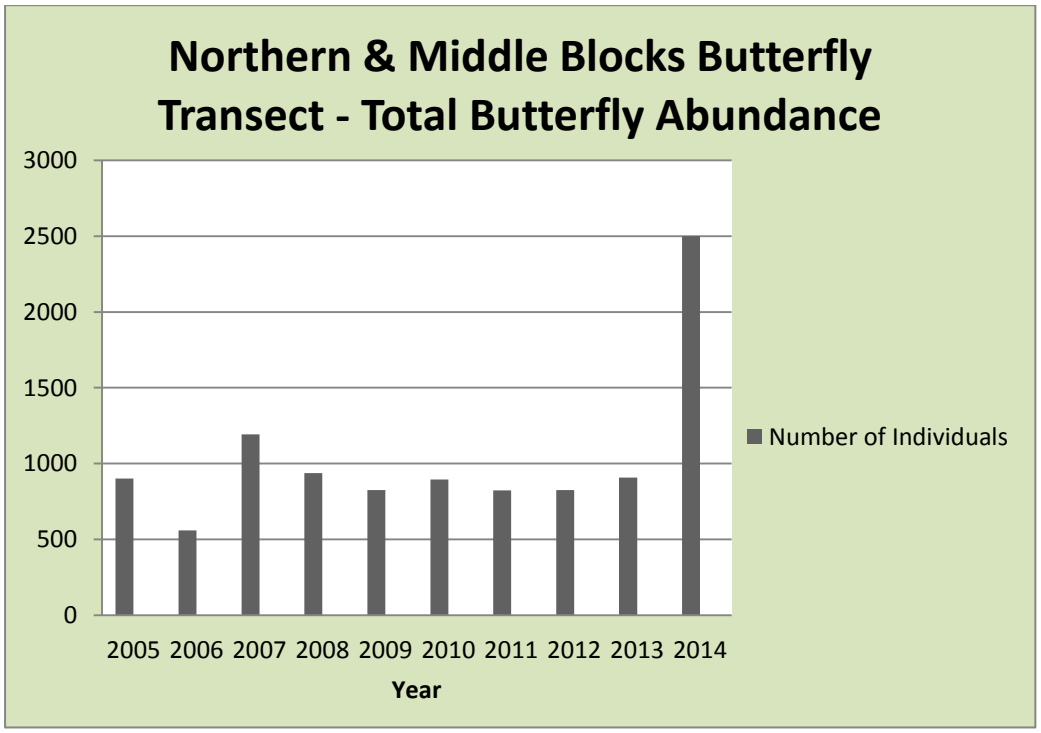
The biggest 'winners' of 2014 were the 'golden skippers', this being an informal grouping of the very similar Small and Essex Skippers, which showed increases over 2013 figures of 1174% and 960% respectively.

The White-letter Hairstreak appeared for the first time on formal surveys, although there have been previous sightings elsewhere on the Wildland (Oates, M., pers. comm.). This brings the total number of species recorded by Howorth and Hulme (2005 – 2014) to 32, representing 71% of the Sussex butterfly fauna.

Results



This bar chart shows the total number of species seen (species diversity) along the Transect route across the Northern and Middle Blocks between 2005 and 2014.



This bar chart shows the total number of butterflies counted along the Transect route across the Northern and Middle Blocks between 2005 and 2014.

NORTHERN & MIDDLE BLOCKS BUTTERFLY TRANSECT – TRANSECT SECTIONS: SPECIES DIVERSITY										
Parcel Number	2005 Spp.	2006 Spp.	2007 Spp.	2008 Spp.	2009 Spp.	2010 Spp.	2011 Spp.	2012 Spp.	2013 Spp.	**2014 Species**
1	4	6	1	5	7	3	6	1	2	**4**
2	3	7	6	4	5	5	9	2	4	**4**
3	1	1	4	4	1	2	3	1	5	**7**
4	4	9	8	6	9	7	11	5	6	**8**
5	3	6	5	5	8	4	9	8	10	**11**
6	4	4	5	6	7	7	7	5	7	**10**
7	5	9	6	7	7	3	6	4	10	**9**
8	6	7	8	8	7	9	10	7	9	**13**
9	1	4	4	7	4	6	4	9	11	**8**
10	3	2	9	5	8	3	3	3	5	**9**
11	3	4	3	3	5	5	2	5	6	**5**
12	2	4	5	4	6	4	3	7	11	**7**
13	3	5	3	4	2	2	4	4	5	**3**
14	2	3	4	5	8	5	2	6	6	**10**
15	5	7	6	4	5	4	1	4	7	**10**
16	2	1	2	3	5	1	2	2	5	**7**
17	4	5	4	4	6	5	5	4	5	**9**
18	2	5	3	3	2	2	2	4	3	**6**
19	3	3	5	5	3	6	3	2	6	**7**
20	1	1	1	2	1	2	1	3	2	**5**
21	3	2	3	5	1	4	2	5	9	**7**
22	4	2	2	4	1	4	1	4	7	**13**
23	No data	No data	No data	No data	No data	No data	No data	2	0	**2**
24	3	0	0	2	0	1	1	0	1	**0**
25	3	0	2	2	1	0	1	3	4	**5**
26	3	0	1	2	1	0	1	2	3	**8**
ALL	13	18	16	12	15	16	18	18	23	**23**

This table shows the total number of species seen (species diversity) in each of the 26 recording parcels along the Transect route across the Northern and Middle Blocks between 2005 and 2014.

NORTHERN & MIDDLE BLOCKS BUTTERFLY TRANSECT – TRANSECT SECTIONS: ABUNDANCE OF INDIVIDUALS										
Parcel Number	2005 Individuals	2006 Individuals	2007 Individuals	2008 Individuals	2009 Individuals	2010 Individuals	2011 Individuals	2012 Individuals	2013 Individuals	**2014 Individuals**
1	30	31	7	23	17	4	24	10	8	**23**
2	6	17	32	30	30	68	57	16	35	**24**
3	4	1	6	4	1	13	3	1	8	**22**
4	90	57	163	160	151	66	90	64	46	**152**
5	61	42	92	96	106	106	177	125	59	**371**
6	19	11	20	11	21	50	38	12	34	**43**
7	70	103	45	64	38	73	32	26	76	**128**
8	64	45	63	60	43	103	89	41	74	**170**
9	10	32	31	64	31	32	16	124	136	**313**
10	13	10	18	24	24	20	15	6	18	**17**
11	28	20	10	11	5	39	6	6	12	**19**
12	27	19	52	62	87	54	55	85	64	**267**
13	33	33	74	36	12	7	23	18	13	**57**
14	26	24	130	42	109	71	16	41	77	**163**
15	51	32	23	9	26	23	1	22	67	**86**
16	14	4	30	27	41	5	7	15	24	**55**
17	95	37	86	45	26	56	41	64	58	**141**
18	42	14	38	22	10	3	18	25	11	**30**
19	44	10	77	40	16	50	24	16	20	**71**
20	10	1	25	6	5	5	7	20	2	**22**
21	12	14	42	26	1	35	19	40	24	**63**
22	75	3	89	49	12	10	28	28	28	**184**
23	No data	No data	No data	No data	No data	No data	No data	4	0	**21**
24	48	0	0	2	0	2	1	0	1	**0**
25	5	0	27	14	9	0	16	13	8	**42**
26	24	0	12	10	4	0	1	4	4	**15**
ALL	901	560	1192	937	825	895	824	826	907	**2499**

This table shows the total number of butterflies counted in each of the 26 recording parcels along the Transect route across the Northern and Middle Blocks between 2005 and 2014.

NORTHERN & MIDDLE BLOCKS BUTTERFLY TRANSECT – RECORDED SPECIES: TOTAL ABUNDANCE										
Species	2005 Abund	2006 Abund	2007 Abund	2008 Abund	2009 Abund	2010 Abund	2011 Abund	2012 Abund	2013 Abund	**2014 Abund**
Small Skipper	35	23	1	38	9	8	21	15	62	**790**
Essex Skipper	3	0	33	0	0	11	9	41	15	**159**
Large Skipper	2	1	1	2	2	1	6	0	5	**14**
Clouded Yellow	0	1	0	0	0	0	0	0	1	**0**
Brimstone	2	1	0	0	0	0	0	6	2	**1**
Large White	9	62	27	45	24	18	20	3	55	**15**
Small White	15	16	19	42	36	20	70	0	7	**6**
Green-veined White	0	4	4	2	3	6	5	43	124	**123**
Purple Hairstreak	0	2	1	0	0	0	0	1	1	**13**
Small Copper	0	0	0	0	1	5	3	1	2	**1**
Small Blue	0	1	0	0	0	0	0	0	0	**0**
Brown Argus	0	0	1	0	0	0	2	0	0	**0**
Common Blue	0	21	0	0	1	43	1	1	2	**1**
Holly Blue	0	0	0	0	0	0	0	1	0	**0**
White Admiral	0	0	1	0	0	0	0	1	0	**3**
Purple Emperor	0	0	0	0	0	0	0	0	1	**0**
Red Admiral	0	3	0	0	0	2	7	0	1	**4**
Painted Lady	0	7	2	0	313	0	0	0	2	**3**
Small Tortoiseshell	0	0	0	0	0	0	0	1	1	**8**
Peacock	1	0	4	17	19	1	2	2	19	**37**
Comma	2	2	0	4	8	1	2	2	6	**11**
Silver-washed Fritillary	13	16	26	19	34	59	38	20	60	**70**
Speckled Wood	5	6	5	10	9	9	17	6	6	**2**
Marbled White	0	0	0	1	0	2	1	1	4	**33**
Gatekeeper	198	179	92	138	131	332	187	154	164	**251**
Meadow Brown	611	214	974	619	233	377	431	527	364	**946**
Ringlet	5	1	1	0	2	0	2	0	3	**4**
White-letter Hairstreak	0	0	0	0	0	0	0	0	0	**4**

TOTAL SPECIES = 28

This table shows the total number of butterflies of each species counted along the Transect route across the Northern and Middle Blocks between 2005 and 2014.

NORTHERN & MIDDLE BLOCKS BUTTERFLY TRANSECT – RECORDED SPECIES: FREQUENCY (IN PARCELS)										
Species	2005 Frequency	2006 Frequency	2007 Frequency	2008 Frequency	2009 Frequency	2010 Frequency	2011 Frequency	2012 Frequency	2013 Frequency	**2014 Frequency**
Small Skipper	5	5	1	9	3	4	8	6	11	**19**
Essex Skipper	1	0	11	0	0	4	4	15	5	**12**
Large Skipper	1	1	1	1	2	1	3	0	2	**5**
Clouded Yellow	0	1	0	0	0	0	0	0	1	**0**
Brimstone	1	1	0	0	0	0	0	5	2	**1**
Large White	7	13	13	16	12	5	7	3	19	**11**
Small White	7	7	12	17	11	8	10	0	4	**3**
Green-veined White	0	3	4	2	3	4	4	14	21	**20**
Purple Hairstreak	0	1	1	0	0	0	0	1	1	**6**
Small Copper	0	0	0	0	1	2	3	1	1	**1**
Small Blue	0	1	0	0	0	0	0	0	0	**0**
Brown Argus	0	0	1	0	0	0	1	0	0	**0**
Common Blue	0	6	0	0	1	9	1	1	2	**1**
Holly Blue	0	0	0	0	0	0	0	1	0	**0**
White Admiral	0	0	1	0	0	0	0	1	0	**2**
Purple Emperor	0	0	0	0	0	0	0	0	1	**0**
Red Admiral	0	3	0	0	0	2	4	0	1	**4**
Painted Lady	0	4	2	0	11	0	0	0	2	**2**
Small Tortoiseshell	0	0	0	0	0	0	0	1	1	**3**
Peacock	1	0	3	10	8	1	1	2	8	**15**
Comma	2	2	0	4	6	1	1	1	4	**7**
Silver-washed Fritillary	3	5	6	5	9	6	4	7	10	**10**
Speckled Wood	3	5	4	4	3	3	4	4	4	**2**
Marbled White	0	0	0	1	0	2	1	1	4	**10**
Gatekeeper	23	17	17	16	17	19	17	15	18	**23**
Meadow Brown	26	21	22	24	22	23	24	23	24	**25**
Ringlet	1	1	1	0	1	0	2	0	3	**4**
White-letter Hairstreak	0	0	0	0	0	0	0	0	0	**1**

TOTAL SPECIES = 28

This table shows the total number of recording parcels in which each species of butterfly was seen (frequency) along the Transect route across the Northern and Middle Blocks between 2005 and 2014.

Interpretation

1) The first bar chart (Northern & Middle Blocks Butterfly Transect – Total Species Diversity) shows that species diversity was maintained at its highest level (23 species) since monitoring commenced in 2005, equalling the 2013 best. This is almost double the figure of 12 species recorded in 2008. Data collected over a ten year period are now providing a firm indication that some species are reacting positively to habitat change across the Northern and Middle Blocks.
2) The second bar chart (Northern & Middle Blocks Butterfly Transect – Total Butterfly Abundance) shows a very significant increase in the total number of butterflies recorded over the Transect route. The 2499 total for 2014 represents a 175.5% increase over the previous year. This is more than double the previous highest count of 1192 in 2007. These figures tentatively suggest an overall improvement in habitat quality across this part of the project area. However, a data spike such as this might be at least partly attributable to favourable weather patterns, and further monitoring will be required before its significance becomes clearer.
3) The second table (Northern & Middle Blocks Butterfly Transect – Transect Sections: Abundance of Individuals) demonstrates the continuing improvement in Transect parcel 9 (particularly over Saddleback, east of Horsham Common – see 2012 and 2013 reports), as measured by the total number of individuals. This probably remains attributable to an increased incidence of thistle (*Cirsium* spp.), which provides a good source of nectar and draws butterflies in from a wide area.

   The first two tables (Northern & Middle Blocks Butterfly Transect – Transect Sections: Species Diversity and Northern & Middle Blocks Butterfly Transect – Transect Sections: Abundance Of Individuals) show significant increases in both total butterfly abundance and species diversity over Transect parcel 22, encompassing a series of fields immediately west of the A24 and south of the Adur. The 13 species recorded in 2014 is a significant improvement over the 7 of 2013, and the previous best of 4 species prior to that. An increase in the diversity of both grasses and flowering plants is probably driving this improvement in the local butterfly fauna.
4) The third table (Northern & Middle Blocks Butterfly Transect – Recorded Species: Total Abundance) clearly shows that the biggest 'winners' of 2014 were the 'golden skippers', this being an informal grouping of the very similar Small and Essex Skippers, which showed increases over 2013 figures of 1174% (790 individuals) and 960% (159 individuals) respectively. The latter species is probably under-represented, due to the difficulties involved in identifying every specimen, but when 'lumped' together these skippers demonstrate a 1132% increase over the 2013 figure.

   The third and fourth tables (Northern & Middle Blocks Butterfly Transect – Recorded Species: Total Abundance and Northern & Middle Blocks Butterfly Transect – Recorded Species: Frequency [In Parcels]) demonstrate an increase in both abundance and spread of the Marbled White, with the 2014 count of 33 spread over 10 recording parcels being a significant improvement upon the previous best of 4 individuals (2013). However, the significance of this is as yet unclear, bearing in mind that the species had a very strong year across the whole of Sussex.

   In 2014 the White-letter Hairstreak appeared for the first time on formal surveys, although there have been previous sightings elsewhere on the Wildland (Oates, M., pers. comm.). This brings the total number of species recorded by Howorth and Hulme (2005 – 2014) to 32, representing 71% of the Sussex butterfly fauna.

Timed Count Survey, Southern Block, June 2014

Introduction

In 2012 the decision was taken to increase the number and spread of butterfly surveys across the Wildland project area. Two of these additional, annual surveys focus on a fixed route, planned to cover a variety of habitats over part of the Southern Block.

One of the aims of this spring survey is to record species which potentially occur on the Estate, but which fly earlier in the year, thus avoiding 'capture' by the original recording regime.

The methodology employed for these two surveys is significantly different to the standard UKBMS Transect technique employed for the Northern and Middle Blocks area. The Transect technique does have limitations when only performed on a single day each year, rather than the recommended 26 weekly repetitions. These Southern Block surveys will be conducted as Timed Counts, with a standardised period of recording being spent (flexibly) within each of the named survey sections (e.g. 'Sallow Fields') along the route. A more generous survey corridor will be allowed (20 m width, rather than 5 m) and there will be no ceiling to the recording cube, allowing for the easier 'capture' of arboreal species. There will be no requirement to walk at a steady, rapid pace, so that more interesting habitat patches can be examined more thoroughly, potentially allowing for the sighting of less common butterflies; indeed some species are notoriously adept at avoiding inclusion within Transect counts. Wind speed, cloud cover and temperature will be recorded. Precise details of this Southern Block route, including the time limits for each survey section, are appended to this year's report (see Timed Count survey route map).

Summary

The spring survey again recorded relatively few butterflies, with 8 species contributing towards a total of only 19 individuals.

However, despite the modest results achieved so far, there remains real potential for colonisation of the Wildland by several early season species, including Green Hairstreak, Dingy and Grizzled Skipper.

Results

SOUTHERN BLOCK BUTTERFLY SURVEY (TIMED COUNT) – JUNE 2014											
	Survey Section										
Species	Green Lane Approach	Green Lane	Pen Bridge North	Pen Bridge West	The Strip	Brookhouse Farm	Sallow Fields	Grasslands	Woodland Block	Emperor Walk	**Total Species Counts**
Large Skipper				1							**1**
Green-veined White	1	4									**5**
Common Blue			1								**1**
Small Heath				1							**1**
Speckled Wood	1								1		**2**
Meadow Brown			1					1			**2**
Red Admiral		5									**5**
Small Tortoiseshell				1		1					**2**
TOTAL SECTION COUNTS	**2**	**9**	**2**	**3**	**0**	**1**	**0**	**1**	**1**	**0**	**19**
TOTAL SECTION SPECIES	**2**	**2**	**2**	**3**	**0**	**1**	**0**	**1**	**1**	**0**	

TOTAL SPECIES = 8

This table shows the number of butterflies of each species counted in each named survey section (e.g. 'Sallow Fields') along the Timed Count survey route across the Southern Block in June 2014.

Timed Count Survey, Southern Block, July 2014

Introduction

In 2012 the decision was taken to increase the number and spread of butterfly surveys across the Wildland project area. Two of these additional, annual surveys focus on a fixed route, planned to cover a variety of habitats over part of the Southern Block. This particular survey, conducted on 16th July, was designed to 'capture' high summer species over a previously (pre-2012) unsampled area of the Estate.

The methodology employed for these two surveys is significantly different to the standard UKBMS Transect technique employed for the Northern and Middle Blocks area. The Transect technique does have limitations when only performed on a single day each year, rather than the recommended 26 weekly repetitions. These Southern Block surveys will be conducted as Timed Counts, with a standardised period of recording being spent (flexibly) within each of the named survey sections (e.g. 'Sallow Fields') along the route. A more generous survey corridor will be allowed (20 m width, rather than 5 m) and there will be no ceiling to the recording cube, allowing for the easier 'capture' of arboreal species. There will be no requirement to walk at a steady, rapid pace, so that more interesting habitat patches can be examined more thoroughly, potentially allowing for the sighting of less common butterflies; indeed some species are notoriously adept at avoiding inclusion within Transect counts. Wind speed, cloud cover and temperature will be recorded. Precise details of this Southern Block route, including the time limits for each survey section, are appended to this year's report (see Timed Count survey route map).

Summary

The July survey results proved to be remarkably consistent with the 2013 data, both in terms of total abundance (1145 vs. 1137 individuals) and diversity (23 vs. 23 species). Very little information can be gleaned from such an apparent status quo, particularly during the first few years of monitoring.

However, these data do suggest that the spectacular changes recently observed in the butterfly fauna across the Northern and Middle Blocks are more likely attributable to an improvement in habitat conditions, rather than more universal factors such as favourable weather patterns.

Results

SOUTHERN BLOCK BUTTERFLY SURVEY (TIMED COUNT) – JULY 2014											
	Survey Section										
Species	Green Lane Approach	Green Lane	Pen Bridge North	Pen Bridge West	The Strip	Brookhouse Farm	Sallow Fields	Grasslands	Woodland Block	Emperor Walk	**Total Species Counts**
Small Skipper		3	30	73	13	61	19	46	1	10	**256**
Essex Skipper						11	1	4		3	**19**
Large Skipper		7			1						**8**
Brimstone		1				3					**4**
Large White		2		1		4	1				**8**
Small White						1					**1**
Green-veined White	3	8	3	5	3	11	1	1	2	8	**45**
Purple Hairstreak	2	2			1		1	1			**7**
Holly Blue		1				1					**2**
Small Copper				1	1						**2**
Purple Emperor						1				3	**4**
Red Admiral						1	2				**3**
Peacock	1	2	3	2	2	15	1	4		1	**31**
Small Tortoiseshell						2				1	**3**
Comma	1					2					**3**
Silver-washed Fritillary						1					**1**
Marbled White	1	1		11	2	17		2		1	**35**
Speckled Wood		2									**2**
Gatekeeper	4	33	3	45	8	43	9	33	1	19	**198**
Meadow Brown	5	32	69	94	39	73	24	89	13	66	**504**
Ringlet	4	1		1		1					**7**
Small Heath			1								**1**
Painted Lady								1			**1**
TOTAL SECTION COUNTS	**21**	**95**	**109**	**233**	**70**	**248**	**59**	**181**	**17**	**112**	**1145**
TOTAL SECTION SPECIES	**8**	**13**	**6**	**9**	**9**	**17**	**9**	**9**	**4**	**9**	

TOTAL SPECIES = 23

This table shows the number of butterflies of each species counted in each named survey section (e.g. 'Sallow Fields') along the Timed Count survey route across the Southern Block in July 2014.

Interpretation

1) The July survey revealed an impressive number and diversity of butterflies, with 1145 individuals and 23 species being recorded across this part of the Southern Block. These figures are remarkably similar to the 1137 individuals and 23 species recorded in 2013. Very little information can be gleaned from such an apparent status quo, particularly during the early years of monitoring.
2) Unsurprisingly, the Meadow Brown and Gatekeeper were again well represented within the butterfly fauna, contributing 61% to the total count, this being slightly lower than the 67% measured in 2013.

   The biggest change observed was a significant increase in the abundance of the Small Skipper, with 256 individuals easily outstripping the 99 recorded in 2013. A population explosion of this species was observed over the Northern and Middle Blocks this year.

Single Species Survey (Purple Emperor), Southern Block, June - July 2014

Introduction

In 2013 several additional butterfly surveys were added to the already improved and extended programme covering the Wildland project area. In addition to the more formalised UKBMS style Transect (2005 onwards), Timed Counts (2012 onwards) and Brown Hairstreak egg searches (winter 2012/2013 onwards), there are now focused, Single Species surveys for the Purple Emperor. This species is invariably under-recorded by most standardised survey methods, due to its arboreal lifestyle and highly elusive habits. Numerous casual records of the Purple Emperor are also now collated each season, often arising from field trips run as part of the Knepp Safaris programme.

The methodology employed is very informal, involving a search of the areas considered most likely to reveal the presence of the butterfly, based on detailed knowledge of the species' autecology. As this requires a considerable level of experience, the results are not necessarily repeatable by other observers.

Summary

A total of 313 sightings of this usually elusive species were made in 2014 by Hulme, Oates and Fosterjohn alone. The Purple Emperor's flight season on the Southern Block project area ran from at least 22nd June to 31st July. The majority of individuals were observed within the one kilometre squares at TQ1319, TQ1320 and TQ1420.

Although maximum daily counts were significantly down on 2013, the best being a tally of 45 male butterflies on 24th June, the data clearly confirm this as the second largest Purple Emperor population in the UK.

Results

Date	22.6	24.6	27.6	3.7	4.7	5.7	6.7	7.7	13.7	16.7	21.7	22.7	31.7
Total Counts	18	45	40	42	23	31	22	26	30	21	5	5	5

Interpretation

1) The Purple Emperor's flight season in the Southern Block project area ran from at least 22nd June to 31st July. However, the count of 18 male butterflies on the former date suggests that the species started to emerge several days earlier than this. The majority of individuals were observed within the one kilometre squares at TQ1319, TQ1320 and TQ1420.
2) A total of 313 sightings of this usually elusive species were made in 2014 by Hulme, Oates and Fosterjohn alone. However, maximum daily counts were significantly down on 2013, the best being a tally of 45 male butterflies on 24th June; in 2013 peak counts of 84 and 71 were made. This dip in numbers is entirely in line with the national picture for the species in 2014, and the data clearly confirm this as the second largest Purple Emperor population in the UK.
3) Field observations again demonstrate that the Purple Emperor should not be considered a species confined to mature, oak-rich woodland habitats. It is clearly able to thrive in much more open countryside, in areas where suitable specimens of its food-plant (*Salix* spp.) grow in profusion.

4) The Purple Emperor is a much sought-after species and the presence of such a strong population on the estate has drawn considerable interest from wildlife enthusiasts. The lure of this iconic butterfly has attracted a large number of visitors in 2014, both as individuals and in guided groups through the Knepp Safaris field programme. It is hoped that the Purple Emperor population will continue to help in raising awareness and understanding of the Wildland project long into the future.

Brown Hairstreak Egg Survey, All Blocks, Winter 2013/2014

Introduction

Winter Brown Hairstreak butterfly egg surveys are now included as part of the extended Knepp Castle Estate Wildland monitoring programme, initiated during 2012. This short report sets out the findings of searches conducted over three locations within the Southern Block project area, and a further three situated just outside the project area boundary. Surveys were performed by independent consultant Neil Hulme, over a total period of seven hours, on 19th and 21st January 2014.

The methodology employed is straightforward and easily repeatable, involving a timed count over areas where suitable blackthorn growth occurs. A measure of their relative density is achieved by calculating the number of eggs discovered per hour of searching.

The survey areas examined this year fall into three categories.

1) Control: Brookhouse 5 (east), which yielded by far the greatest density of eggs in the previous survey (23 per hour), is now used as a 'control', with annual recounts being made to give some idea of the species' breeding success each season. This will allow for a fairer comparison of results over different areas of the estate from year to year.

2) Wildland Project Area: A further two locations within the boundaries of the Southern Block project area were surveyed, continuing the systematic searches first performed in early 2013.

3) Outside Project Area: Three locations just outside the boundaries of the project area were surveyed, in order to compare egg densities where browsing pressure is likely to be significantly lower than on the Wildland.

Summary

Egg density in the Brookhouse 5 (east) Control section (19 per hour) was similar to that observed in the last survey (23 per hour), suggesting that results obtained this year are broadly comparable with data collected in 2013.

The survey of eggs in a further two locations within the boundaries of the Southern Block project area revealed very low densities, ranging from zero discoveries per hour, to just 1. These results are slightly poorer than the figures previously obtained over this part of the Wildland (1 – 4 discoveries per hour), with the exception of Brookhouse 5 (east).

Egg densities were significantly higher in areas immediately outside the Southern Block project area, recorded at 6, 16 and 20 eggs per hour.

Although more work is required, early results suggest that livestock browsing pressure over large parts of the Wildland is significantly reducing the local population of Brown Hairstreak, by removing a very large proportion of the young blackthorn shoots upon which the butterfly selectively lays its eggs.

Support for this interpretation is provided by examination of the blackthorn itself. At first sight, the widespread occurrence of suckers around the bases of many hedgerows and thickets appears to provide ideal breeding habitat for the butterfly. However, these short suckers are actually composed of tough, older wood, now invariably caked in lichens. Younger shoots of fresh-looking, purplish-grey blackthorn on which female hairstreaks prefer to lay their eggs are all-but-absent in most areas examined.

Results

BROWN HAIRSTREAK EGG SURVEY (TIMED COUNT) ALL BLOCKS – WINTER 2013/2014						
Survey Area	Brookhouse 5 (east)	Bentons Place, Brookhouse 13, Keens Field	Shipley Church River Section	Tree Field	Oakfield, Honeypools Hs, Rainbow, Hammer	Countryman Lane (east of Hammer)
Grid Ref	TQ135197	TQ140200	TQ145217	TQ137215	TQ145212	TQ147212
Date	19/1/2014	19/1/2014	21/1/2014	21/1/2014	21/1/2014	21/1/14
Time	1 hour	2 hours	1 hour	0.5 hour	2 hours	0.5 hour
Number Eggs	19	0	16	3	2	10
Eggs Per Hour	19	0	16	6	1	20

TOTAL EGGS = 50

This table shows the number of Brown Hairstreak eggs found in each survey area and their relative density, measured as the number of eggs discovered per hour by searching suitable blackthorn growth.

Interpretation

1) Egg density in the Brookhouse 5 (east) Control section (19 per hour) was similar to that observed in the last survey (23 per hour), suggesting that results obtained this year are broadly comparable with data collected in 2013.

   The density of eggs in this particular location is much higher than that recorded elsewhere within the Wildland area, and is similar to some of the more productive areas outside the project boundary fences. This may be due to one of, or a combination of, several factors.

   The Brookhouse 5 (east) Control section lies in quite close proximity to the Brown Hairstreak master trees (male assembly area) discovered in August 2012 at the Hooklands Lane/Green lane intersect (grid ref: TQ134193). This location is therefore likely to represent a population hotspot, where relatively high egg counts are to be expected, despite significant browsing pressure.

   This hedgerow runs alongside a well-used, public 'green lane' and browsing may be reduced due to the regular passage of walkers and riders nearby. A proportion of the blackthorn also grows behind a protective, barbed-wire fence.

2) The survey of eggs in a further two locations within the boundaries of the Southern Block project area revealed very low densities, ranging from zero discoveries per hour (Bentons Place, Brookhouse 13, Keens Field), to just 1 (Oakfield, Honeypools House, Rainbow, Hammer). These results are slightly poorer than the figures previously obtained over this part of the Wildland (1 – 4 discoveries per hour), with the exception of Brookhouse 5 (east).

The very low egg counts over these areas are attributed to heavy browsing of the younger blackthorn growth. The 2 eggs discovered in a 2 hour search of the Oakfield to Hammer section were both found on new shoots growing through the Wildland boundary fence, bordering Countryman Lane.

3) Egg densities were significantly higher in areas immediately outside the Southern Block project area, recorded at 6 (Tree Field), 16 (Shipley Church River Section) and 20 (Countryman Lane east of Hammer) eggs per hour. The latter location lies only a couple of metres beyond the Wildland boundary fence, adjacent to an area which yielded only 1 egg per hour.

4) Although more work is required, early results suggest that livestock browsing pressure over large parts of the Wildland is significantly reducing the local population of Brown Hairstreak, by removing a very large proportion of the young blackthorn shoots upon which the butterfly selectively lays its eggs.

Support for this interpretation is provided by examination of the blackthorn itself. At first sight, the widespread occurrence of suckers around the bases of many hedgerows and thickets appears to provide ideal breeding habitat for the butterfly. However, these short suckers are actually composed of tough, older wood, now invariably caked in lichens. Younger shoots of fresh-looking, purplish-grey blackthorn on which female hairstreaks prefer to lay their eggs are all-but-absent in most areas examined.

The degree to which the blackthorn within the Wildland is currently being browsed may reflect pressures more complex than livestock density alone. One of the more spectacular (although almost certainly short-term) effects of abandoning the traditional management of arable land is the periodic dominance of some invasive plant species. Currently, large areas within the project area appear to be under a 'blanket' of Fleabane

(*Pulicaria dysenterica*). This will reduce the available grass for herbivores, possibly driving a greater reliance on the browsing of shrubs.