

## **Report on 2018 Seaford Head butterfly surveys.**

**(PD Feb 2019 vsn 030219a)**

This report:

- presents the main results from the 2018 surveys
- describes changes in the survey design between 2017 and 2018
- provides some limited comparison of the two years' results.

There are four main parts to the body of the report

- an introduction and a summary of the main survey changes and numbers of sightings (Sections 1-3)
- more detail on the route changes and the corresponding changes in sightings per 100m on each part of each transect (section 4)
- a description of which species were observed and when they were seen, plus a discussion of any differences in the distribution of species between the transects and the years (sections 5-8)
- a summary and some very brief conclusions (Section 9)

***N.B. Some parts of this reporting (especially section 4) will be most relevant to those who devised the surveys and are interested in the performance of individual route sections after the 2018 modifications. For this reason, readers who are mainly interested in what butterflies were seen on the surveys might want to skip section 4.***

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## 1. Introduction

The current series of weekly Seaford Head butterfly surveys began in 2017. Two routes are being surveyed: one in the east, along rides from South Barn to Hope Gap, and across rough pasture to the east of Hope Gap; the other covering grassland and rides to the west, on the slopes above Chyngton Road.

There were two main changes to the surveys between 2017 and 2018. Firstly, the surveying was able to start earlier in 2018, because much of the preparatory work on the routes and materials was already done. Secondly, there were substantial changes to both routes following analysis of the 2017 data and discussions with Sussex Wildlife Trust (SWT). These changes increased the length of the eastern route from 1870 to 2835 metres and the number of sections from 9 to 12. The length of the western route was reduced from 2600 to 2100 metres, but the number of sections increased from 11 to 14. Section 4 gives more details of these route changes.

## 2. Changes to start dates - surveying started earlier in 2018

In 2017, the first year of the survey, routes, rotas and materials were still being developed in early Spring and the surveying did not start until May in the east, and July in the west. In 2018, we were able to start earlier on both transects and conducted 58 surveys, compared with 38 in 2017.

**Table 1 Start dates**

|      |      | Start week | End week | N of surveys | Av. N of sightings per survey | Total sightings |
|------|------|------------|----------|--------------|-------------------------------|-----------------|
| East | 2017 | 20th May   | 19th Oct | 22           | 85                            | 1876            |
| East | 2018 | 6th April  | 24th Oct | 30           | 130                           | 4043            |
| West | 2017 | 1st July   | 24th Oct | 16           | 63                            | 875             |
| West | 2018 | 6th April  | 5th Oct  | 28           | 82                            | 2230            |

## 3. Total number of sightings in each year

Total sightings were 6273 in 2018 and 2751 in 2017. The average number of sightings per survey was 108 in 2018, compared with 72 in 2017. Table 2 provides a monthly breakdown of the average numbers of sightings per survey for both years.

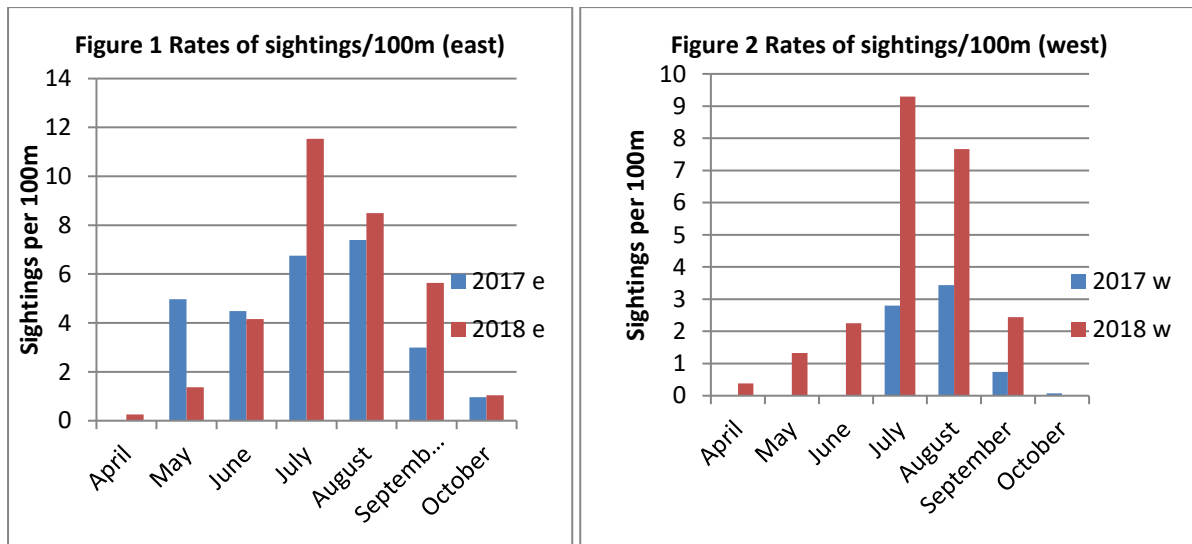
**Table 2 Average number of observations per survey session**

|      |     | April | May | June | July | August | September | October |
|------|-----|-------|-----|------|------|--------|-----------|---------|
| 2017 | E   | x     | 93  | 84   | 126  | 138    | 56        | 18      |
|      | W   | x     | x   | x    | 73   | 89     | 19        | 2       |
|      | ALL | x     | 93  | 84   | 97   | 111    | 40        | 11      |
| 2018 | E   | 7     | 39  | 118  | 327  | 241    | 160       | 30      |
|      | W   | 8     | 28  | 47   | 195  | 161    | 51        | x       |
|      | ALL | 8     | 32  | 86   | 261  | 201    | 100       | 30      |

During the months of July to September, when both transects were being surveyed in both years, the average number of sightings per survey was 185 in 2018 and 86 in 2017. The low number of sightings in September 2017 partly explains the difference in these averages.

Rather than using the crude number of sightings for comparisons, the number of sightings per 100m walked/surveyed is a better measure, as this corrects for both the changes in the length of the transects and the differences in the number of surveys.

Monthly rates of sightings (per 100m surveyed) for the east and west are shown in Figures 1 and 2. Typically these range from less than one sighting per 100m, to more than 10. The most striking point is that while the 2018 rates are much higher for both the east and west from July to September (there were no western surveys before July in 2017), the 2017 eastern rates for May and June 2017 were higher than those for 2018.



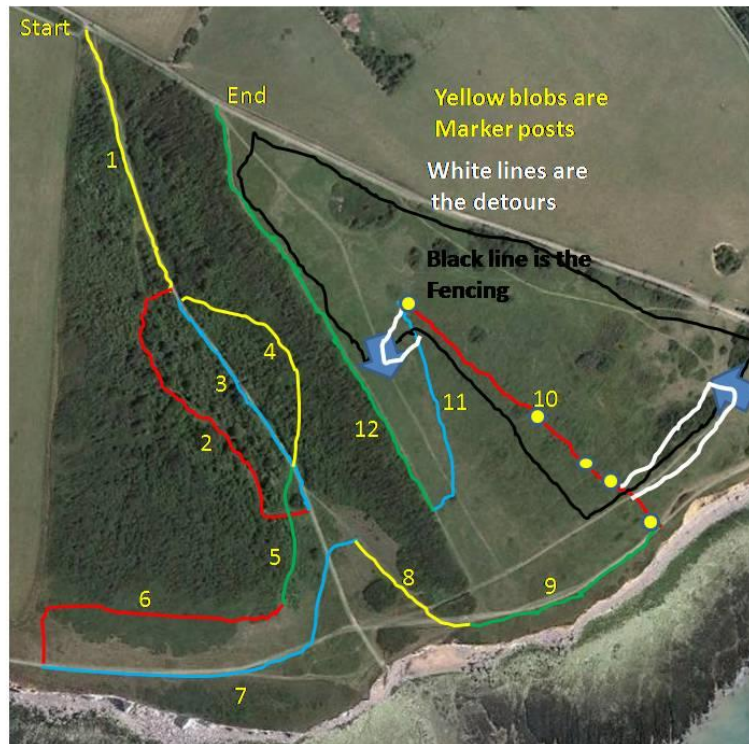
In trying to understand the reasons for these changes, it is hard to distinguish effects due to weather from those due to changes of route and therefore habitat. Possible weather effects are briefly explored in Annex 2 which tests for any associations between the sun, temperature and wind data (as recorded on the survey sheets) and the number of sightings in the eastern transect. No clear trends were found, not least because these data from the record sheets only refer to the days on which we survey, which are unrepresentative (since we tend to choose the best days), and therefore do not necessarily reflect the general weather patterns that influence numbers and species in the butterfly populations.

The next two sections consider whether the changes to the routes and hence the habitats along the transects have influenced the number and species of butterflies observed.

#### 4. Route changes and density of sightings in the transect sections

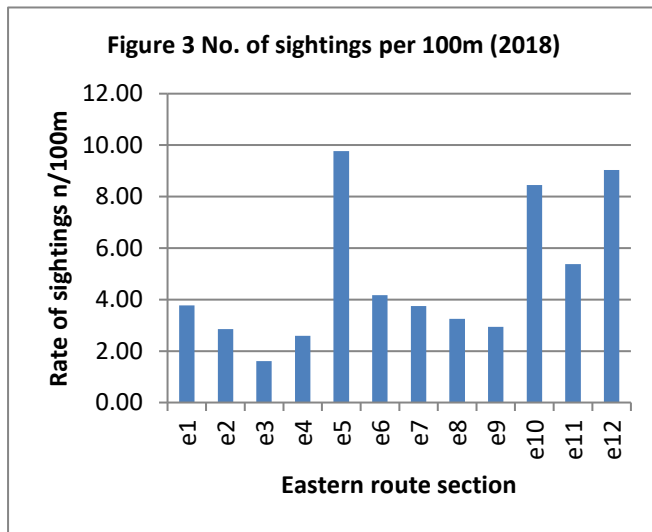
Following analysis of the 2017 data, and discussions with Sussex Wildlife Trust (SWT), there were substantial changes to the routes for 2018.

**4.1 The eastern route** . Particular attention was paid to the redesign of the new eastern route as this is to be fixed for several years, so that the sightings can be uploaded to the UK Butterfly Monitoring Service (UKBMS) database. The 2018 route has now been registered with the UKBMS and the 2018 sightings were uploaded in November.



Three new stretches were added to the eastern route for 2018. The first was a loop up and down the coast path to the west of Hope Gap (marked on the map as 6&7 and referred to here as E6 &E7). This increased the coverage of rabbit disturbed chalk grassland and scrub edges where Graeme Lyons hoped we would find the Scarce Purple and Gold Moth. The second addition (E9) follows the coast path to the east of Hope Gap towards the coastguard cottages, but keeps to the rough grassland to the seaward side to be closer to Forester Moth habitat. The third addition (E10&E11) is a zigzag across the cattle grazed area in the west. These changes increase the length of the eastern route from 1870 to 2835 metres and the number of sections from 9 to 12. Six of these sections are broadly comparable with those from 2017. The map (above) also shows diversions to take the route through the gates in the electric cattle fencing that was erected during the survey.

One measure of the effectiveness of these route changes is their impact on the rate of sightings, measured as the average numbers seen per 100m of each section. The 2018 rates (averaged across all 30 eastern surveys) are reported in Figure 3 and Table 3.



| Section | Obs/100m | Length |
|---------|----------|--------|
| E5      | 9.77     | 103    |
| E12     | 9.04     | 394    |
| E10     | 8.45     | 221    |
| E11     | 5.38     | 174    |
| E6      | 4.18     | 257    |
| E1      | 3.77     | 214    |
| E7      | 3.75     | 333    |
| E8      | 3.26     | 129    |
| E9      | 2.94     | 235    |
| E2      | 2.85     | 306    |
| E4      | 2.59     | 243    |
| E3      | 1.61     | 226    |
| All     | 4.75     | 2835   |

Figure 3 shows how the rates vary as we follow the 2018 survey route. The route starts with section E1 where the rate (3.77/100m) is 11% below the overall average of 4.75. Rates decline further in sections E2 and E3, then increase slightly to 2.6 in e4, before rising to a maximum (9.8/100m) in E5 - the section that incorporates the most productive part of the 2017 transect.

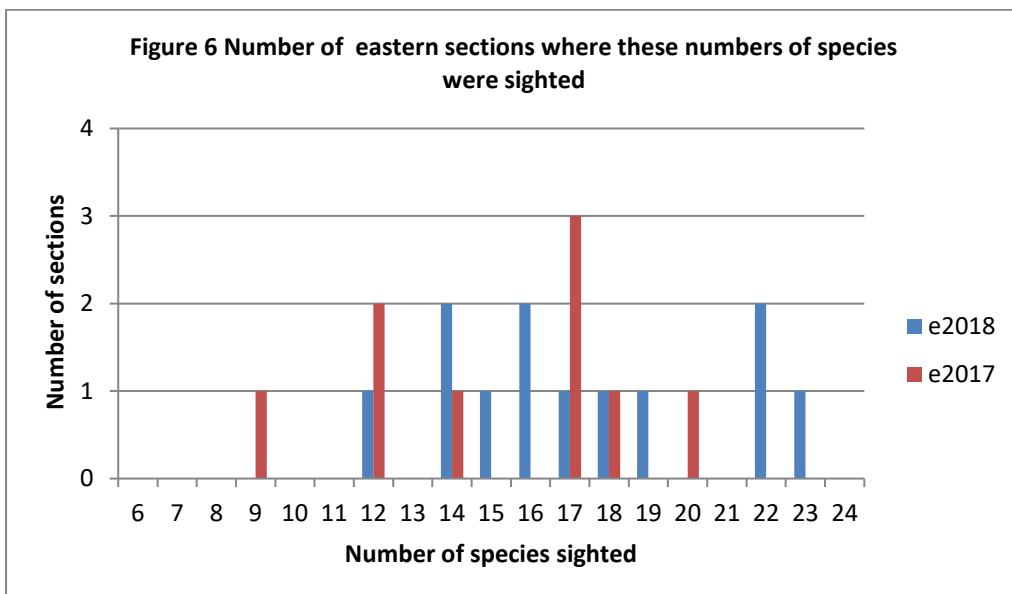
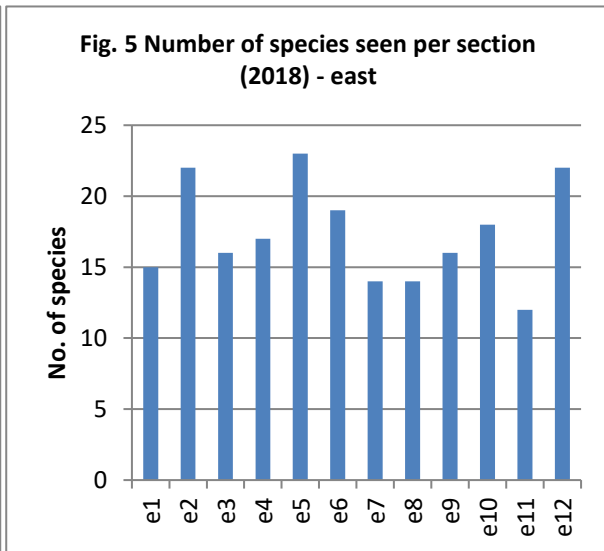
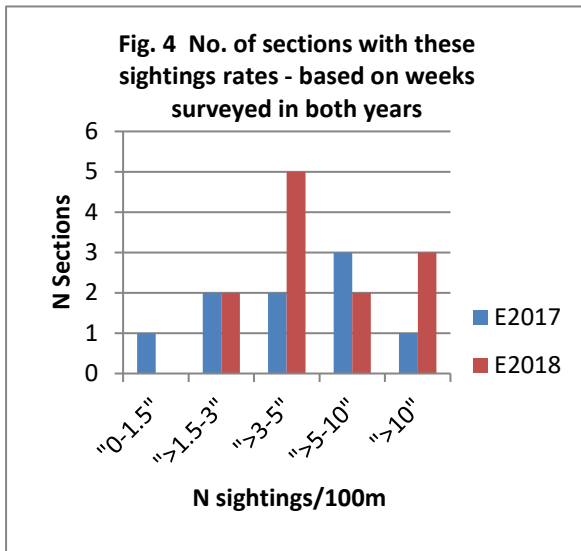
The route then leaves E5 and ascends the slopes of the coastal valley west of Hope Gap. The rates in the next three sections (E6 -E9) decline from 4.2 to 2.9, but then increase to 8.45 in E10 and 5.4 in E11, where the route crosses the rough pasture to the east. These are the sections that the author predicted would be least productive! The survey finishes with high rates in E12 - a length of rabbit grazed path with scrub on one side and rough pasture on the other that also did well in 2017 when the rate was 7.0 sightings per 100m.

Comparing these rates with 2017 is problematic, not least because of the differences in the routes, the start dates and the weather. Figure 4 and Table 4 provide tentative comparisons and show that there is not much difference in the distributions of rates between the years on the eastern route - only a slight decrease in the proportion of low rate sections.

|      | Percentage of route sections in these rate bands |                      |                |
|------|--|----------------------|----------------|
|      | Low (3 or less)                                  | Medium (> 3 up to 5) | High (Above 5) |
| 2017 | 33%  | 22%                  | 44%            |
| 2018 | 16%  | 42%                  | 42%            |

The effectiveness of sections might also be measured by the number of species seen - though this measure is ambiguous as transect sections are supposed to represent specific habitats and a wide range of sightings could indicate habitat diversity. Figure 5 shows that in 2018 more than 20 species were seen in three of the eastern sections: E2, E5 and E12. All three include more than one type of habitat. E2 combines a semi-woodland ride with two stretches of open grassland; and both E5 and E12 include more than one distinct type of grassland and scrub edges. When the number of species

seen in the eastern sections in 2018 are compared with data from 2017 (see Figure 6), there is slight evidence for saying that species diversity was higher in 2018.



#### 4.2 Western route changes and sightings rates in 2018

**In the west**, the transect was shortened from 2600 to 2100 metres. After examining last year's results, several low ecotone rides where there had been few sightings were replaced by more open and scalloped rides. The other main change was the substitution of an area that has been heavily sheep grazed for the long zigzags across cleared (and intermittently grazed) rough grassland.

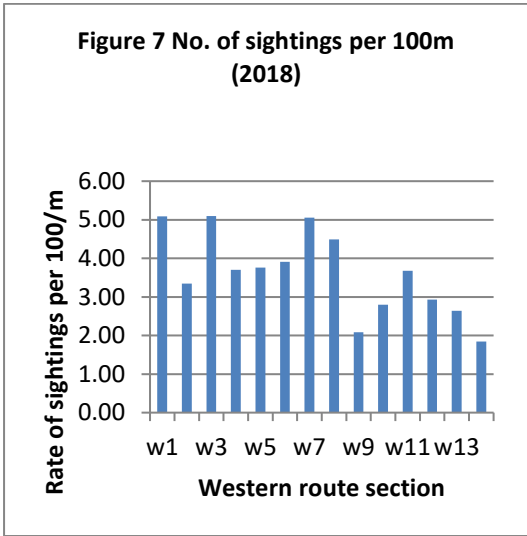
Although the length of the route decreased, the number of sections was increased from 11 to 14 to try to ensure that each section had uniform habitat. Eight or nine of these new sections are roughly comparable with those from 2017.

The broad pattern of rates of sightings on the new western route is that they are relatively high from the start until section W8 (see Figure 7). In these first eight sections the route crosses open

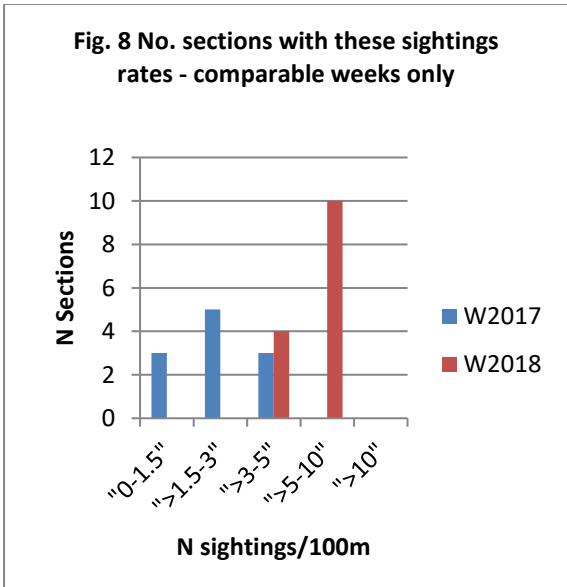


grassland, follows scrub edges and goes along open rides with reasonable ecotone. The rates drop to below 3/100m thereafter as the route descends through narrower rides and tracks with low ecotone edges. The one exception is section W11 - a path across open grassland - where the rate is 3.67.

It is worth noting that the rates in Table 5 and Figure 7 are based on all 28 western 2018 surveys, including those in April and May when numbers of sightings were relatively low. The 2018 rates increase considerably (See Figure 8) when they are recomputed to only include the weeks when the western route was surveyed in both years - i.e. from July 1st. Using these for comparison, the route changes seem to have been very effective and have removed the sections with very low rates of sightings in 2017.

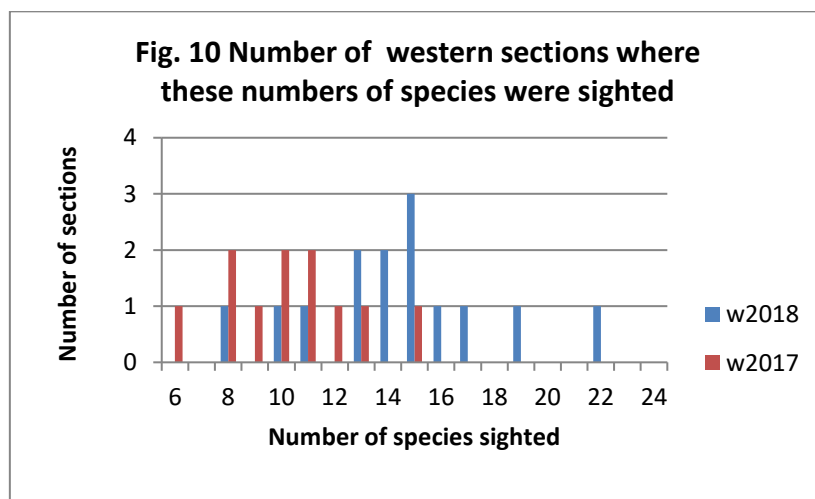
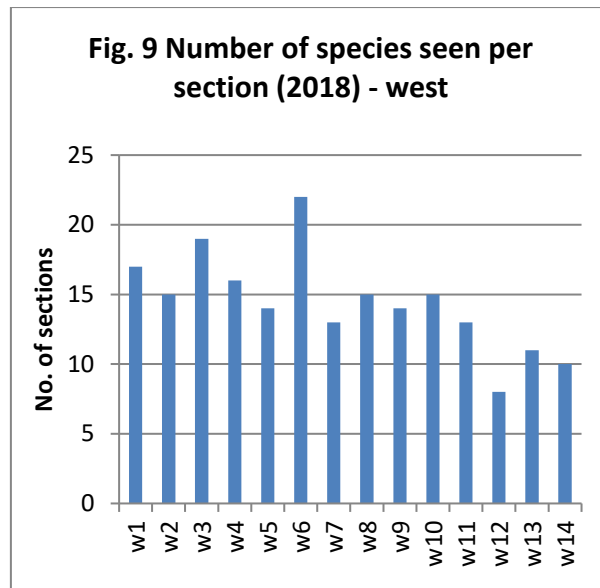


| Table 5 | Obs/100m | length |
|---------|----------|--------|
| W3      | 5.09     | 265    |
| W1      | 5.09     | 120    |
| W7      | 5.05     | 140    |
| W8      | 4.49     | 160    |
| W6      | 3.91     | 329    |
| W5      | 3.76     | 134    |
| W4      | 3.70     | 134    |
| W11     | 3.67     | 140    |
| W2      | 3.35     | 128    |
| W12     | 2.93     | 61     |
| W10     | 2.80     | 180    |
| W13     | 2.64     | 69     |
| W9      | 2.08     | 180    |
| W14     | 1.85     | 60     |
| All     | 3.79     | 2100   |



Much the same improvement can be seen in the increase in the number of species observed in the western sections between 2017 and 2018 (Figures 9 and 10). The most diverse section of the 2018 route is W6 the broad ride with good ecotone that ascends diagonally to the golf course rough (22 species were recorded in this section). Sections W9 and W10, running through low scrub and woodland and sections W12-W14 (the low ecotone track back to the start) display much less diversity. In one case (W12) only 8 species were sighted. Figure 10 compares the numbers of species seen in the west in 2017 and 2018. It shows a substantial increase in the number of species seen in 2018 - though, admittedly, the 2018 figures include all sightings from April whereas in 2017 the western surveys only started in July.





Reviewing the main results from sections 4.1 and 4.2, it is worth noting that the differences between the 2018 and 2017 figures based on comparable weeks are much greater in the west than east. This is consistent with our having changed the western route to replace low ecotone rides and with areas that were more likely to attract butterflies.

### 5. Which butterflies were observed?

Before listing the species sighted on the survey, it is worth emphasising that this type of exercise is not looking for rare or unusual species, but is almost entirely concerned with recording changes over years in the general butterfly population of Seaford Head. To standardise results, surveyors are instructed to only record butterflies that are less than 2.5metres from each side of the fixed route, although this protocol is sometimes suspended when an unusual sighting is made outside these boundaries. Such sightings are recorded separately.

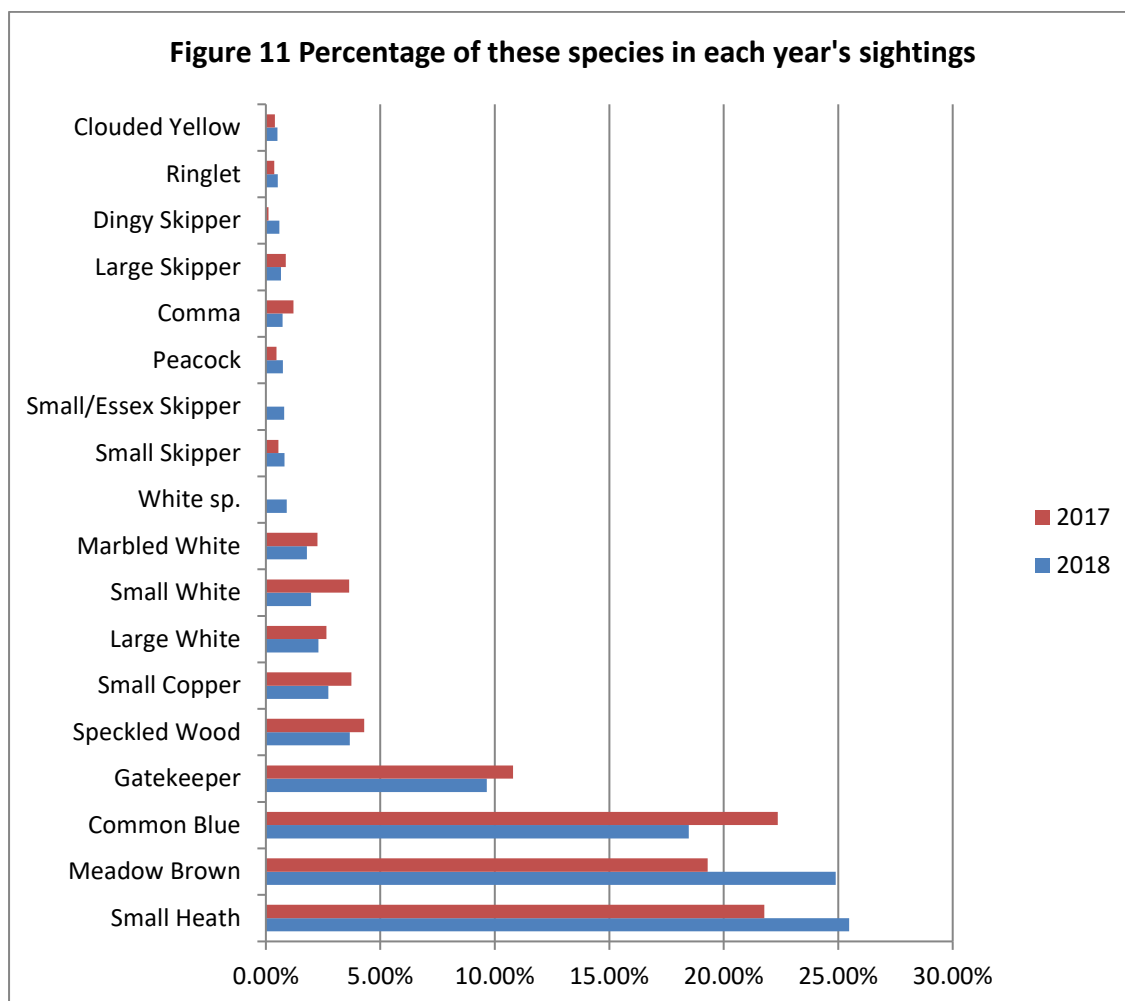
The numbers of 2018 sightings of each species in each transect and the percentages of the transect totals are presented in Table 6 (the combined totals are in Table A.1.1) In 2018, 33 species were sighted, compared with 26 in 2017.

The following species were only seen on one of the two years. A Silver-washed Fritillary was the only species recorded in 2017, but not in 2018 - though members of the Society have seen this species on other occasions on Seaford Head in 2018. Several species were sighted in 2018, but not in 2017. These were: Adonis, Holly and Chalkhill Blues, Brimstones, Silver-spotted Skippers and Small Tortoiseshells. In 2018 there was also an unconfirmed sighting of a Small Blue.

Figure 11 shows the percentage distribution of the species comprising 0.5% or more of the 2018 total (31 or more sightings), and the corresponding figures for 2017. Despite the changes in routes and weather, the proportions of the most common species: Small Heaths, Meadow Browns and Common Blues remained relatively unchanged at between 19 and 26% of the totals in both years. Similarly, Gatekeepers represented around 10% of the totals in both years; and Speckled Woods 3-4%. The introduction of a White sp. recording category for 2018, may have partly accounted for the reduction in the reported numbers of Small Whites. Based on these results, the relative proportions of the main butterfly species on the Head were largely unchanged between 2017 and 2018.

| Table 6<br>Species       | 2018 |        |      |        | 2017 |        |      |        |
|--------------------------|------|--------|------|--------|------|--------|------|--------|
|                          | east |        | west |        | east |        | west |        |
|                          | N    | %      | N    | %      | N    | %      | N    | %      |
| Adonis Blue              | 2    | 0.05%  | 0    | 0.00%  | 0    | 0.00%  | 0    | 0.00%  |
| Brimstone                | 1    | 0.02%  | 2    | 0.09%  | 0    | 0.00%  | 0    | 0.00%  |
| Brown Argus              | 3    | 0.07%  | 2    | 0.09%  | 6    | 0.32%  | 0    | 0.00%  |
| Chalkhill Blue           | 6    | 0.15%  | 0    | 0.00%  | 0    | 0.00%  | 0    | 0.00%  |
| Clouded Yellow           | 34   | 0.84%  | 0    | 0.00%  | 10   | 0.53%  | 1    | 0.11%  |
| Comma                    | 16   | 0.40%  | 30   | 1.35%  | 11   | 0.59%  | 22   | 2.51%  |
| Common Blue              | 642  | 15.88% | 517  | 23.18% | 498  | 26.55% | 117  | 13.37% |
| Dark Green Fritillary    | 10   | 0.25%  | 0    | 0.00%  | 1    | 0.05%  | 1    | 0.11%  |
| Dingy Skipper            | 11   | 0.27%  | 26   | 1.17%  | 2    | 0.11%  | 1    | 0.11%  |
| Essex Skipper            | 0    | 0.00%  | 8    | 0.36%  | 0    | 0.00%  | 1    | 0.11%  |
| Gatekeeper               | 386  | 9.55%  | 219  | 9.82%  | 147  | 7.84%  | 150  | 17.14% |
| Grayling                 | 0    | 0.00%  | 0    | 0.00%  | 0    | 0.00%  | 0    | 0.00%  |
| Green Hairstreak         | 17   | 0.42%  | 5    | 0.22%  | 3    | 0.16%  | 0    | 0.00%  |
| Green-veined White       | 8    | 0.20%  | 7    | 0.31%  | 4    | 0.21%  | 0    | 0.00%  |
| Grizzled Skipper         | 14   | 0.35%  | 4    | 0.18%  | 1    | 0.05%  | 0    | 0.00%  |
| Holly Blue               | 0    | 0.00%  | 5    | 0.22%  | 0    | 0.00%  | 0    | 0.00%  |
| Large Skipper            | 21   | 0.52%  | 20   | 0.90%  | 19   | 1.01%  | 5    | 0.57%  |
| Large White              | 115  | 2.84%  | 29   | 1.30%  | 48   | 2.56%  | 25   | 2.86%  |
| Long Tailed Blue         | 0    | 0.00%  | 0    | 0.00%  | 0    | 0.00%  | 0    | 0.00%  |
| Marbled White            | 92   | 2.28%  | 20   | 0.90%  | 43   | 2.29%  | 19   | 2.17%  |
| Meadow Brown             | 1143 | 28.27% | 418  | 18.74% | 298  | 15.88% | 233  | 26.63% |
| Orange Tip               | 0    | 0.00%  | 0    | 0.00%  | 0    | 0.00%  | 0    | 0.00%  |
| Painted Lady             | 2    | 0.05%  | 3    | 0.13%  | 4    | 0.21%  | 1    | 0.11%  |
| Peacock                  | 23   | 0.57%  | 24   | 1.08%  | 11   | 0.59%  | 2    | 0.23%  |
| Red Admiral              | 13   | 0.32%  | 6    | 0.27%  | 75   | 4.00%  | 26   | 2.97%  |
| Ringlet                  | 11   | 0.27%  | 22   | 0.99%  | 0    | 0.00%  | 10   | 1.14%  |
| Silver Washed Fritillary | 0    | 0.00%  | 0    | 0.00%  | 1    | 0.05%  | 0    | 0.00%  |

| Species                 | 2018 |         |      |         | 2017 |         |      |         |
|-------------------------|------|---------|------|---------|------|---------|------|---------|
|                         | east |         | west |         | east |         | west |         |
|                         | N    | %       | N    | %       | N    | %       | N    | %       |
| Silver-spotted Skipper  | 11   | 0.27%   | 0    | 0.00%   | 0    | 0.00%   | 0    | 0.00%   |
| Small Blue              | 1    | 0.02%   | 0    | 0.00%   | 0    | 0.00%   | 0    | 0.00%   |
| Small Copper            | 153  | 3.78%   | 18   | 0.81%   | 98   | 5.22%   | 5    | 0.57%   |
| Small Heath             | 1061 | 26.24%  | 537  | 24.08%  | 477  | 25.43%  | 122  | 13.94%  |
| Small Skipper           | 26   | 0.64%   | 25   | 1.12%   | 2    | 0.11%   | 13   | 1.49%   |
| Small Tortoiseshell     | 18   | 0.45%   | 2    | 0.09%   | 0    | 0.00%   | 0    | 0.00%   |
| Small White             | 101  | 2.50%   | 23   | 1.03%   | 14   | 0.75%   | 0    | 0.00%   |
| Small/Essex Skipper     | 33   | 0.82%   | 17   | 0.76%   | 73   | 3.89%   | 27   | 3.09%   |
| Speckled Wood           | 27   | 0.67%   | 203  | 9.10%   | 25   | 1.33%   | 93   | 10.63%  |
| Wall                    | 16   | 0.40%   | 6    | 0.27%   | 5    | 0.27%   | 1    | 0.11%   |
| White Letter Hairstreak | 0    | 0.00%   | 0    | 0.00%   | 0    | 0.00%   | 0    | 0.00%   |
| White sp.               | 25   | 0.62%   | 32   | 1.43%   | 0    | 0.00%   | 0    | 0.00%   |
| Totals                  | 4043 | 100.00% | 2230 | 100.00% | 1876 | 100.00% | 875  | 100.00% |



## 6. Changes in the distribution of species recorded along each transect.

After reviewing the 2017 results, transects were revised in order to changes the distribution of habitats in the survey, potentially changing the numbers and species sighted. This section briefly describes how the distributions of the commonest species differed between the years in the two transects.

**6.1 In the east,** Common Blue sightings dropped from 26.6% of the total (2017) to 16% in 2018; Meadow Browns increased from 16% to 28%. Despite the differences in the numbers of Small Heaths - from 477 to 1061 (in 2018), their proportion of the total was unchanged at around 25-26%. The decline in the proportion of Speckled Woods may be due to their favoured habitat (narrow shaded rides) being a smaller proportion of the new longer route. A similar argument (the route including more pasture that was too rough for Bird's-foot-trefoil) might explain the reduction in the proportion of Common Blues.

**Table 7 Changes in the distribution of species recorded - eastern transect**

|               | N in east in 2018 | N in east in 2017 | % in east in 2018 | % in east in 2017 | Change in proportion from 2017 to 2018 |
|---------------|-------------------|-------------------|-------------------|-------------------|--|
| Red Admiral   | 13                | 75                | 0.32%             | 4.00%             | -91.96%                                |
| Speckled Wood | 27                | 25                | 0.67%             | 1.33%             | -49.79%                                |
| Large Skipper | 21                | 19                | 0.52%             | 1.01%             | -48.57%                                |
| Common Blue   | 642               | 498               | 15.88%            | 26.55%            | -40.19%                                |
| Small White   | 101               | 73                | 2.50%             | 3.89%             | -35.78%                                |
| Small Copper  | 153               | 98                | 3.78%             | 5.22%             | -27.50%                                |
| Marbled White | 92                | 43                | 2.28%             | 2.29%             | -0.63%                                 |
| Small Heath   | 1061              | 477               | 26.24%            | 25.43%            | 3.20%                                  |
| Large White   | 115               | 48                | 2.84%             | 2.56%             | 11.11%                                 |
| Gatekeeper    | 386               | 147               | 9.55%             | 7.84%             | 21.78%                                 |
| Meadow Brown  | 1143              | 298               | 28.27%            | 15.88%            | 78.03%                                 |

**6.2 In the west,** although more there were more Meadow Brown and Gatekeeper sightings in 2018 than in 2017, their representation in the total decreased from 27% to 19% and from 17% to 10%. Of the other more numerous species, Common Blues and Small Heaths showed the largest increases, both rising from 13-14% of the total to 23-24%. It is possible that the Meadow Brown proportion dropped because the proportion of rough grassland in the route was reduced - equally, the increase in Meadow Browns in the east might be due to an increase in this type of habitat. Removing some narrow Bramble bordered rides from the western route, might also explain the reduction in the percentage of Gatekeepers.

**Table 8 Changes in the distribution of species recorded - western transect**

| Table 8       | N in west in 2018 | N in west in 2017 | % in west in 2018 | % in west in 2017 | Change in proportion from 2017 to 2018 |
|---------------|-------------------|-------------------|-------------------|-------------------|--|
| Red Admiral   | 6                 | 26                | 0.27%             | 2.97%             | -90.94%                                |
| Small White   | 23                | 27                | 1.03%             | 3.09%             | -66.62%                                |
| Marbled White | 20                | 19                | 0.90%             | 2.17%             | -58.67%                                |
| Large White   | 29                | 25                | 1.30%             | 2.86%             | -54.53%                                |
| Comma         | 30                | 22                | 1.35%             | 2.51%             | -46.40%                                |
| Gatekeeper    | 219               | 150               | 9.82%             | 17.14%            | -42.70%                                |
| Meadow Brown  | 418               | 233               | 18.74%            | 26.63%            | -29.61%                                |
| Small Skipper | 25                | 13                | 1.12%             | 1.49%             | -24.76%                                |
| Speckled Wood | 203               | 93                | 9.10%             | 10.63%            | -14.36%                                |
| Ringlet       | 22                | 10                | 0.99%             | 1.14%             | -13.46%                                |
| Small Heath   | 537               | 122               | 24.08%            | 13.94%            | 72.75%                                 |
| Common Blue   | 517               | 117               | 23.18%            | 13.37%            | 73.40%                                 |
| Peacock       | 24                | 2                 | 1.08%             | 0.23%             | 367.93%                                |
| Dingy Skipper | 26                | 1                 | 1.17%             | 0.11%             | 959.93%                                |

### 6.3 Summary of changes in species distribution between the transects between 2017 and 2018

#### *Species more likely to be found in one of the transects in both years*

- We saw a higher proportion of Small Coppers in the east (4-5% vs. <1%W); and a higher proportion of Speckled Woods in the west (9-19% vs. 1%E).

#### *Species where the proportions in east and west changed between the years*

- In 2018 Small Heaths represented approx. 25% of the sightings in both east and west. In 2017 they were only 14% of the western total.
- From 2017-8 the proportion of Meadow Browns increased in the east (16%-28%) and declined in the west (27%-19%).
- Conversely, the proportion of Common Blues decreased in the east (from 27% in 2017 to 17%) and increased in the west (from 13% to 23%).
- The proportion of Gatekeeper sightings decreased in the west (from 17% in 2017 to 10%)

#### *Species where the proportions changed between 2017 and 2018 in both transects.*

- Small White proportions decreased for both transects - which may be partly due to them being assigned to the new White sp. category.
- The reduction in both the numbers and percentage of Red Admirals is not so easy to explain. The harsh 2018 spring conditions may have killed larvae and reduced the number of overwintering specimens available for breeding. The 2018 Big Butterfly Count also reported a large reduction in this species : "*The number of Red Admirals across the UK was found to have dropped by 73% since 2017, the largest decline seen by any of the 19 species surveyed. This may be due to the extremely cold weather seen early in 2018 which could have killed overwintering Red Admirals and their offspring.*" **Big Butterfly Count (2018)**

## 7. Brood patterns and flight periods

The tables on pages 15-17 report the numbers of each butterfly species seen in each week over both years. The table cells are tinted - darker shades representing higher numbers - in order to highlight the different brood patterns. For example, the Gatekeeper is a single brood species as can be seen from our figures for both 2017 and 2018. In both years, peak Gatekeeper numbers were seen at the end of July and there were no observations before July and none or very few after the third week of August. The main trends from pages 15-17 are summarised in Table 9.

| <b>Table 9. Summary of flight periods (2017 and 2018) and brood patterns for most numerous species.</b> |   |
|---|---|
| Common Blue   | Typical 2 broods (as 2017) with possible small 3rd brood in mid Sept.?  |
| Small Heath   | Typical 2 broods. Much more numerous and 2nd brood slightly later than 2017.  |
| Small Copper  | Typical 3 brood pattern - same as 2017  |
| Large Skipper   | Single brood - similar to 2017  |
| Small Skipper   | Single brood - similar to 2017  |
| Small White   | First brood seen due to earlier start (outside recoding period in 2017). Typical 2nd brood July-Sept, but peaks at end of Sept might be sign of a-typical 3rd brood.  |
| Comma   | Overwintering adults seen in April (missed due to later start in 2017). Same peak as 2017 (early July). Unlike 2017 no 2018 sightings after early Sept. Are there likely to be few/no overwintering adults in 2018/9.   |
| Gatekeeper  | Typical single brood - similar to 2017  |
| Speckled Wood   | Observed in all but first 2 weeks of the 2018 surveys. Possible evidence of all "three overlapping broods" (Lewington), but no strong signs of the 3rd brood potentially overwintering adults in late October. More continuous sightings than 2017, but same basic pattern. |
| Red Admirals  | Far fewer sightings than 2017. Plus no October peak as seen in 2017.  |
| Meadow Brown  | Same pattern as 2017. Single brood May-Sept.  |
| Large White   | First brood (May) seen in 2018 - missed due to earlier start in 2017. Second brood in 2018 had two peaks: late June/early July and early Sept.  |
| Marbled White   | Same typical single brood pattern June/July in both years.  |
| Ringlet   | Typical single brood emerging late June/early July. In both years sightings stopped rather earlier than expected - i.e. none in August. Were they mistaken for Speckled Woods?  |

The above Table identifies very few differences between the two years - especially when the earlier start in 2018 is taken into account. Two sightings benefitting from this earlier start were first brood Large and Small Whites. Conversely, in 2018 (unlike 2017) we saw no Commas towards the end of the survey period ( after early September), giving concerns as to the numbers likely to overwinter. Also in 2018, a small late peak in the number of Common Blues may be evidence of a late brood - which Lewington mentions as a possibility after "long hot summers".

|                           |             | April   |   |   |          | May |   |           |    |    | June         |    |    |    | July |     |     |     | August |     |    |    | September |    |    |    | October |    |    |    |    |
|---------------------------|-------------|---|---|---|----------|-----|---|-----------|----|----|--------------|----|----|----|------|-----|-----|-----|--------|-----|----|----|-----------|----|----|----|---------|----|----|----|----|
|                           |             | 1   | 2 | 3 | 4        | 5   | 6 | 7         | 8  | 9  | 10           | 11 | 12 | 13 | 14   | 15  | 16  | 17  | 18     | 19  | 20 | 21 | 22        | 23 | 24 | 25 | 26      | 27 | 28 | 29 | 30 |
| Adonis Blue               | 2018        |   |   |   |          |     |   |           |    |    |              |    |    |    |      |     |     |     |        |     |    | 1  |           | 1  |    |    |         |    |    |    |    |
| Brimstone                 | 2018        |   | 1 |   |          | 2   |   |           |    |    |              |    |    |    |      |     |     |     |        |     |    |    |           |    |    |    |         |    |    |    |    |
| Brown Argus               | 2017        |   |   |   |          |     |   |           |    |    |              |    |    |    |      |     | 1   |     |        |     |    | 3  | 2         |    |    |    |         |    |    |    |    |
| Brown Argus               | 2018        |   |   |   |          |     |   |           |    |    |              |    |    |    |      |     |     |     | 3      | 2   |    |    |           |    |    |    |         |    |    |    |    |
| Chalkhill Blue            | 2018        |   |   |   |          |     |   |           |    |    |              |    |    | 1  |      |     | 4   |     | 1      |     |    |    |           |    |    |    |         |    |    |    |    |
| Clouded Yellow            | 2017        |   |   |   |          |     |   |           |    |    |              |    |    |    |      |     | 2   |     |        |     |    |    |           | 1  | 1  | 4  | 3       |    |    |    |    |
| Clouded Yellow            | 2018        |   |   |   |          |     |   |           |    |    |              |    |    |    |      |     |     |     |        |     |    | 1  |           |    |    | 6  | 4       | 3  | 9  | 9  |    |
| Clouded Yellow (pale)     | 2018        |   |   |   |          |     |   |           |    |    |              |    |    |    |      |     |     |     |        |     |    |    |           | 2  |    |    |         |    |    |    |    |
| Comma                     | 2017        |   |   |   |          |     |   |           |    |    |              | 1  |    | 17 |      | 4   | 5   |     | 1      |     | 2  |    |           |    |    |    |         |    | 3  |    |    |
| Comma                     | 2018        |   | 1 | 6 | 3        | 6   |   | 1         |    |    |              |    | 2  | 13 | 8    |     | 3   |     |        |     | 1  | 1  | 1         |    |    |    |         |    |    |    |    |
| Common Blue               | 2017        |   |   |   |          |     |   |           | 55 | 44 | 19           | 5  | 14 | 1  | 2    | 5   | 26  | 166 | 115    | 51  | 17 | 52 | 12        | 11 | 15 | 2  | 2       | 1  |    |    |    |
| Common Blue               | 2018        |   |   |   |          |     |   |           | 38 | 95 | 37           | 51 | 22 | 8  | 1    | 23  | 44  | 141 | 331    | 178 | 63 | 48 | 18        | 6  | 7  | 21 | 12      | 9  | 4  | 1  | 1  |
| Dark Green Fritillary     | 2017        |   |   |   |          |     |   |           |    |    |              |    | 1  | 1  |      |     |     |     |        |     |    |    |           |    |    |    |         |    |    |    |    |
| Dark Green Fritillary     | 2018        |   |   |   |          |     |   |           |    |    |              | 1  | 6  |    |      |     |     |     | 3      |     |    |    |           |    |    |    |         |    |    |    |    |
| Dingy Skipper             | 2017        |   |   |   |          |     |   | 1         | 1  |    |              |    |    |    |      |     |     |     |        | 1   |    |    |           |    |    |    |         |    |    |    |    |
| Dingy Skipper             | 2018        |   |   |   |          | 1   | 5 | 21        | 6  | 1  | 2            | 1  |    |    |      |     |     |     |        |     |    |    |           |    |    |    |         |    |    |    |    |
| Essex Skipper             | 2017        |   |   |   |          |     |   |           |    |    |              |    |    | 1  |      |     |     |     |        |     |    |    |           |    |    |    |         |    |    |    |    |
| Essex Skipper             | 2018        |   |   |   |          |     |   |           |    |    |              |    |    | 6  | 1    |     | 1   |     |        |     |    |    |           |    |    |    |         |    |    |    |    |
| Gatekeeper                | 2017        |   |   |   |          |     |   |           |    |    |              |    |    | 23 | 17   | 77  | 104 | 66  | 10     |     |    |    |           |    |    |    |         |    |    |    |    |
| Gatekeeper                | 2018        |   |   |   |          |     |   |           |    |    |              |    |    | 27 | 105  | 126 | 273 | 60  | 8      | 3   |    |    | 1         |    |    |    |         | 2  |    |    |    |
| Green Hairstreak          | 2017        |   |   |   |          |     |   | 1         | 1  | 1  |              |    |    |    |      |     |     |     |        |     |    |    |           |    |    |    |         |    |    |    |    |
| Green Hairstreak          | 2018        |   |   |   |          | 1   | 7 | 11        | 1  | 2  |              |    |    |    |      |     |     |     |        |     |    |    |           |    |    |    |         |    |    |    |    |
| Green-veined White        | 2017        |   |   |   |          |     |   |           |    |    |              |    |    |    |      |     | 1   |     |        |     |    | 3  |           |    |    |    |         |    |    |    |    |
| Green-veined White        | 2018        |   |   |   |          |     | 9 | 2         |    |    |              | 1  |    | 1  |      |     |     |     |        |     |    | 1  |           | 1  |    |    |         |    |    |    |    |
| <b>KEY</b>                |             |   |   |   |          |     |   |           |    |    |              |    |    |    |      |     |     |     |        |     |    |    |           |    |    |    |         |    |    |    |    |
| <b>Sightings per week</b> | <b>2017</b> | 1 to 10   |   |   | 11 to 50 |     |   | 51 to 100 |    |    | 101 and over |    |    |    |      |     |     |     |        |     |    |    |           |    |    |    |         |    |    |    |    |
| <b>Sightings per week</b> | <b>2018</b> | 1 to 10   |   |   | 11 to 50 |     |   | 51 to 100 |    |    | 101 and over |    |    |    |      |     |     |     |        |     |    |    |           |    |    |    |         |    |    |    |    |
| <b>2017 start dates</b>   |             | <b>2017 Eastern surveys started in week 8. Western in week 14</b> |   |   |          |     |   |           |    |    |              |    |    |    |      |     |     |     |        |     |    |    |           |    |    |    |         |    |    |    |    |

|                           |             | April   |    |    |          | May |   |           |    |   | June         |    |    |    |     | July |     |     |     |     | August |    |    |    |    | September |    |    |    |    | October |  |  |  |  |
|---------------------------|-------------|---|----|----|----------|-----|---|-----------|----|---|--------------|----|----|----|-----|------|-----|-----|-----|-----|--------|----|----|----|----|-----------|----|----|----|----|---------|--|--|--|--|
|                           |             | 1   | 2  | 3  | 4        | 5   | 6 | 7         | 8  | 9 | 10           | 11 | 12 | 13 | 14  | 15   | 16  | 17  | 18  | 19  | 20     | 21 | 22 | 23 | 24 | 25        | 26 | 27 | 28 | 29 | 30      |  |  |  |  |
| Grizzled Skipper          | 2017        |   |    |    |          |     |   |           | 1  |   |              |    |    |    |     |      |     |     |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |
| Grizzled Skipper          | 2018        |   |    |    |          |     | 6 | 3         | 5  | 2 | 1            | 1  |    |    |     |      |     |     |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |
| Holly Blue                | 2018        |   |    |    |          | 1   |   | 4         |    |   |              |    |    |    |     |      |     |     |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |
| Large Skipper             | 2017        |   |    |    |          |     |   |           |    |   | 1            | 3  | 3  | 2  | 15  |      |     |     |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |
| Large Skipper             | 2018        |   |    |    |          |     |   |           |    |   |              | 6  | 7  | 5  | 14  | 9    |     |     |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |
| Large White               | 2017        |   |    |    |          |     |   |           |    |   |              |    |    |    | 10  |      | 1   | 3   |     | 3   | 23     | 5  | 4  | 1  | 6  | 5         | 12 |    |    |    |         |  |  |  |  |
| Large White               | 2018        |   |    |    |          | 1   | 2 | 5         | 15 |   |              |    |    |    |     | 20   | 24  | 13  | 13  | 1   | 8      | 4  | 5  | 5  | 5  | 19        | 2  |    | 2  |    |         |  |  |  |  |
| Marbled White             | 2017        |   |    |    |          |     |   |           |    |   |              | 11 | 20 | 20 | 5   | 6    |     |     |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |
| Marbled White             | 2018        |   |    |    |          |     |   |           |    |   |              |    | 1  | 29 | 37  | 25   | 15  | 5   |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |
| Meadow Brown              | 2017        |   |    |    |          |     |   |           |    |   | 4            | 14 | 18 | 54 | 47  | 38   | 66  | 107 | 62  | 45  | 49     | 9  | 13 | 5  |    |           |    |    |    |    |         |  |  |  |  |
| Meadow Brown              | 2018        |   |    |    |          |     |   |           |    |   |              | 2  | 48 | 76 | 134 | 104  | 177 | 370 | 262 | 157 | 81     | 48 | 39 | 36 | 22 | 2         | 2  | 1  |    |    |         |  |  |  |  |
| Painted Lady              | 2017        |   |    |    |          |     |   |           |    |   | 1            |    |    |    |     |      |     |     | 3   |     |        |    |    |    |    |           |    |    |    |    | 1       |  |  |  |  |
| Painted Lady              | 2018        |   |    |    |          |     |   |           |    |   |              | 3  | 2  |    |     |      |     |     |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |
| Peacock                   | 2017        |   |    |    |          |     |   |           | 3  |   |              |    |    |    | 2   |      |     |     | 6   | 1   |        |    | 1  |    |    |           |    |    |    |    |         |  |  |  |  |
| Peacock                   | 2018        | 1   | 17 | 13 | 2        | 4   | 2 | 2         | 1  |   |              |    |    |    | 1   | 1    |     |     |     |     |        | 2  |    |    |    |           | 1  |    |    |    |         |  |  |  |  |
| Red Admiral               | 2017        |   |    |    |          |     |   |           | 2  | 4 |              | 3  | 4  | 3  | 4   | 2    | 3   | 7   | 4   | 3   | 3      | 3  | 1  | 1  | 7  | 8         | 4  | 1  | 2  |    | 35      |  |  |  |  |
| Red Admiral               | 2018        |   |    |    |          |     |   |           |    |   |              |    | 2  | 3  | 1   |      |     | 2   | 1   | 1   |        |    |    |    |    |           | 7  |    |    |    | 2       |  |  |  |  |
| Ringlet                   | 2017        |   |    |    |          |     |   |           |    |   |              |    |    |    | 9   | 1    |     |     |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |
| Ringlet                   | 2018        |   |    |    |          |     |   |           |    |   |              |    | 1  | 3  | 10  | 18   |     | 1   |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |
| Silver-spotted Skipper    | 2017        |   |    |    |          |     |   |           |    |   |              |    |    |    |     |      |     |     |     |     |        | 1  |    |    |    |           |    |    |    |    |         |  |  |  |  |
| Silver-spotted Skipper    | 2018        |   |    |    |          |     |   |           |    |   |              |    |    |    |     |      |     |     | 6   | 3   |        |    | 2  |    |    |           |    |    |    |    |         |  |  |  |  |
| <b>KEY</b>                |             |   |    |    |          |     |   |           |    |   |              |    |    |    |     |      |     |     |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |
| <b>Sightings per week</b> | <b>2017</b> | 1 to 10   |    |    | 11 to 50 |     |   | 51 to 100 |    |   | 101 and over |    |    |    |     |      |     |     |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |
| <b>Sightings per week</b> | <b>2018</b> | 1 to 10   |    |    | 11 to 50 |     |   | 51 to 100 |    |   | 101 and over |    |    |    |     |      |     |     |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |
| <b>2017 start dates</b>   |             | <b>2017 Eastern surveys started in week 8. Western in week 14</b> |    |    |          |     |   |           |    |   |              |    |    |    |     |      |     |     |     |     |        |    |    |    |    |           |    |    |    |    |         |  |  |  |  |



|                           |   | April   |   |   |          | May |    |           |    |    | June         |     |    |    | July |    |    |    | August |    |     |     |     | September |     |    |    | October |    |    |    |
|---------------------------|---|---------|---|---|----------|-----|----|-----------|----|----|--------------|-----|----|----|------|----|----|----|--------|----|-----|-----|-----|-----------|-----|----|----|---------|----|----|----|
|                           |   | 1       | 2 | 3 | 4        | 5   | 6  | 7         | 8  | 9  | 10           | 11  | 12 | 13 | 14   | 15 | 16 | 17 | 18     | 19 | 20  | 21  | 22  | 23        | 24  | 25 | 26 | 27      | 28 | 29 | 30 |
| Small Blue                | 2018  |         |   |   |          |     |    |           |    | 1  |              |     |    |    |      |    |    |    |        |    |     |     |     |           |     |    |    |         |    |    |    |
| Small Copper              | 2017  |         |   |   |          |     |    | 8         | 33 | 1  |              |     |    | 1  | 1    | 1  | 7  |    | 1      | 4  | 13  | 4   | 23  | 4         |     |    | 2  |         |    |    |    |
| Small Copper              | 2018  |         |   |   |          | 17  | 12 | 5         | 4  |    | 2            |     | 1  | 1  | 4    |    | 5  | 10 | 2      |    |     | 2   |     | 33        | 20  | 21 | 14 | 9       | 7  | 2  |    |
| Small Heath               | 2017  |         |   |   |          |     |    | 17        | 12 | 4  | 38           | 100 | 53 | 28 | 35   |    | 8  | 13 | 36     | 87 | 89  | 55  | 18  | 4         | 2   |    |    |         |    |    |    |
| Small Heath               | 2018  |         |   |   |          |     | 7  | 15        | 15 | 24 | 74           | 110 | 82 | 89 | 18   | 9  | 28 | 53 | 49     | 47 | 202 | 180 | 152 | 213       | 161 | 44 | 20 | 3       | 3  |    |    |
| Small Skipper             | 2017  |         |   |   |          |     |    |           |    | 1  |              |     |    | 9  | 2    |    | 1  |    | 2      |    |     |     |     |           |     |    |    |         |    |    |    |
| Small Skipper             | 2018  |         |   |   |          | 1   |    |           |    |    |              | 3   | 8  | 14 | 20   |    | 5  |    |        |    |     |     |     |           |     |    |    |         |    |    |    |
| Small Tortoiseshell       | 2017  |         |   |   |          |     |    |           |    | 2  | 2            | 4   | 1  | 1  |      |    | 3  | 1  |        |    |     |     |     |           |     |    |    |         |    |    |    |
| Small Tortoiseshell       | 2018  | 1       | 8 | 2 | 1        |     |    |           |    |    |              | 3   |    | 3  |      |    |    | 2  |        |    |     |     |     |           |     |    |    |         |    |    |    |
| Small White               | 2017  |         |   |   |          |     |    |           |    |    |              |     |    | 2  |      | 1  | 1  | 17 | 21     | 26 | 9   | 4   | 14  |           | 4   | 1  |    |         |    |    |    |
| Small White               | 2018  |         |   | 1 |          | 4   | 1  | 20        |    | 1  |              |     | 1  | 3  | 6    | 8  | 3  | 21 | 9      | 2  | 5   | 4   | 1   | 2         | 1   | 2  | 29 |         |    |    |    |
| Small/Essex Skipper       | 2018  |         |   |   |          |     |    |           |    |    |              |     |    | 29 | 10   | 5  | 4  |    |        | 2  |     |     |     |           |     |    |    |         |    |    |    |
| Speckled Wood             | 2017  |         |   |   |          |     |    |           | 3  | 1  |              |     |    | 11 |      |    | 5  | 14 | 13     | 21 | 8   | 10  | 10  | 6         | 10  |    | 5  |         | 1  |    |    |
| Speckled Wood             | 2018  |         |   | 1 | 3        | 6   | 8  | 5         | 4  | 4  | 1            | 14  | 11 | 9  | 3    | 13 | 11 | 6  | 14     | 13 | 5   | 15  | 20  | 14        | 24  | 12 | 4  | 3       | 1  | 4  | 2  |
| Wall                      | 2017  |         |   |   |          |     |    |           |    |    |              |     |    |    |      | 1  | 1  | 1  |        |    |     |     | 1   | 1         |     | 1  |    |         |    |    |    |
| Wall                      | 2018  |         |   |   |          |     |    |           |    | 1  | 2            |     |    | 2  |      |    | 1  | 3  | 5      | 2  |     |     |     | 1         | 3   | 1  | 1  |         |    |    |    |
| White sp.                 | 2018  |         |   |   |          |     |    | 2         | 7  |    | 1            | 1   | 6  |    | 9    | 3  | 6  |    |        | 8  | 2   |     |     | 1         |     | 2  |    | 7       |    | 1  | 1  |
| <b>KEY</b>                |   |         |   |   |          |     |    |           |    |    |              |     |    |    |      |    |    |    |        |    |     |     |     |           |     |    |    |         |    |    |    |
| <b>Sightings per week</b> | <b>2017</b>   | 1 to 10 |   |   | 11 to 50 |     |    | 51 to 100 |    |    | 101 and over |     |    |    |      |    |    |    |        |    |     |     |     |           |     |    |    |         |    |    |    |
| <b>Sightings per week</b> | <b>2018</b>   | 1 to 10 |   |   | 11 to 50 |     |    | 51 to 100 |    |    | 101 and over |     |    |    |      |    |    |    |        |    |     |     |     |           |     |    |    |         |    |    |    |
| <b>2017 start dates</b>   | <b>2017 Eastern surveys started in week 8. Western in week 14</b> |         |   |   |          |     |    |           |    |    |              |     |    |    |      |    |    |    |        |    |     |     |     |           |     |    |    |         |    |    |    |

## 8. Moths

At Graeme Lyon's request, two sections of the eastern transect were modified to increase the chances of seeing two diurnal moths: The Forester and the Scarce Purple and Gold. Both were added to the recording sheet for 2018.

- **The Forester** The transect section from Hope Gap towards the Coastguard Cottages was moved seawards from the coastal path onto rough grassland in order to be closer to scrub where The Forester might be present. In fact, none were seen during the surveys, but there were several sightings in early July around the scrub on both sides of this path.
- **The Scarce Purple and Gold** This is a micro-moth that is present around the Privet scrub on the seaward side of the coast path west of Hope Gap and in the valley floor of the Gap. There were 15 sightings here on surveys between 14th and 28th August.

## 9. Summary and Conclusions

The current series of Seaford Head butterfly surveys began in 2017. Since then, weekly surveys have been carried out along two transects/routes: one to the east, along rides and grassland between South Barn and Hope Gap; the other in the west, on the grassy slopes and rides between Chyngton Road and the top of the hill.

Both routes were redesigned for 2018 after discussions with SWT and an analysis of the results from 2017. Initial design work had delayed the start in 2017, but a full series of surveys was carried out in 2018: starting in April and ending in early October. There were 58 surveys in 2018 and 38 in 2017.

After the close of surveying in 2018, the eastern transect was registered with the UKBMS and the sightings sent to their database. We are now aiming to survey the same eastern route for as many years as possible, in order to generate comparable data. Moreover, if as seems likely the western route stays unchanged from 2018 to 2019, and there are sufficient volunteers to sustain this route for several years, this can also be registered and the results sent to UKBMS.

For whatever reason, such as the weather, longer recording period, or changes to habitat, the numbers of sightings increased very considerably from 2017 to 2018. In 2017 there were 2751 sightings of butterflies from 26 species and in 2018 there were 6273 sightings from 33 species. There are, of course, more species of butterflies than this on the Head, but it is worth stressing that this type of survey is not seeking rare or unusual species, but is almost entirely concerned with standardised recording of changes over years in the general butterfly population of Seaford Head. To this end, there is a recommended speed for walking the transects and only sightings within 2.5m of the route are included in the standard recording.

The ten most frequently sighted species in 2018 are listed here, together with the percentages of the totals they represented in 2017 and 2018 (2017 % first). Small Heath (21.8, 25.5), Meadow Brown (19.3, 24.9), Common Blue (22.4, 18.5), Gatekeeper (10.8, 9.6), Speckled Wood (4.3, 3.7), Small Copper (3.7, 2.7), Large White (2.6, 2.3), Small White (0.5, 2.0), Marbled White (2.3, 1.8), Small Skipper (0.6, 0.8). The same five were the most sighted in both years, and, more generally, the overall distributions are similar. The slight differences in order amongst the first five and other differences in the top 10 can potentially be explained by the changes in the recording

period and changes to the habitat distribution on the transects. The introduction of two new recording groups for 2018 - White sp. and Small/Essex Skipper may also have deflated the numbers of sightings of these individual species.

In addition to the species distributions, the observed brood patterns were also very similar across the two years. Admittedly, the earlier start in 2018 enabled us to see the first brood emergence of Small and Large Whites - and Commas overwintering from 2017. Lack of sightings of Commas towards the end of the survey in 2018, (they were seen late in 2017), may raise concerns about the number overwintering to 2019. A small peak in Common Blue numbers towards the end of the 2018 survey may be evidence for a third brood that can occur after hot late summers. More significantly, the Red Admiral sightings dropped from 101 in 2017 to 19 in 2018. This is consistent with the Big Butterfly Survey estimate of a 73% drop between the years that is blamed on the unusually cold weather in early 2018.

The previous two paragraphs discussed the combined pattern of sightings for both survey routes. However, in order to judge the effectiveness of the redesign of the routes for 2018 we need to consider each separately.

In 2018 the eastern transect was lengthened from 1870 to 2835m, to cover three new areas: the coastal path to the east and west of Hope Gap and the rough pasture in the east of the reserve. Most of this was done at SWT's request, to include privet scrub edges where Forester or Scarce Purple and Gold moths might be found; or to monitor butterfly numbers on rough pasture that is being actively managed.

**In the west**, the transect was shortened from 2600 to 2100 metres. After examining last year's results, several low ecotone rides, where there had been few sightings, were replaced by more open and scalloped rides. The other main change was the substitution of an area that has been heavily sheep grazed for much longer zigzags across cleared (and intermittently grazed) rough grassland.

Following the route changes in the east, Scarce Purple and Gold moths were seen during the survey close to Hope Gap. The Forester was not recorded on the survey, but was reported near the survey route on other occasions.

The changes to the western route also seem to have had the desired effect, by removing several rides with very low rates of sightings. The variety of habitats on the two routes became more similar as a result of the changes. Two signs of convergence, probably due to the increase of rough pasture on the eastern route and its reduction on the western, were the increased proportion of Meadow Browns in the total western sightings (there was a decrease in the east) and an increase in the proportion of Common Blues in the west and a decrease in the east. Changes to the western route may also partly explain the reduction in the proportion of Gatekeepers and the increase in Small Heath sightings.

Despite some convergence, differences persist between the distribution of species in the east and west - the most striking being the concentration of Small Coppers in the east and Speckled Woods in the west. Given the variety of habitats covered by the two transects and the range of and stability of sightings from 2017 and 2018 there is a good case for arguing that the current

methodology provides a reasonable picture of the general distribution of butterflies on Seaford Head.

One final point relates to the weather during the surveys - and its recording. We need to try to stay within the UKBMS guidelines to avoid our records being excluded from their analyses - three of the 2018 western surveys would have failed on these criteria and a fourth would have been omitted for lack of weather data. Nevertheless, this should not stop us surveying when the only decent day in a week looks unlikely to meet the UKBMS criteria.

**Appendix 1 Total Sightings, by species, in 2017 and 2018.**

| Species                  | 2018 |         | 2017 |         |
|--------------------------|------|---------|------|---------|
|                          | N    | %       | N    | %       |
| Adonis Blue              | 2    | 0.03%   | 0    | 0.00%   |
| Brimstone                | 3    | 0.05%   | 0    | 0.00%   |
| Brown Argus              | 5    | 0.08%   | 6    | 0.22%   |
| Chalkhill Blue           | 6    | 0.10%   | 0    | 0.00%   |
| Clouded Yellow           | 34   | 0.54%   | 11   | 0.40%   |
| Comma                    | 46   | 0.73%   | 33   | 1.20%   |
| Common Blue              | 1159 | 18.48%  | 615  | 22.36%  |
| Dark Green Fritillary    | 10   | 0.16%   | 2    | 0.07%   |
| Dingy Skipper            | 37   | 0.59%   | 3    | 0.11%   |
| Essex Skipper            | 8    | 0.13%   | 1    | 0.04%   |
| Gatekeeper               | 605  | 9.64%   | 297  | 10.80%  |
| Grayling                 | 0    | 0.00%   | 0    | 0.00%   |
| Green Hairstreak         | 22   | 0.35%   | 3    | 0.11%   |
| Green-veined White       | 15   | 0.24%   | 4    | 0.15%   |
| Grizzled Skipper         | 18   | 0.29%   | 1    | 0.04%   |
| Holly Blue               | 5    | 0.08%   | 0    | 0.00%   |
| Large Skipper            | 41   | 0.65%   | 24   | 0.87%   |
| Large White              | 144  | 2.30%   | 73   | 2.65%   |
| Long Tailed Blue         | 0    | 0.00%   | 0    | 0.00%   |
| Marbled White            | 112  | 1.79%   | 62   | 2.25%   |
| Meadow Brown             | 1561 | 24.88%  | 531  | 19.30%  |
| Orange Tip               | 0    | 0.00%   | 0    | 0.00%   |
| Painted Lady             | 5    | 0.08%   | 5    | 0.18%   |
| Peacock                  | 47   | 0.75%   | 13   | 0.47%   |
| Red Admiral              | 19   | 0.30%   | 101  | 3.67%   |
| Ringlet                  | 33   | 0.53%   | 10   | 0.36%   |
| Silver Washed Fritillary | 0    | 0.00%   | 1    | 0.04%   |
| Silver-spotted Skipper   | 11   | 0.18%   | 0    | 0.00%   |
| Small Blue               | 1    | 0.02%   | 0    | 0.00%   |
| Small Copper             | 171  | 2.73%   | 103  | 3.74%   |
| Small Heath              | 1598 | 25.47%  | 599  | 21.77%  |
| Small Skipper            | 51   | 0.81%   | 15   | 0.55%   |
| Small Tortoiseshell      | 20   | 0.32%   | 0    | 0.00%   |
| Small White              | 124  | 1.98%   | 14   | 0.51%   |
| Small/Essex Skipper      | 50   | 0.80%   | 100  | 3.64%   |
| Speckled Wood            | 230  | 3.67%   | 118  | 4.29%   |
| Wall                     | 22   | 0.35%   | 6    | 0.22%   |
| White Letter Hairstreak  | 0    | 0.00%   | 0    | 0.00%   |
| White sp.                | 57   | 0.91%   | 0    | 0.00%   |
| Totals                   | 6273 | 100.00% | 2751 | 100.00% |

## Appendix 2 Weather: UKBMS criteria, variability and possible effects

### UKBMS criteria

In order to standardise results, the UKBMS analyses only include data from surveys carried out in good weather. More specifically:

"Transect walks should only be carried out in warm and at least bright weather, with no more than moderate winds and not when it is raining. The minimum criteria are either 13-17°C with at least 60% sunshine, or if there is no sunshine the temperature must be 17°C or above. Windspeed (Beaufort scale) should be no more than 5 unless the transect route is sheltered from the wind."

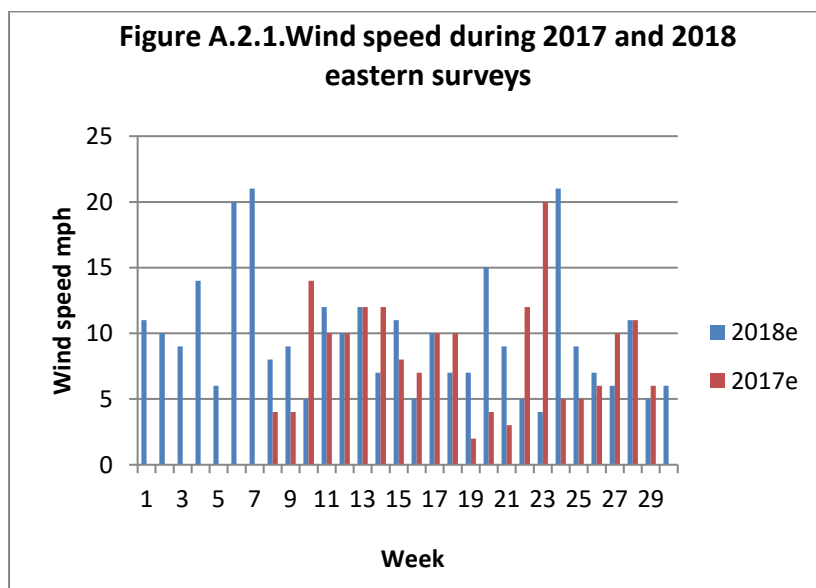
*(UKBMS G2: FIELD GUIDANCE NOTES FOR BUTTERFLY TRANSECTS)*

None of the 2018 eastern surveys failed on these criteria, but four in the west did (Table A.2.1).

Weeks 1 and 4 failed because the temperature was below 13 °C. Week 2 failed because the percentage of sun was below 60% and the temperature was not more than 17 °C. Week 10 failed because the temperature was not recorded - though it was probably more than 17 °C, so the results should have been considered despite the lack of sun.

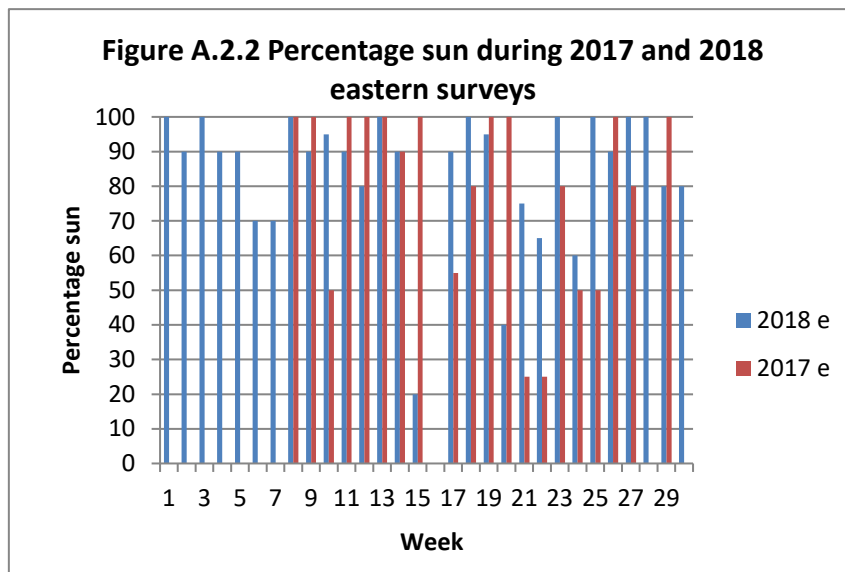
| Week and date | Temp °C      | % sun | Wind speed mph |
|---------------|--------------|-------|----------------|
| 1 (6/4/18)    | 12           | 80    | 15             |
| 2 (11/4/18)   | 15           | 50    | 9              |
| 4 (26/4/18)   | 12           | 50    | 15             |
| 10 (7/6/18)   | Not recorded | 0     | 5              |

### Eastern survey weather for 2017 and 2018



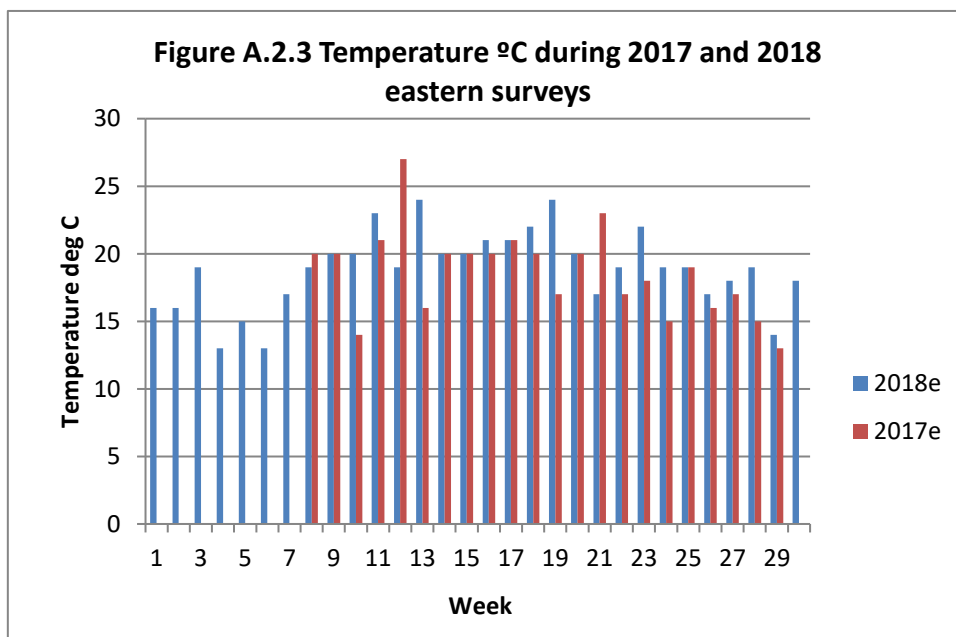
Figures A.2.1-3 show the recorded weather conditions for the eastern surveys in both 2017 and 2018. Somewhat surprisingly, the wind speed never exceeded 21 mph - which is within level 5 on the Beaufort scale and is acceptable to UKBMS.

From Figure A.2.2 it looks as though the percentage of sun was below 60% for two or three of the 2018 eastern surveys - and at least 8 in 2017. However, none of the 2018 eastern surveys were



excluded because on these days the temperature exceeded 17 °C despite the reduced sun levels.

Figure A.2.3 show that the temperature on the eastern surveys in both 2017 and 2018 was never



less than 13 °C - so all these would have passed the UKBMS low temperature criterion.

**Possible associations between weather and number of sightings**

There is the possibility of using the weekly data to explore any associations between number of sightings and weather conditions. The report on the 2017 survey looked for relations between all three weather variables and variations in the number of sightings from the transect monthly averages. When plotting the number of sightings against temperature it concluded: "On the only

*occasion when the temperature was more than 25 deg., the numbers seen were 67% more than the monthly average. And on all 8 occasions when the temperature was between 21 and 25 degrees the numbers exceeded the averages by 12.7 to 49.2%. Conversely, in 21 of the 23 surveys when the temperature was between 16 and 20 deg., the numbers were below the monthly average. No corresponding relation between wind speed and numbers was found."*

Nothing so "sophisticated" as controlling for monthly averages was attempted this year, nor any form of multivariate analysis, but a simple plot of temperature against number of sightings for the eastern transect in 2018 (Figure A.2.4) shows signs of an increase with temperature. This may, of course, be simply due to there being most butterflies in flight in the warmer mid-summer months.

Even if more sophisticated analyses were attempted, the weather data on the record sheets is inadequate for this purpose since it only relates to the days on which we survey, which are unrepresentative (since we tend to choose the best days), and does not necessarily reflect the general weather patterns that influence the numbers and species of butterflies.

