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# STEYNING DOWNLAND SCHEME

## BOTANY SURVEYS

### 2016

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### Introduction

Three areas of Steyning Downland Scheme: Steyning Coombe and the North and South sides of the Rifle Range have been subjected to botany surveys since 2010. The area known as 'The Secret Garden' was also surveyed for the first time in 2015 and a further survey carried out this year. Management of these areas is aimed at maintaining and improving the chalk grassland characteristics of the areas and the surveys are intended to monitor changes in the vegetation. This report describes the surveys carried out in 2016 and compares the results with the previous years.

### Method

Surveys are carried out by teams of volunteers and take the form of a 20-stop W-transect over each of the areas. Handheld GPS devices are used in an effort to cover the same route over each area on each occasion. 0.5m<sup>2</sup> quadrats are placed at each stop and the plant species present in the quadrat are recorded on sheets listing the plant species likely to be encountered. The number of quadrats in which a species occurred is totalled and this gives an indication of the abundance of the species in the area.

In 2016 Rifle Range North Side, Rifle Range South Side and Steyning Coombe were surveyed in June and July. Plans to survey these areas in August was twice abandoned due to bad weather. The Secret Garden (between Pepperscombe and Steyning Round Hill) was surveyed once in June.

Records were entered into the national biological database, iRecord, and into an Excel spreadsheet for analysis. This can be accessed at:

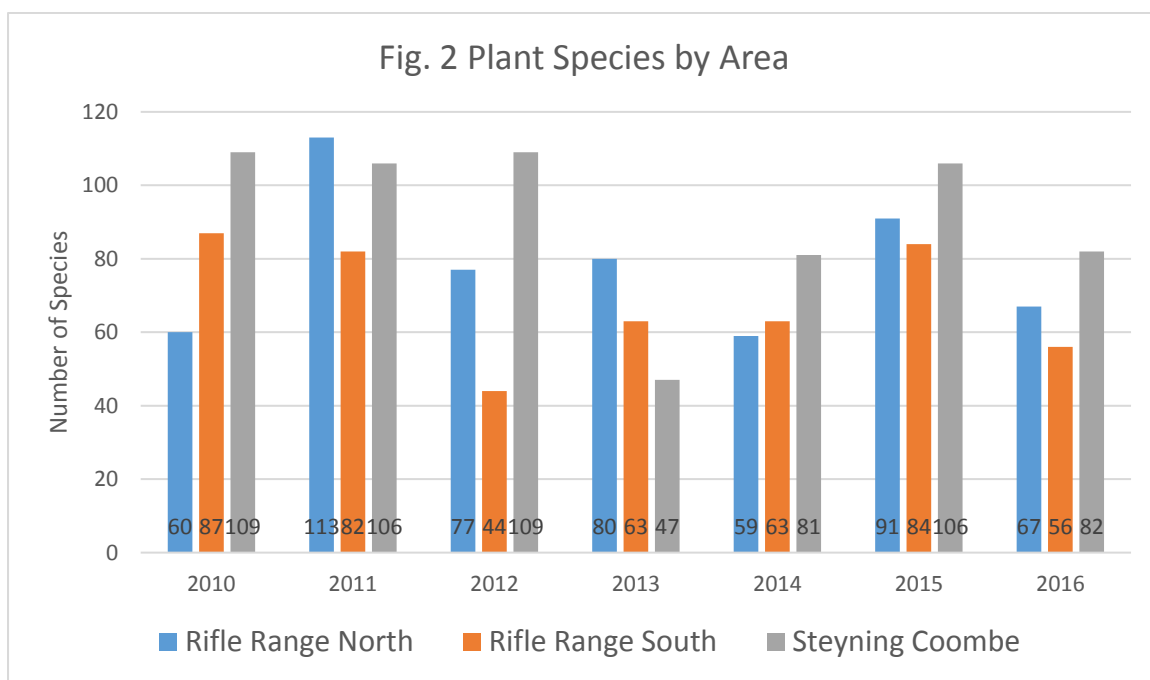
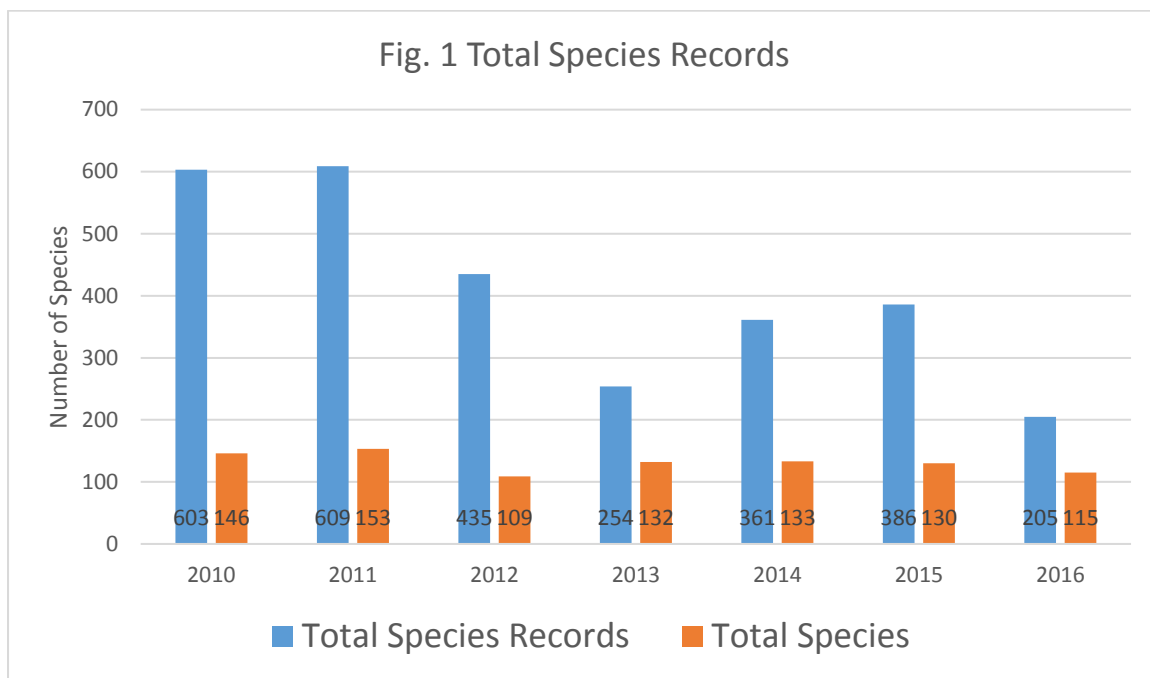
<https://www.dropbox.com/home/Biological%20Recording/Botany%20Surveys?preview=Botany+Surveys++to+2016.xlsx>.

The total number of species gives an indication of the overall biodiversity of the area. Species are classified as herbs, grasses or sedges, and woody plants, giving an indication of the extent of invasion by woody species. Twenty-one species of plants are identified as positive indicator species for chalk grassland and eight are negative indicator species. Their presence or absence is an indicator of the success of management. Records of surveys carried out each year since 2010 have been maintained and comparisons are made with this year's results.

### Results

Results for 2016 are shown below in a series of charts comparing them with the previous survey years. In 2010 and 2011 surveyors noted the plants in the vicinity of each stop on the W transect. In 2012 and subsequent years quadrats were introduced and this accounts for the fall in the total number of species recorded. In the first three years surveys were carried out in June, July, August and September. In 2013 and 2014 surveys were only conducted in June, July and August; the September survey was omitted. Surveys were cancelled because of bad weather in July 2012 and August 2013 and August 2016.

The introduction of quadrats in 2012, the cancellation of surveys in 2012 and 2013 and the loss of data from some surveys, all affect the results, giving an impression of declining numbers of species which may not be justified. Fig.1 shows the total number of species records and Fig. 2 shows the number species recorded in each area.



Plant species are classified as herbs, grasses or sedges or woody plants. Figs. 3, 4 and 5 show the percentages of each type recorded in each area in 2015.

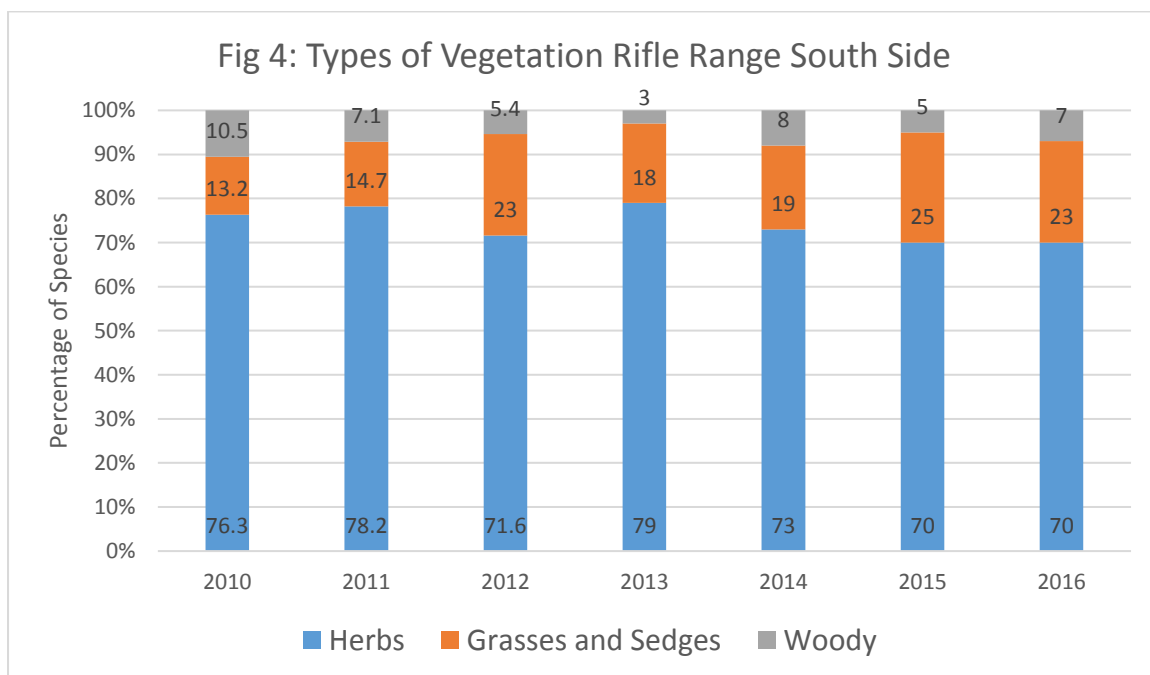
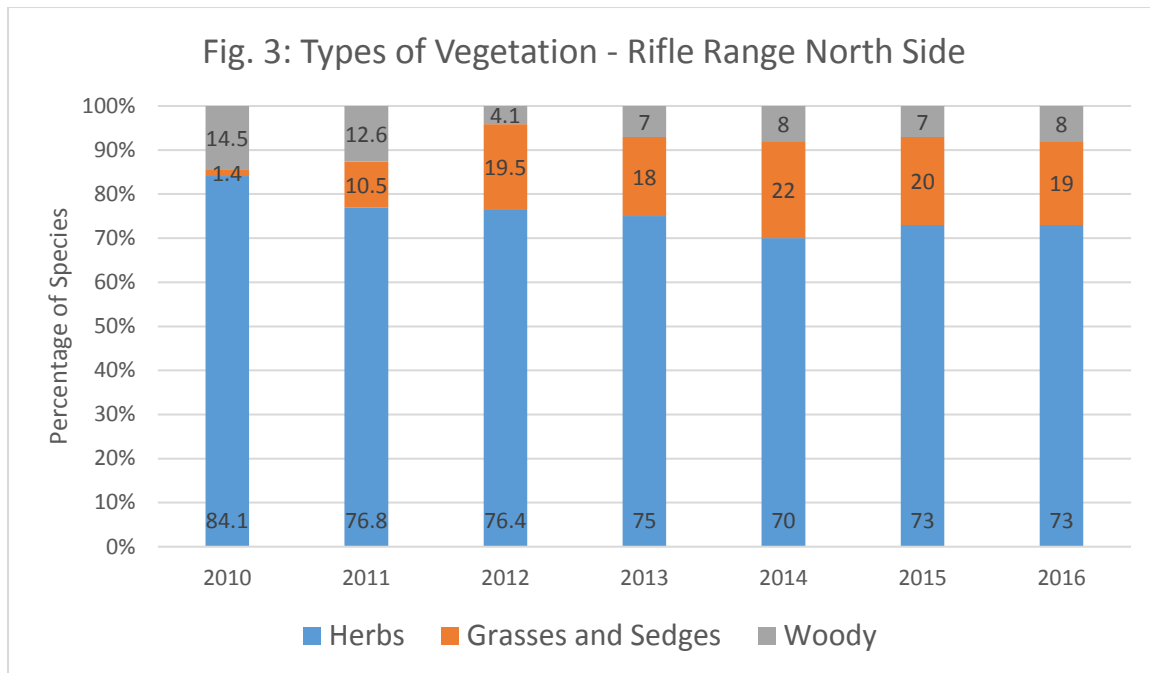
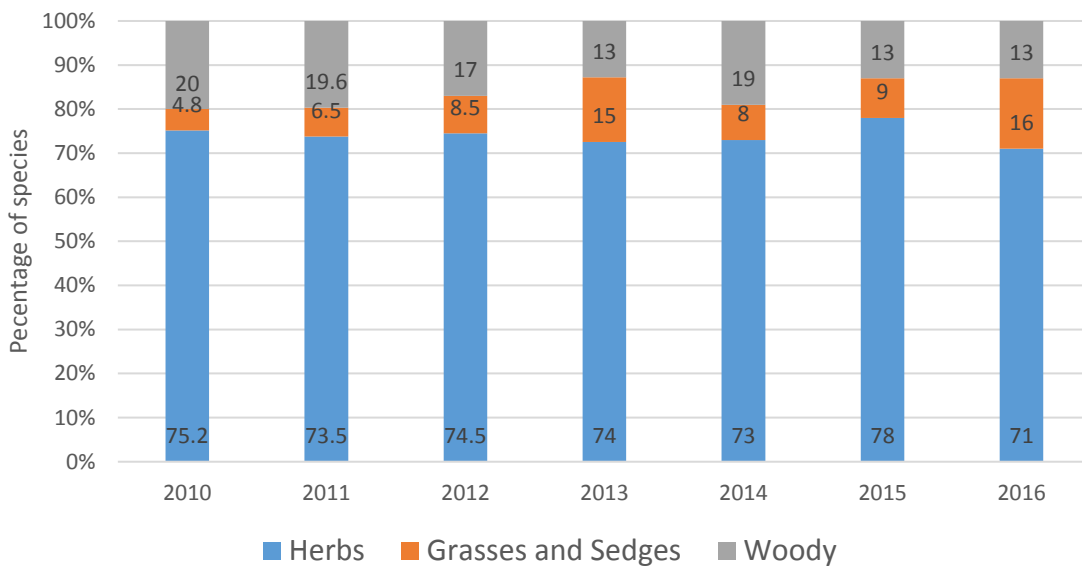
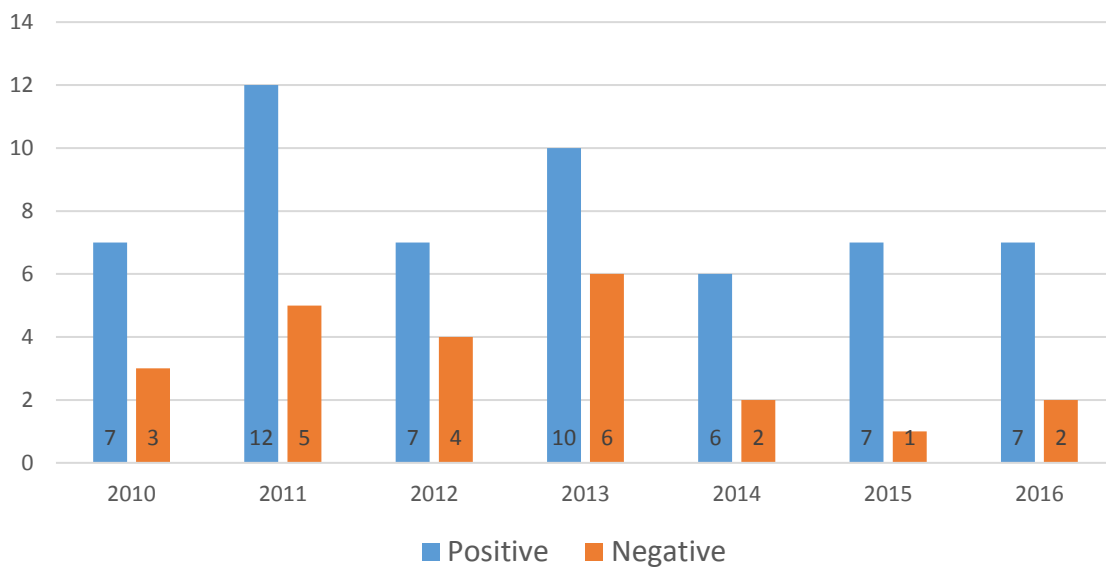


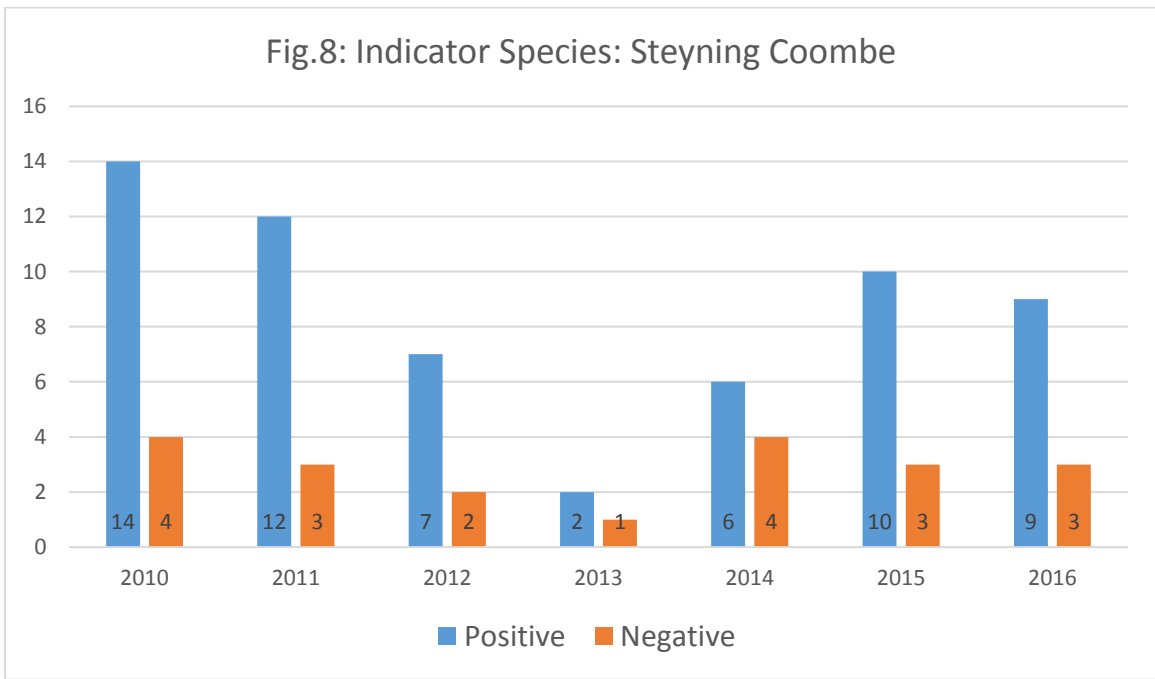
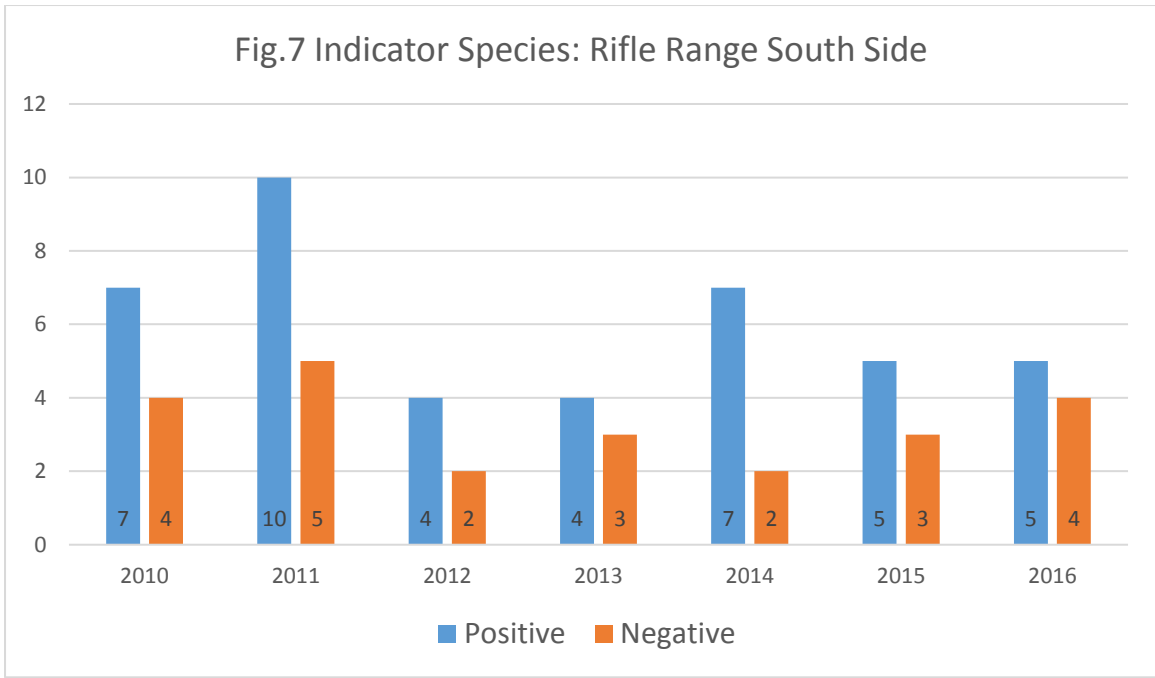
Fig. 5: Types of Vegetation Steyning Coombe



Twenty-one species of plants are identified as positive indicators of chalk grassland and eight are identified as negative indicators. The numbers of each species recorded in the three areas are shown in Figs. 6, 7 and 8.

Fig. 6 Indicator Species Rifle Range North Side





Positive and negative indicator species recorded in each area are shown in Tables 1, 2, and 3. Frequency of occurrence is noted by the number of quadrats in which that each species was recorded.

Table 1. Positive and Negative indicator species recorded in Rifle Range North.

Rifle Range North			2016
Species	Common name	Indicator species	Frequency
<i>Brachypodium pinnatum s.l.</i>	Tor Grass	N	12
<i>Urtica dioica</i>	Nettle, Common (Stinging)	N	2
<i>Cirsium acaule</i>	Thistle, Dwarf	P	2
<i>Hippocrepis comosa</i>	Vetch, Horseshoe	P	2
<i>Linum catharticum</i>	Flax, Fairy (Purging Flax)	P	2
<i>Lotus corniculatus</i>	Bird's-foot Trefoil, Common	P	22
<i>Pilosella officinarum</i> or <i>Hieracium pilosella</i>	Mouse-ear-hawkweed	P	1
<i>Plantago media</i>	Plantain, Hoary	P	1
<i>Sanguisorba minor</i> subsp. <i>minor</i>	Burnet, Salad	P	4

Table 2. Positive and Negative Indicator Species recorded in Rifle Range South

Rifle Range South			2016
Species	Common name	Indicator species	Frequency
<i>Bromopsis erecta</i>	Brome, Upright	N	1
<i>Senecio jacobaea</i>	Ragwort, Common	N	2
<i>Cirsium vulgare</i>	Thistle, Spear	N	3
<i>Brachypodium pinnatum s.l.</i>	Tor-grass	N	5
<i>Lotus corniculatus</i>	Bird's-Foot-Trefoil, Common	P	23
<i>Sanguisorba minor</i> , subsp. <i>minor</i>	Burnet, Salad	P	5
<i>Primula veris</i>	Cowslip	P	1
<i>Leontodon hispidus</i> / <i>L. saxatilis</i>	Hawkbit, Rough or Lesser	P	2
<i>Plantago media</i>	Plantain, Hoary	P	1

Table 3. Positive and Negative Indicator species recorded in Steyning Coombe.

Steyning Coombe			2016
Species	Common name	Indicator species	Frequency
<i>Senecio jacobaea</i>	Ragwort, Common	N	5
<i>Cirsium arvense</i>	Thistle, Creeping	N	2
<i>Brachypodium pinnatum s.l.</i>	Tor-Grass	N	18
<i>Lotus corniculatus</i>	Bird's-foot-trefoil, Common	P	23
<i>Sanguisorba minor</i> subsp. <i>minor</i>	Burnet, Salad	P	4
<i>Linum catharticum</i>	Flax, Fairy (Purging Flax)	P	2
<i>Leontodon hispidus</i> / <i>L. saxatilis</i>	Hawkbit, Rough or lesser	P	6
<i>Polygala vulgaris</i>	Milkwort, Common	P	4
<i>Plantago media</i>	Plantain, Hoary	P	1
<i>Succisa pratensis</i>	Scabious, Devil's-bit	P	1
<i>Cirsium acaule</i>	Thistle, Dwarf	P	1
<i>Hippocrepis comosa</i>	Vetch, Horseshoe	P	2

The presence or absence of indicator species in each area over the six survey years is shown in Table 4, 5 and 6 below.  
 Note: Clustered Bellflower, Dyer’s Greenweed, Kidney Vetch and Saw-wort are included in the lists of Positive and Negative species, but have never been recorded in surveys and so are not included in the tables.

Table 4. Rifle Range North Side: Frequency of positive (P) and negative (N) indicator plant species/taxa							
	2010	2011	2012	2013	2014	2015	2016
Common Bird’s-foot Trefoil	P	P	P	P	P	P	P
Common Rock-rose							
Cowslip						P	
Devil’s-bit Scabious		P	P				
Dropwort		P					
Dwarf Thistle	P	P	P	P	P		P
Fairy Flax		P	P	P		P	P
Gentian Family							
Hoary Plantain		P					P
Horseshoe Vetch			P	P			P
Milkwort Family	P	P	P		P		
Mouse-ear-hawkweed	P	P	P	P		P	P
Ox-eye Daisy		P	P			P	
Rough or Lesser Hawkbit	P	P	P	P	P	P	
Salad Burnet	P	P	P	P	P	P	P
Small Scabious	P	P	P		P		
Squinancywort							
Broad-leaved Dock							
Common Ragwort		N	N	N			
Creeping Thistle	N	N	N		N		
Curled Dock				N			
Spear Thistle		N					
Stinging Nettle	N	N	N	N			N
Tor Grass	N	N	N	N	N	N	N
Upright Brome							
Total positive indicator plant species	7	12	11	7	6	7	6
Total negative indicator plant species	3	5	4	4	2	1	2

Table 5: Rifle Range South Side: Frequency of positive (P) and negative (N) indicator plant species/taxa

	2010	2011	2012	2013	2014	2015	2016
Common Bird's-foot Trefoil	P	P	P	P	P	P	P
Common Rock-rose		P					
Cowslip	P	P			P	P	P
Devil's-bit Scabious		P					
Dropwort							
Dwarf Thistle	P	P			P		
Fairy Flax	P	P	P	P	P	P	
Gentian Family							
Hoary Plantain		P					P
Horseshoe Vetch							
Milkwort Family							
Mouse-ear-hawkweed					P		
Ox-eye Daisy							
Rough or Lesser Hawkbit	P	P	P	P	P	P	P
Salad Burnet	P	P	P	P	P	P	P
Small Scabious	P	P					
Squinancywort							
Broad-leaved Dock							
Common Ragwort		N		N			N
Creeping Thistle	N	N	N		N	N	
Curled Dock				N			
Spear Thistle	N	N					N
Stinging Nettle	N	N					
Tor Grass	N	N	N	N	N	N	N
Upright Brome						N	N
Total positive indicator plant species	7	10	4	4	7	5	5
Total negative indicator plant species	4	5	2	3	2	3	4



Table 6: Steyning Coombe: Frequency of positive (P) and negative (N) indicator plant species/taxa.

	2010	2011	2012	2013	2014	2015	2016
Common Bird's-foot Trefoil	P	P	P		P	P	P
Common Rock-rose							
Cowslip							
Devil's-bit Scabious	P	P	P			P	P
Dropwort	P	P					
Dwarf Thistle	P	P					P
Fairy Flax	P	P	P		P	P	P
Gentian Family	P	P					
Hoary Plantain							P
Horseshoe Vetch	P	P	P			P	P
Milkwort Family	P	P	P	P	P	P	P
Mouse-ear-hawkweed	P				P	P	
Ox-eye Daisy	P	P					
Rough or Lesser Hawkbit	P	P	P		P	P	P
Salad Burnet	P	P	P		P	P	P
Small Scabious	P			P		P	
Squinancywort	P	P				P	
Broad-leaved Dock					N		
Common Ragwort	N	N			N	N	N
Creeping Thistle	N		N		N	N	N
Curled Dock							
Spear Thistle	N	N					
Stinging Nettle							
Tor Grass	N	N	N	N	N	N	N
Upright Brome							
Total positive indicator plant species	14	12	7	2	6	10	9
Total negative indicator plant species	4	3	2	1	4	3	3

## Discussion

While the overall number of plant species recorded has remained little changed over the last three years, the numbers recorded in each area have risen and are now as high, or higher, than at any time since the introduction of quadrats. While this may be affected by factors such as timing of surveys, observer effort and ability, it is an encouraging trend. The loss of the third survey date in 2016 also means that some later-flowering species will be under-represented in the data.

The two Rifle Range areas have only a small percentage of woody species present and this has remained consistent over the last six years. Steyning Coombe has a higher percentage of woody species than either of them, but the trend seems to be a declining one. Grass and sedge species have formed a higher percentage of overall species numbers on the Rifle Range areas than on Steyning Coombe. There would appear to be a slight trend towards more grass species being recorded in all areas. It should be noted that some volunteers find grass identification challenging and some species can be difficult, especially when not in flower.

In the pre-quadrat survey years, volunteers would seek out and record indicator species, consequently the apparent decline of these species on subsequent years should be treated with caution. In more recent years, there is little in the way of a clear trend, except for an encouraging decline to one negative species in Rifle Range North. Tables 1, 2 and 3 list the positive and negative indicator species in all three areas with an indication of their frequency (number of quadrats recorded in). It may come as no surprise that Bird's-foot Trefoil *Lotus corniculatus* and Tor Grass *Brachypodium pinnatum* s.l. are easily the most common positive and negative indicator species respectively in all areas. Among the positive indicator species regularly appearing are Fairy Flax *Linum catharticum*, Hawkbits *Leontodon* spp., Salad Burnett *Sanguisorba minor* and Mouse-ear Hawkweed *Pilosella officinarum*. Besides Tor-grass, only Creeping Thistle *Cirsium arvensis* has been a persistent occurrence among the negative indicator species.

## Conclusion

More surveys were carried out in the earlier years and in the first two years 0.5m<sup>2</sup> quadrats were not used and this gives a distorted picture of the range of species, and the frequency of indicator species. Furthermore, the loss of the last survey date means that some later-flowering species were under-recorded in comparison with previous years. However, it is possible to see an improving trend of species diversity, and indicator species frequency. The data gathered so far will enable future progress in management to be assessed with confidence.

## Acknowledgement

The Steyning Downland Scheme Botany Surveys are made possible by the enthusiastic participation of a large group of volunteers including:

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## Appendix

The area known as the Secret Garden was surveyed for the first time in September 2015. This area is centred on Grid Reference TQ165105. The survey was in the form of a 20-stop W-Transect using a 0.5m<sup>2</sup> quadrat.

Forty-one species were recorded, of which twenty-six were herbs, eight were grasses and seven woody species. In June 2016, a further survey was carried out. Unfortunately, it was not possible to arrange another survey during the year. In June 2016, 45 species were recorded, 30 herbs, 10 woody species and 5 grasses and sedges. A comparison of positive and negative indicator species is shown in Table 1.

Table 1: Positive and negative indicator species recorded in two surveys in 2015 and 2016.

Secret Garden			2015	2016
Species	Common name	Indicator species	September	June
<i>Cirsium arvense</i>	Thistle, Creeping	N		1
<i>Brachypodium pinnatum</i> s.l.	Tor-Grass	N	19	10
<i>Lotus corniculatus</i>	Bird's-foot Trefoil, Common	P		7
<i>Sanguisorba minor</i>	Burnet, Salad	P	6	5
<i>Primula veris</i>	Cowslip	P		1
<i>Linum catharticum</i>	Fairy Flax	P	1	
<i>Leontodon hispidus</i> / <i>L. saxatilis</i>	Hawkbit, Rough or Lesser	P	10	3
<i>Polygala</i> spp.	Milkwort, spp.	P		1
<i>Pilosella officinarum</i> or <i>Hieracium pilosella</i>	Mouse-ear-hawkweed	P		3
<i>Succisa pratensis</i>	Scabious, Devil's-bit	P	6	
<i>Cirsium acaule</i>	Thistle, Dwarf	P	2	

It is not possible to draw conclusions from just two surveys carried out at different months, but the species lists they provide hopefully will be a useful record.

Bob Platt

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