

THE ADMIRAL'S HEDGEROW. AN 80-YEAR OLD HEDGE IN WIMBLEDON PARK. Preprint, March 2026
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Abstract

The subject hedge is confirmed to be a 'species-rich, shrubby hedgerow with trees' in the national guidance, but not acknowledged by its owner, the 'All England Lawn Tennis Club', in their planning proposals for the area. It is a National Priority Habitat. Investigation of it revealed a serious source of bias and imprecision in statutory biodiversity net gain (BNG) procedures, which could allow gaming those procedures to overestimate gains. To overcome this, I recommend that hedges be evaluated for BNG by documenting more than one standard 30-metre section and with more than one visit in the period June to August. Documentary evidence shows the hedge to be some 80-years-old, throwing serious doubt on Pollard's, often cited, age estimation algorithm. Comparison of the species composition of the hedge with that of its surrounds shows that ancient woodland indicator species had difficulty dispersing there and that the species that did colonise were predominantly animal-dispersed. Colonisation of a nearby site suggests that the entire successional sequence of species was present at the start, with succession merely representing the unfolding of that initial flora. There was also evidence that succession is heterogeneous, since the flora seems partly dependent on who gets there first. The hedge is a valuable local habitat and amenity, but poorly managed. Although this could be remedied readily, it is threatened by a development proposal and we may lose it, rather than enhance it.

Introduction

Here I explore my findings from a hedgerow in Wimbledon Park. My title is inspired by the, perhaps apocryphal, story of when Admiral Lord Nelson put the telescope to his blind eye when hearing of his unwelcome battle orders, saying "I really do not see the signal." This hedgerow was evident to me as I walked past it on many occasions over the last 42 years, but was apparently not evident to its owner, the 'All England Lawn Tennis Club' (AELTC). So, was I wrong, could it be perhaps just some scrub, a tiny woodland, or a line of trees, not a hedgerow? I looked into its history before checking it against accepted definitions of what makes a hedgerow. If it is a hedgerow, is it "rich" and so deserving conservation priority, or no better than a garden Privet hedge? I used the standard assessment methodology to see which it is, but also to test the precision of that methodology, asking whether it can be tweaked to bias the outcome? There are lessons here in the recognition and evaluation of hedges, especially in the context of biodiversity net gain. Finally, this hedge has attributes that reveal some fascinating ecology of 'secondary succession', it is an accessible learning resource and amenity, embedded in suburban London, but is it managed well? What is its future?

The subject

The hedgerow (Figure 1) separates two open spaces. It lies just within the Wimbledon Park Golf Course, adjacent to the public Wimbledon Park. The golf course was already there when the land was acquired by the predecessor of the London Borough of Merton (the Wimbledon Municipal Borough Council) in 1915. Thereafter, the club leased the land from the local government, until 1996, when it was sold by Merton to AELTC, who inherited the lease. The hedge originates at the north edge of Wimbledon Park Lake and follows the boundary north from there beside the Athletics Stadium for 200m and continues north beside the perimeter path of the public park for a further 185m as far as the Wimbledon Park Road entrance of the public park. As the Athletics Stadium and Golf Course were not always accessible, it is the section beside the perimeter path that is described in detail here, and referred to as the "hedge".



Figure 1. The hedge in context. (Map data from OpenStreetMap and contributors, available under the Open Database License, www.openstreetmap.org/copyright)

History

Ordnance Survey maps from the 1930s were the first to show a boundary between the golf course and the newly-developed public park. This corresponded with the present boundary in the south but, north of the borough boundary between Merton and Wandsworth, it deviated some 80m west of today's boundary. We can date the subsequent shift from there to today's boundary from a poor Luftwaffe aerial photograph from 1939-42, which showed the boundary in the present-day position. Better detail awaited a Google Earth aerial photograph dated 1945, an RAF photograph of March 1946 and an Ordnance Survey Air Photo Mosaic of May 1948. These post-war images clearly showed the new hedge and, to its west, established tees, roughs, fairways and bunkers of the golf course; to its east was the perimeter path of the public park and wartime allotments beyond that. So, the hedge was clearly planted along the new boundary and established by 1945 and, given that various features were well-established then, the origin would have been some years earlier, making the hedge around 85-years old.

A minimum estimate of the age of the hedge can be made, also, from the 'diameter at breast height' (dbh) of four Pedunculatae ('English') Oaks (the Latin names of all the species are given in the appendix table) which are spaced out along the western edge of the hedge, on the assumption they originated by natural colonisation in the adjacent golf course rough. These were approximately 30 to 40cm dbh, giving an estimated age of 50 years, using the method of White (1998). As a minimum age, it is not surprising that these figures are well below those from the

aerial photographic evidence. Two substantially larger oaks are at the northern end of the hedge: with an estimated age of 135 years, these originated some 40 years before the establishment of the public park and so clearly preceded the origin of the hedge.

The perimeter path in the public park was clearly shown separated from the boundary and the shrubs of the hedge by a narrow strip (presumably grassed) on OS map TQ2472 NE which was surveyed in 1949. The Athletics Stadium, however, was not established beside the southern part of the hedge until 1952 (Hercules Athletics Club 2025).

The hedge is dominated by Hawthorns of varying size, but many are old, with stem diameters up to 40cm, and these larger shrubs presumably date from the original planting. At the eastern edge of the shrubs is an old iron security fence, supplemented in places by an older fence around 5 cm further west and a newer one some 5 cm further east. All the woody species in the hedge are rooted on AELTC land just west of this fence. The distances west of the fence of 152 of the older Hawthorns were measured. These ranged from 0.1m to 3.0m, so these Hawthorns grow within the 5m maximum width of a hedgerow (Defra 2007). The median distance was 0.6m and modal value 0.5m, so the original planted hedge was about one metre wide and wholly on the golf course. This narrow linear shape meant it was clearly not a woodland (see below).

In 2025, the grassy strip east of the security fence was 2.1m wide and the perimeter path was 1.8m wide, beyond which was the grassland of the Great Field of the public park.

Evaluation and proposed development.

The hedge was surveyed in the Greater London Council's 1985 Wildlife Habitat Survey of Greater London (Goode 1999) leading to its listing as one of the best hedges in a Site of Borough Importance for Nature Conservation defined around the golf course, lake and woodlands (Yarham *et al.* 1998, page 62). This designation was the result of a comparison with candidate sites elsewhere in the Boroughs of Merton and Wandsworth and followed public consultation, so the importance of the site, and this hedge, was known to AELTC and their golf course tenant and there was no threat to it. This all changed in July 2021, when AELTC made a planning application for intensive lawn tennis development across the golf course.

The AELTC proposals were supported by a prodigious volume of documents and so it took some time to discover that the hedge was not acknowledged. A 'Phase I' habitat survey (Land Use Consultants 2021) mapped this edge of the golf course as rough grassland with broadleaved woodland and scattered trees of 'Pedunculate oak, Red oak, Silver birch, Cherry and Apple', but found no hedge. AELTC commissioned Treework Environmental Practice (2021) to prepare a Tree Survey. This supposedly followed the British Standard for trees in relation to design, demolition and construction (BS5837-2012) which should document all trees of 75mm dbh and all hedgerows. However, it documented no hedge and listed just 14 trees of 220mm dbh or more, so missing all those between 75mm and 220mm, of which there were many. AELTC also submitted three iterations of a Biodiversity Net Gain Metric. The last of these (Land Use Consultants 2024) was the first to have maps of habitats; the mapped habitat here was 'H3 - Dense scrub' and no hedgerow was indicated.

So, it seems that the hedge I had been seeing when passing by in the public park for some 42 years, and which was an integral part of the nature conservation site was not now visible to AELTC. So, what was there, if not a hedge?

An official definition of a hedgerow is available in the Hedgerow Survey Handbook (Defra 2007, Box 1). We clearly have a 'shrubby hedgerow with trees', which is a boundary line of shrubs and trees over 20 m long and less than 5 m wide at the base, the shrubs are more or less continuous and the gaps are less than 20m. This definition was carried forward in 'UKHab' (Butcher *et al.* 2025), which adds a criterion that the base of the leafy canopy should be 2m or less above the ground, which is certainly the case for our hedge.

UKHab (Butcher *et al.* 2025) has sub-types of hedge. Ours is clearly a native hedge, which is a hedgerow with >80% canopy cover of UK native or archaeophyte woody species (habitat type 'h2a'), as it is dominated by a Hawthorn canopy and several other native species occur (see below). It is a hedge with trees (habitat type 190), having two or more trees growing over the shrub canopy. Whether it is a species-rich native hedgerow ('h2a5') depends upon having five or more native woody species in a standard 30-metre sample (see below).

Species richness.

Between 2019 and 2025, I made some 39 species lists from the hedge, finding some 72 species. This suggested a rich hedge, so I sought a survey method to document its quality objectively. Two protocols were possible.

The Countryside Survey collects information for the UK Hedgerow Biodiversity Action Plan. It documents hedge structure, and the cover of each woody species in 30-metre long sample plots (Maskell, Wood & Norton 2022), but it uses a dedicated electronic application for collating the data, so is not readily undertaken for a single, subject hedge.

Most statutory development proposals are required to achieve a Biodiversity Net Gain, documented through the completion of a Biodiversity Metric (Defra 2025). The Metric collects information on the condition of hedgerows, with reference to the UKHab (Butcher *et al.* 2025) for the habitat definition, and cites the Hedgerow Survey Handbook (Defra 2007). This provides a survey and evaluation protocol which is readily applied to an individual hedge.

Our hedge is uncomplicated, being quite homogeneous in composition, situated on level ground and lacking any significant gaps, so simplifying the documentation. For recording woody species, Defra (2007) use a 30-metre long 'survey section' of hedge, and describe an objective way of selecting the section. Here, however, I sought a measure of repeatability, to explore the precision of the method. So, I documented six contiguous survey sections, starting at the north-west corner of the athletics stadium and ending 180 m to the north, just 5 m short of the end of the hedge. The field survey period extends approximately from April to October and June and July are said to be ideal months, particularly where surveys include assessments of the ground flora (Defra 2007). Again, I sought to test this advice, as I had found some species to be most readily discovered in the winter when leaf fall meant that I could see into the hedge readily, so I surveyed all six sections in each month of 2025, with the exception of October.

My visits generated 66 species lists (6 sections, each visited on 11 months) and I found an average of 14.2 species per list. The detailed species lists have been deposited with Greenspace Information for Greater London and are given in the appendix. I found five qualifying woody species listed in Defra (2007) in all six sample sections of hedge (Hawthorn, Ash, Holly, Pedunculate oak and Yew). I also found Silver Birch, Dog rose, Elder, Scots Pine and Wild Cherry in four sections, as well as Sycamore in two sections and a native Lime in one. Sycamore is of uncertain status, but treated as an archaeophyte (an archaeophyte is a species known from the British Isles since before 1500, often uncertain as to whether native or introduced: Stace 2019) and is allowable to count towards the five-species threshold for a rich hedge. Scots pine is considered to be an archaeophyte in the London area, and also qualifies. Defra (2007) list Swedish whitebeam as qualifying, but Stace (2019) considers it to be a neophyte, so I omitted it from the list. So, there were 12 qualifying species in my survey results. On the face of it, all six survey sections would have five or more qualifying species, making the hedge 'species rich' (see the bottom row of table 1).

However, each of those sections was surveyed throughout the year, giving 11 visits each, whereas the official protocol (Defra 2007) requires just the one visit. So, I investigated how many qualifying species I would have missed had I visited each section just the once. The result was illuminating: of the 66 individual survey results, fully one quarter (17) fell below the 5-species threshold. Five of

the six survey sections averaged five species or above, but section A averaged 3.9 species (top line of Table 1). So, my individual survey results were substantially lower than the number known to be there from being found at some time in the survey year (compare the top and bottom rows of table 1). The effect of the season of survey was evident from the average counts each month (Table 1); the greatest average was 5.8 in January, June and November and the lowest was 4.7 in August, not what would have been expected from the advice in Defra (2007).

	Survey sections							
	Average	A	B	C	D	E	F	All sections
Average	5.4	3.9	5.8	5.6	6.3	5.2	5.6	9.5
Jan	5.8	4	7	6	7	5	6	9
Feb	5.3	4	8	3	7	5	5	9
Mar	5.5	3	7	7	5	6	5	9
Apr	5.3	4	7	5	6	4	6	10
May	5.2	5	7	5	6	4	4	8
Jun	5.8	4	5	5	8	6	7	10
Jul	5.5	3	5	6	6	5	8	11
Aug	4.7	3	4	4	6	6	5	11
Sep	4.8	4	3	6	6	5	5	9
Nov	5.8	6	4	8	6	6	5	9
Dec	5.7	3	7	7	6	5	6	10
All year	8.2	8	8	8	9	8	8	11

Table 1. In italics is the number of qualifying species seen in each 30-metre section (A-F) each month. To quality, a species had to be woody and native, or an archaeophyte.

The results for the whole hedge (right column in table 1) might suggest that July or August are the best months to visit a hedge, so perhaps two visits could be done then. However, it is possible that visits in other months might find a complementary list of species. So, to further explore the optimal time to survey a hedge, I investigated every possible pair of months (table 2) for which I counted the number of qualifying species found in all six sections. For example, 12 species were found in the combined list from the April and August visits. Overall, the number found increased by some 9% by surveying in two months (9.5 is the average in Table 1 and 10.4 is the average of the results in Table 2). A high species tally, 11 or more, was found for pairs including every month studied, but especially those including June, July and August as shown by the averages in the top line of table 2, refining the indication from table 1 and showing that visits in other months were slightly less productive.

Ave	10.1	10.1	10.2	10.6	9.7	10.7	11.0	11.5	10.2	10.2	10.5
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Nov	Dec
Feb	9										
Mar	10	10									
Apr	11	11	10								
May	9	9	9	10							
Jun	11	11	10	10	10						
Jul	11	11	11	10	11	11					
Aug	11	11	12	12	11	12	12				
Sep	10	10	10	10	9	10	11	11			
Nov	10	9	10	11	9	11	11	11	10		
Dec	9	10	10	11	10	11	11	12	11	10	

Table 2. The number of qualifying species found in the whole hedge, the results of pairs of visits, combining those in each month with each other month. Counts of 11 qualifying species or above are in bold.

Species composition.

The species found reflect the history of the hedge, the soil type, introductions, natural colonisation and management operations.

The grassy strip between the perimeter path and boundary fence was some 2.1m wide. It was frequently close-mown throughout the growing season, and a margin some 0.25m wide on each side was sprayed occasionally with glyphosate. The woody species of the hedge were cut with a flail to prevent incursion east of the security fence, so there was a sharp division between the sunny grass strip and the woody, shady hedge. This management prevented all spread of woody species (and most of the ground flora) into the public park, so several species classified by Defra (2007) as ground flora, I reclassified (in the appendix) as of amenity grassland. Most of these were unexceptional plants of weedy amenity grass, thriving in full light and moist, fertile soil (Hill *et al.* 1998), but there were three exceptions: the single plant of Salad Burnet is a species of dry, basic soils, the two Snowdrops were likely of planted origin, and a single plant of Wood Speedwell is a shade plant.

Turning to the woody part of the hedge west of the security fence, we are confident that the original planting was predominantly of Hawthorn. The large old Hawthorns are now outnumbered by many others of every size. Other species that were probably planted over the last 80 years include a horticultural climbing rose, a coastal species that is naturally uncommon inland (Burnet Rose; Stace 2019), the naturalised Snowdrop, and two trees that are large enough to have been planted at the same time as the hedge: Scots Pine and Silver Birch.

The other woody shrubs are younger than the pine and birch and very likely to have colonised naturally from seed deposited in bird droppings or buried there by Jays and Squirrels. These include the very numerous (and evergreen) Ivy, Bramble, Evergreen Oak, Holly and Yew which contributed

winter shade. Less frequent were Dog Rose, Elder and Cherry Plum, and single specimens of Turkey Oak, Laurustinus, Sycamore, Sweet Bay, Snowberry, Swedish Whitebeam and Lime.

Apart from Scots Pine and Silver Birch, the hedgerow trees were probably also natural colonists: Pedunculate Oak, and single trees of Horse Chestnut and Wild Cherry, the latter surrounded by several suckers. Several other tree species were predominantly saplings contained within the Hawthorn canopy but a few grew above the canopy, including several Ash, Evergreen Oak, Holly and Norway Maple, and a single tall Yew.

Especially in summer, the ground below the shrubs was very shady, supporting little other than Ivy, with even Bramble mostly confined to the edges. Defra (2007) classified Ivy and Bramble, and Honeysuckle, as ground flora, so excluding them from the woody native species count for judging a species rich hedge. This left just Lords-and-Ladies and Stinking Iris as real hedge ground flora, both of them species of shady habitat and difficult to spot in amongst the dense Ivy.

Discussion

The age of the hedge.

Pollard *et al.* (1974) proposed a rule-of-thumb for aging a hedge, approximated these days by the simple formula of 100 times the number of woody species in a 30-metre sample. This would make our hedge some 540 years old, not the 85 years that I found from good documentation. I join those others who have concluded that the Pollard formula should be abandoned as far too imprecise.

Is a single hedgerow sample representative of the whole?

It is not surprising that I found more species in the whole hedge than I did in any one of the six sample sections. This accumulation of extra species as we monitor an increasing number of survey sections is an example of a species-area curve, one of the few laws of ecology (Scheiner 2003). In this curve, the number of species found increases with the area surveyed, and the rate of increase slows as extra area is studied. In our case we have the whole hedge divided into six contiguous samples. The increase in the average number of species from 5.4 to 9.5 as the number of sections surveyed increased from one to six is wholly expected from a species-area relationship. Underlying the species-area curve is the variation between our six 30-metre sections of the hedgerow. Obviously, the greater this variation the less confidence can be placed in the result from a single section, as is illustrated by one of our six sections failing to achieve the richness threshold when the other five did. The inherent variation between sections is summarised by the coefficient of variation (Lobry *et al.* 2023): this was 16% (bias corrected) in our hedge. This value would be considered reasonably precise for a measure in field ecology, but nevertheless shows that a species-richness value for a single sample from any given hedge should not be assumed to be fully reliable. A value close to the threshold could classify a hedge wrongly by statistical chance.

Defra (2025) ignores this problem of reliability and so ignores the obvious solution. Where a Biodiversity Net Gain (BNG) calculation is to be applied, we need greater confidence in the species-richness than is obtained from a single sample section. Clearly, it is desirable to sample at least two sections and to average the results. We perhaps we should also question why a minimum of five species in a 30-metre length is the standard: why not four or six? Indeed, why use a threshold, when the actual number of woody, native species gives a sliding scale of richness? Shouldn't BNG employ the full data rather than a threshold, arbitrary or not?

At which time of year should we look?

We found that the average number of species found in a survey section increased from 5.4 species to 8.2 as the number of months visited increased from one to eleven. Such an increase has been

described as a collector's or species accumulation curve (Colewell & Coddington 1994). In this we expect the number of species discovered to increase with the amount of survey effort, and the rate of discovery of new species to decline as effort increases. There have been many studies of this which show that empirically there is no such thing as a 'complete' listing. Employing a single visit to each hedge misses many species, but allows a maximum number of hedges to be surveyed, for example in a study of many hedges in a landscape. However, this is not optimal for BNG calculations, where the focus may be on a few, or just the one hedge, as in our example. Unfortunately, Defra (2025) failed to identify this problem, nor the obvious solution. Visiting the sample section of hedge more than once in the most favourable season (June, July and August) and averaging the result will give greater precision and so better confidence in the answer.

How many species were there in the hedge?

It is very often the case that not all uncommon species are found on any one visit, and there are many methods which allow us to estimate the actual number present from such incomplete information. Schmitz & Rahmann (2025) reviewed 20 of these methods, and found that a simple method, the 'bias corrected Chao 1' estimator, performed well for our kind of data. I applied this method to each of the six survey sections of the hedge and to the whole hedge. The estimate for the whole hedge was 59 species, 11% higher than my total from all 11 visits. For each of the six survey sections, I used the method on the qualifying woody, native species and the estimates averaged 11.1 species, 35% greater than the average for all the 11 visits and twice the average for individual visits (table 1). Given that I undertook many more visits than would normally be part of a routine survey, it is salutary that so many more species remained undiscovered.

How did the plants get to the hedge?

Apart from Hawthorn, there was no evidence that the other 10 woody indicator species found in the hedge were planted there, but nor is there good evidence on how else they may have got there. We are not alone in this, as it is prodigiously difficult to infer, let alone measure, natural dispersal.

To start with, if we consider that a hedge is comparable to a woodland, we might suggest that the ecology of ancient woodland indicator species may throw some light on the question. Peterken's (1974) classic study concluded that these indicator species have difficulty colonising recent woodlands because they disperse poorly across non-woodland habitat. Subsequent work (Argote *et al.* 2025) sees Peterken's study area as an untypical extreme contrast between habitat and non-habitat and suggests that colonisation depends upon three factors: the suitability of the destination, the distribution of the sources and the unsuitability of the space between the destination and the sources. Nevertheless, the concept of ancient woodland indicator species has been found to be informative (Kimberley *et al.* 2013). In our case, the only near ancient wood is the tiny Ashen Grove Wood, which lies 500 m away to the south-east (Figure 1). Horse Close Wood is nearer, probably planted and we have insufficient information to determine whether it is ancient or just old. These two sources are the only known nearby. I compared Francis Rose's indicators of ancient woodland (Rose 1999) for the south-east (including London) with the list of plants of Ashen Grove Wood and Horse Close Wood (Dawson 2018 & 2025). Horse Close Wood has 12 indicators, none of them abundant (Field Maple *Acer campestre*, Pendulous Sedge *Carex pendula*, Hornbeam *Carpinus betulus*, Hybrid Hawthorn *Crataegus x media*, Giant Fescue *Schedonornus giganteus*, Bluebell *Hyacinthoides non-scripta*, Holly, Stinking Iris, Crab Apple *Malus sylvestris*, Wild Cherry, Small-leaved Lime *Tilia cordata* and Guelder Rose *Viburnum opulus*). Ashen Grove Wood has just three of those species, but adds Wood Millet, *Milium effusum*, bringing the total up to 13 species. The hedge has three indicator species, a comparable total to Ashen Grove Wood. As the hedge (at 0.04 ha) is around 5% the area of Ashen Grove Wood (at 0.7 ha), it has a reasonable number of ancient woodland indicators in comparison with its surroundings. It is not obvious where these species may have originated, but their presence suggests that the hedge has not suffered from significant isolation from sources of colonists.

We may also examine the mode of dispersal of the species that have made it to the wood. I looked up all the woody species in the reference table of Lososová *et al.* (2023), to find that 13 of our species have fleshy fruits eaten by birds with the seeds defecated when birds arrive to perch in the hedge (Bay, Cherry plum, Dog rose, Elder, Hawthorn, Holly, Honeysuckle, Japanese honeysuckle, Laurustinus, Snowberry, Swedish whitebeam, Wild cherry, & Yew). This also applies to Bramble and Ivy. A further four species (the three oaks and Horse chestnut) are carried by birds or mammals to be buried at the hedge. All 19 of those animal-dispersed species are given a median dispersal distance of 400 m. Just six species (Ash, Lime, Norway maple, Sycamore, Scots pine and Silver birch) are wind dispersed and are given a median distance of 40 m.

The 400 m dispersal distance includes the whole northern end of the public Wimbledon Park and of the golf course, including all the old planted Horse Close Wood, and much well-treed suburbia to the west across Wimbledon Park Road. There are mature trees or shrubs of most of the animal-dispersed species known in these places, and the others are very likely to be somewhere in the suburbs, so it's reasonable to assume arrival by bird, or squirrel, transport over the 80 years that the hedge has been there. The wind dispersed species, however, need a source much nearer, essentially within the near part of the golf course only. There are no known sufficiently mature Scots Pine or Silver Birch there, so it seems likely that these two species were planted.

Conversely, one might wonder if there are candidate seed sources nearby that are missing from the hedge. The nearest corner of Horse Close Wood is only 70m away and the wood has 14 woody species mature enough to be a source. Of these, half are animal-dispersed (Red horse chestnut *Aesculus carnea*, Sweet chestnut *Castanea sativa*, Hazel *Corylus avellana*, Blackthorn *Prunus spinosa*, Rowan *Sorbus aucuparia*, Wayfaring tree *Viburnum lantana* and Guelder rose *Viburnum opulus*) and half wind-dispersed (Field maple *Acer campestre*, Buddleja *Buddleja davidii*, Hornbeam *Carpinus betulus*, Hybrid black poplar *Populus x canadensis*, Goat willow *Salix caprea*, Crack willow *Salix x fragilis* and English Elm *Ulmus procera*). This contrasts with the proportions that made it to the hedge, only a quarter of these being wind-dispersed. This difference is statistically significant in a 2x2 chi-squared test, so suggesting that our hedge was sufficiently isolated that wind-dispersed woody species had difficulty getting there. In contrast to the ancient woodland indicators, this suggests that distance from sources has had a significant influence on what species made it to the hedge. Clearly, this applies just to the precise situation of our hedge, so it would be great if other studies of hedges were to test the generality of this.

Turning to the ground flora in deep shade below the hedge canopy, we should return to the concept of ancient woodland indicator species. These are all given a median dispersal distance of 2 m, or less, by Lososová *et al.* (2023). Only one of these (Stinking Iris) had made it to the hedge, clearly indicating that dispersal difficulty was one reason for the few ancient woodland species in the ground flora of the hedge. Other herbaceous plants of the nearby woodlands that are not on Rose's list, but were given a median dispersal distance of 2 m by Lososová *et al.* (2023), included Garlic mustard (*Alliaria petiolata*), Black horehound (*Ballota nigra*), Hedge bindweed (*Calystegia x lucana*), Herb Robert (*Geranium robertianum*), Hogweed (*Heracleum sphondylium*) and Lesser celandine (*Ficaria verna*). Only Enchanter's nightshade (*Circaea lutetiana*) was considered to be animal-dispersed and so have a 500 m median distance. So, here too, dispersal ability seems to be a major influence on colonisation. In contrast, Hill *et al.* (1999) did not classify any of the species that failed to establish in the hedge as adverse to shade, so suggesting that it was not the shady interior of the hedge that deterred them.

What does current recruitment tell us about the earlier history of the hedge?

	Year						
	19	20	21	22	23	24	25
<i>Acer campestre</i>	0	0	0	1	1	1	3
<i>Aesculus hippocastanum</i>	0	1	1	1	1	1	1
<i>Alliaria petiolata</i>	0	1	4	30	8	28	9
<i>Anthriscus sylvestris</i>	0	4	6	7	9	46	66
<i>Arctium minus</i> agg.	0	0	0	1	0	0	0
<i>Arrhenatherum elatius</i>	0	22	0	0	34	0	1
<i>Buddleja davidii</i>	0	9	10	10	9	10	10
<i>Carex pendula</i>	1	10	10	10	24	10	9
<i>Carex remota</i>	0	0	1	0	0	0	0
<i>Carex sylvatica</i>	0	1	10	3	1	1	1
<i>Centaurea nigra</i> agg.	0	0	0	0	0	1	1
<i>Corylus avellana</i>	0	0	1	1	1	1	2
<i>Crataegus monogyna</i>	0	78	36	33	40	28	33
<i>Dactylis glomerata</i>	4	7	34	9	24	8	18
<i>Festuca ovina</i>	0	1	0	0	0	0	0
<i>Fraxinus excelsior</i>	0	1	0	1	0	0	1
<i>Galium aparine</i>	0	44	331	2676	700	604	525
<i>Geranium robertianum</i>	0	6	5	100	340	100	34
<i>Geum urbanum</i>	0	1	5	10	10	10	55
<i>Holcus lanatus</i>	0	4	1	10	10	0	30
<i>Iris foetidissima</i>	0	1	1	10	37	28	9
<i>Myosotis sylvatica</i>	0	0	1	10	8	100	40
<i>Plantago lanceolata</i>	0	6	16	5	7	5	6
<i>Poa trivialis</i>	0	55	55	70	10	100	6
<i>Prunus avium</i>	0	1	1	1	1	1	0
<i>Prunus spinosa</i>	0	0	1	1	0	0	0
<i>Quercus robur</i>	0	75	46	9	25	8	20
<i>Rosa canina</i> agg.	0	0	1	1	6	5	7
<i>Rubus fruticosus</i> agg.	0	1	5	10	9	10	8
<i>Rumex crispus</i> subsp. <i>crispus</i>	1	1	1	0	6	6	1
<i>Rumex obtusifolius</i>	0	1	6	7	7	10	18
<i>Rumex sanguineus</i> var. <i>viridis</i>	0	0	1	1	1	0	1
<i>Rumex x pratensis</i>	0	1	0	0	1	0	1
<i>Sambucus nigra</i>	0	0	1	1	1	1	1
<i>Sorbus aucuparia</i>	0	0	0	0	0	0	1
<i>Taraxacum</i> sp.	1	54	74	21	49	46	49

Table 3. The abundance of each species of National Vegetation Classification type W8 found each year (2019-2025) within the veteran oak enclosure in Wimbledon Park. The values in the table are the average of several assessments each year on a log-10 scale of abundance, so an approximation to the actual abundance, and have been rounded to two significant figures.

This site acquired species rapidly, presumably because their seeds or seedlings were already there, or arriving regularly, but rapidly suppressed by the regular mowing before 2019. Such a rapid arrival

in a secondary succession has been attributed to the entire successional sequence of species being present at the start, with succession merely representing the unfolding of that initial flora (Wilson *et al.* 1992). I had introduced Pendulous sedge, and the other three species found in the first year were herbaceous woodland species. In contrast, by 2020 there were already 25 woodland species, woody and herbaceous, and the remaining 11 species were discovered in decreasing numbers over the successive five years (5, 2, 2, 1 and 1 respectively). Of the woody seedlings, the early arrival of Pedunculate Oak and Buddleja was unsurprising, as the veteran oak was overhead and Buddleja notoriously spreads readily carried in the wind to lime-rich disturbed soils. The remarkable early arrival in big quantity was the bird-dispersed Hawthorn, and other animal-dispersed species arriving in 2020 were Horse chestnut, Wild Cherry and Bramble. Most other animal-dispersed woody species were first seen by 2021, only Rowan (*Sorbus aucuparia*) arriving as late as 2025. The only additional wind-dispersed woody species were Ash, arriving in 2020, and Field Maple, first seen in 2022. Of course, the nearby sources will have differed somewhat between the locality of the hedge and that of the veteran, and between 1945 and 2020, but we may nevertheless conclude that most of the arrivals in that hedge would have come in the first few years and to have been dispersed by animals.

Whilst a complete initial floristics explains most of the observations in the enclosure, there is just a little indication of an additional successional pattern: the 'pre-emptive initial floristics' (Wilson *et al.* 1992). Here, the initial arrivals differ by chance between individual sites and succession is heterogeneous, since the development at any one site depends on who gets there first. Ivy and Evergreen Oak are abundant in our hedge, but were absent below the veteran tree, perhaps because earlier species pre-empted them there, but not in the hedge.

The value of the hedge.

The Countryside Survey of England found that 50% of managed hedgerows were in good condition in 2007 (Staley *et al.* 2024), so the richness of our hedge is not exceptional on a national perspective. However, UKCEH recently mapped hedgerows nationally using airborne LIDAR (Light Detection and Ranging). This map has limitations, but shows that the next nearest good hedges were over two kilometres away on Wimbledon Common to the west and there were essentially none in the suburbs to the north and east. The fauna of the hedge has not been studied in detail, but we have good information on birds. My monthly bird counts show that our hedge was in regular use by several species over the last five years, such as tits, Blackbird, Song thrush, Robin, Wood Pigeon, Wren, Blackcap, Song Thrush, Dunnock, Redwing, Chiffchaff, Starling, Stock Dove, Green Woodpecker, Greenfinch, Goldcrest, Jay, Chaffinch, Tawny Owl and Goldfinch, several of which nest there. The Song thrush and Starling are considered to require urgent conservation action ('red-listed', Stanbury *et al.* 2021) and the Dunnock, Green woodpecker and Stock dove are of concern but have not yet become critically endangered (amber-listed). Most of these species appear on Defra's list of birds associated with hedges (Walton *et al.* 2013), mainly as woodland indicators and with hedges as a primary habitat. Clearly, the hedge serves local bird species well.

Wimbledon Park supports some eight species of bat, some of which doubtless use the hedge as a safe route for movements between local habitat (Fure 2017). A static monitoring point for bat activity was run between late April and mid October 2020 near the northern entrance the athletics stadium (LUC 2021a). This confirmed that six of the species recorded by Fure (2017) occurred at the hedge. In order of decreasing frequency of detection, these were Soprano Pipistrelle (*Pipistrellis pygmaeus*), Common Pipistrelle (*Pipistrellus pipistrellus*), Noctule (*Nyctalus noctula*), Daubenton's (*Myotis daubentonii*), Leisler's (*Nyctalus leisleri*), and Nathusius' Pipistrelle (*Pipistrellus nathusii*). The other two species, Brown long-eared (*Plecotus auritus*) and Serotine (*Eptesicus serotinus*), were confirmed nearby. Walton *et al.* (2013) list the Soprano pipistrelle, Noctule and Brown Long-eared as national Priority Species. These observations confirm the importance of the hedge for bats.

The flowers and fruits of Hawthorn, Ivy, Bramble, Holly, Honeysuckles, Dog-rose, Ash, Elder, Horse chestnut, Norway maple, Cherry plum, Scot's pine, Silver birch, Sycamore, Evergreen oak and Yew provided much food for birds and insects and the evergreen foliage of the hedge provides nest and roost sites. Butterflies were not surveyed systematically, but Meadow browns and Gatekeepers were noted in the summer.

Staley *et al.* (2024) reviewed the science behind the occurrence of such plants and animals, many of which were enjoyed by park users as they followed the perimeter path, so providing access to nature. So, the hedge is not remarkable on a national perspective, but serves as valuable habitat for a good range of species in the context of this part of Greater London.

Management.

Sadly, the hedge is not well-managed. The dense foliage of the shrubby component is provided by Hawthorn, Holly and Yew but also by Ivy, Bramble and Evergreen Oak, species that provide valuable habitat, but not valued in traditional assessment. Beyond the line of hedgerow shrubs to the west lies a grassland managed until recently as a golf course rough and colonised in places by Bramble scrub. Some areas of this scrub beside the southern two sections of the hedge were cleared by AELTC in the summer of 2025 for no obvious reason. That the hedge escaped this clearance suggests that AELTC now recognise its value, having ignored it until then, but there has been no public acknowledgement of this. Regular mowing and the use of glyphosate on the grassy hedge bottom on the public park side of the fence prevents the development of a hedge ground flora there. A simple change to a meadow management regime would allow the wildflowers to establish and be enjoyed, and would be cheaper. The management of the shrubs and trees on the eastern side with a mechanical flail preserves a good canopy of shrub species, but at the expense of ugly, shattered branches and extensive loss of hedgerow flowers and fruit, denying wildlife and park users the values of these. Maintenance of this edge of the hedge by volunteers with hand tools can prevent these losses.

The landscape plans of the AELTC planning proposals preserve none of the hedge, proposing its clearance and replacement by new planting, celebrated by AELTC as an improvement. Integrating the hedge into any new landscape is not considered, nor is the use of natural colonists such as have recently been cleared along with the Bramble. These proposals run counter to national guidance on hedgerow management (Staley *et al.* 2024) and would contribute to a biodiversity net loss.

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Appendix. Species list for the hedge

Latin names follow Stace (2019). The "Abun" column gives an approximate number of plants of each species (abundance) estimated on a logarithmic scale and averaged over visits when the species was found. As this is approximate, the results are expressed to two significant figures. The "Cat" column gives a category, mainly as tabulated in Defra (2007), where GF = ground flora, NW = native woody, AW = Archaeophyte woody and N = neophyte. In brackets, I have amended or added to these categories (indicated with brackets) and I introduced two further categories: P = probably planted, and MG = species of the mown and sprayed amenity grassland. Some larger specimens of the woody species were located precisely by the number of metres along the hedge that they occurred, 0 being the north-west corner of the athletics fence.

Species	ABUN	CAT	Metres
Annual Meadow-grass, <i>Poa annua</i>	170	(MG)	
Ash, <i>Fraxinus excelsior</i>	10	NW	68, 71, 150
Bay, <i>Laurus nobilis</i>	1.0	(N)	
Bramble, <i>Rubus fruticosus</i> agg.	100	GF	
Burnet Rose, <i>Rosa spinosissima</i>	1.2	P	
Cherry plum, <i>Prunus cerasifera</i>	1.0	N	
Cleavers, <i>Galium aparine</i>	7.7	MG	
Climbing rose, <i>Rosa</i> sp. (horticultural)	1.1	P	
Cock's-foot, <i>Dactylis glomerata</i>	4.0	(MG)	
Common Couch, <i>Elymus repens</i>	5.5	(MG)	
Common Field-speedwell, <i>Veronica persica</i>	2.0	MG	
Common ivy, <i>Hedera helix</i>	2400	GF	
Cow Parsley, <i>Anthriscus sylvestris</i>	1.0	(MG)	
Creeping Thistle, <i>Cirsium arvense</i>	1.0	(MG)	
Daisy, <i>Bellis perennis</i>	240	MG	
Dandelion, <i>Taraxacum</i> sp.	3.0	MG	
Dog-rose, <i>Rosa canina</i> agg.	3.0	NW	73
Elder, <i>Sambucus nigra</i> (E6)	3.0	NW	82
Evergreen Oak, <i>Quercus ilex</i>	64	N	73, 75, 79
Greater Plantain, <i>Plantago major</i>	11	(MG)	
Groundsel, <i>Senecio vulgaris</i> subsp. <i>vulgaris</i>	5.3	MG	

Hawthorn, <i>Crataegus monogyna</i>	83	NW	
Holly, <i>Ilex aquifolium</i>	32	NW	76, 79, 80
Honeysuckle, <i>Lonicera periclymenum</i>	4.4	GF	
Horse-chestnut, <i>Aesculus hippocastanum</i>	1.8	N	143
Horse-radish, <i>Armoracia rusticana</i>	1.2	(MG)	
Japanese Honeysuckle, <i>Lonicera japonica</i>	4.0	(GF)	
Knotgrass, <i>Polygonum aviculare</i>	50	MG	
Laurustinus, <i>Viburnum tinus</i>	1.2	N	
Lime, <i>Tilia</i> sp. (native)	1.0	NW	
Lords-and-Ladies, <i>Arum maculatum</i>	1.0	GF	
Norway Maple, <i>Acer platanoides</i>	1.6	N	
Pedunculate Oak, <i>Quercus robur</i>	12	NW	44, 81, 107, 113, 135, 159, 175
Perennial rye-grass, <i>Lolium perenne</i>	740	MG	
Purple Cherry Plum, <i>Prunus cerasifera</i> var. <i>pissardii</i>	1.5	N	
Salad Burnet, <i>Poterium sanguisorba</i> Subsp. <i>sanguisorba</i>	1.0	MG	
Scot's Pine, <i>Pinus sylvestris</i>	3.1	AW	62, 103, 168
Silver Birch, <i>Betula pendula</i>	3.0	NW	56, 128
Smooth Sow-thistle, <i>Sonchus oleraceus</i>	1.0	MG	
Snowberry, <i>Symphoricarpos albus</i>	1.0	N	
Snowdrop, <i>Galanthus nivalis</i>	1.0	P	
Spear thistle, <i>Cirsium vulgare</i>	1.3	(MG)	
Stinking Iris, <i>Iris foetidissima</i>	1.8	(GF)	
Swedish Whitebeam, <i>Sorbus intermedia</i>	1.0	N	
Sycamore, <i>Acer pseudoplatanus</i>	1.2	AW	149
Turkey Oak, <i>Quercus cerris</i>	1.3	N	77
Wall Barley, <i>Hordeum murinum</i>	60	MG	
Wild Cherry, <i>Prunus avium</i>	3.0	NW	74, 94
Wood Avens, <i>Geum urbanum</i>	1.0	MG	
Wood Speedwell, <i>Veronica montana</i>	1.0	MG	
Yarrow, <i>Achillea millefolium</i>	8.0	(MG)	
Yew, <i>Taxus baccata</i>	13	NW	74