

Kent Local Hedgerow Survey 2006

**A Pilot Assessment of
Biological and Historical Hedgerow Features in Kent
at Lamberhurst Parish**

Stefanie Buell

**Kent & Medway Biological Records Centre
Tyland Barn
Sandling
Maidstone
Kent ME14 3BD
www.kmbrc.org
info@kmbrc.org**



**Biological
Records Centre**

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EXECUTIVE SUMMARY

A Pilot Assessment of Biological and Historical Hedgerow Features in Kent was undertaken within the Parish of Lamberhurst.

The main objectives were to determine the species-richness, condition and distribution of hedgerows in this Parish. This was carried out through a combination of field surveys following the procedure laid out in the Hedgerow Survey Handbook (2nd Edition, in press) and desktop Geographical Information System (GIS) analysis.

Survey Objectives

Assess for losses and/or gains in species-rich/ancient hedgerows within Lamberhurst Parish.

Assess the species-richness and condition of hedgerows within Lamberhurst Parish.

Provide information on the value of hedgerows that form corridors between areas of woodland within Lamberhurst Parish.

Assess the progress, in terms of hedgerow species-richness and condition, of Defra/Rural Development Service Stewardship Agreements within Lamberhurst Parish.

Raise awareness of the importance of hedgerows in Lamberhurst Parish.

Make all collected data available through the Kent and Medway Biological Records Centre.

Main Findings

- There are an estimated 530 hedgerows in Lamberhurst Parish.
- 57% of the surveyed hedgerow sections were species-rich.
- 47% of the surveyed hedgerow sections were in favourable condition.
- There was an apparent increase in species-rich hedgerows in Lamberhurst Parish from 41% in the 1995 Kent Wildlife Habitat Survey to 59% in the 2006 survey data.
- Over 90% of the surveyed hedgerows were present in some boundary form in the 1840 Tithe maps or 1860 Ordnance Survey 1st Edition maps.
- Hedgerows within Countryside Stewardship Agreement areas had higher percentages of species-rich hedgerows and hedgerows in favourable condition than non-Agreement areas and areas under Environmental Stewardship Agreement.
- Over 1400 species records were recorded during the survey period and are now available through the Kent & Medway Biological Records Centre.

AIMS & OBJECTIVES

A Pilot Assessment of Biological and Historical Hedgerow Features in Kent was undertaken within the Parish of Lamberhurst.

The main objectives were to determine the species-richness, condition and distribution of hedgerows in this Parish, while also assessing the delivery of Biodiversity Action Plan targets through the collation of this data.

This was carried out through a combination of field surveys following the procedure laid out in the Hedgerow Survey Handbook (2nd Edition, in press) and desktop Geographical Information System analysis.

The key objectives were to:

- Assess for losses and/or gains in species-rich/ancient hedgerows within Lamberhurst Parish.
- Assess the species-richness and condition of hedgerows within Lamberhurst Parish
- Provide information on the value of hedgerows that form corridors between areas of woodland within Lamberhurst Parish.
- Assess the progress, in terms of hedgerow species-richness and condition, of Defra/Rural Development Service Stewardship Agreements within Lamberhurst Parish.
- Raise awareness of the importance of hedgerows in Lamberhurst Parish.
- Make all collected data available through the Kent and Medway Biological Records Centre.

METHODS

The Pilot Assessment of Biological and Historical Hedgerow Features in Lamberhurst, Kent followed the standard procedure for local hedgerow surveys, as set out in the Hedgerow Survey Handbook (2nd Edition, in press).

Hedgerows in the survey area were mapped using aerial photographs from 2003 (UKPerspectives.com, permission granted by Kent County Council) on ArcView GIS. From a base layer of the hedgerows in the 1995 Kent Wildlife Habitat Survey, aerial photographs at a scale of 1:3000 were used to remove any hedgerows that no longer existed and add hedgerows that were not present on the 1995 data layer.

A stratified sample of hedgerows was selected for survey using the methodology described in the Hedgerow Survey Handbook (2nd Edition, in press); each 1km square in Lamberhurst was divided into 9 squares and the hedgerow nearest to the centre of each square (if there was one) was selected for survey. Each selected hedgerow was allocated a unique survey identification number comprising the British National Grid 1km square and the selection point number (e.g. TQ6575-6).

In this way, 163 hedgerows were initially identified for survey.

Hedgerow surveys were carried out between 15th August 2006 and 18th October 2006 and where possible, both sides of the hedgerows were surveyed. Time constraints meant that only the Essential Assessments (as set out in the Hedgerow Survey Handbook, 2nd Edition, in press) were made for the hedgerows. The Kent Local Hedgerow Field Survey Form (Appendix 1) and Guidance Notes (Appendix 2) were adapted from the Hedgerow Survey Handbook. The survey form allowed data on non-target species to be recorded, including animal signs such as nibbled acorns and hazelnuts, which were collected to identify the animals that had eaten them. Digital photographs of each hedgerow were also taken.

To maintain consistency in the methodology, all field surveys were carried out by the same Project Officer, accompanied by a maximum of two volunteer surveyors who had been trained in the survey technique. For woody species that could not be identified in situ, a sample was taken for later identification.

A desktop study was also carried out using ArcView GIS. The surveyed hedgerows were compared with Tithe maps (1840) and the Ordnance Survey 1st Edition map (1860). This was carried out by overlaying digital versions of the Tithe and Ordnance Survey maps with the digital layer of hedgerows identified for survey. These hedgerows were then categorised as either being historically present or absent as a boundary feature and if present, whether there were any trees noted on the historic maps.

To get an indication of the importance of hedgerows as wildlife corridors in Lamberhurst Parish, the hedgerows mapped for the Parish were overlaid with data for the woodland areas recorded for 2003 Kent Habitat Survey and also the 1997 Ancient Woodland Inventory.

Comparisons were also made between the current data collected and that of the 1995 Kent Wildlife Habitat Survey hedgerow results. In addition, the species-richness and condition of hedgerows under Countryside/Environmental Stewardship Agreements were compared with the whole dataset.

All survey data were computerised. Unfortunately the updated version of the recommended Access database had not been completed during the data entry phase of the project. Data were therefore entered into Excel spreadsheets, with some information also held on GIS.

RESULTS

Initially, 163 hedgerows (25% of the total mapped) were identified for survey through the stratified sampling method. Of the original number 148 were actually surveyed. Twenty-five of the 163 were found not to be hedgerows during field surveys and of these 14 were reassigned to another suitable hedgerow within the sample square. Three additional hedgerows were considered to be out of the survey area and one hedgerow could not be surveyed as we were unable to contact the landholder. Figure 1 shows the distribution of hedgerows in Lamberhurst and those surveyed for this project.

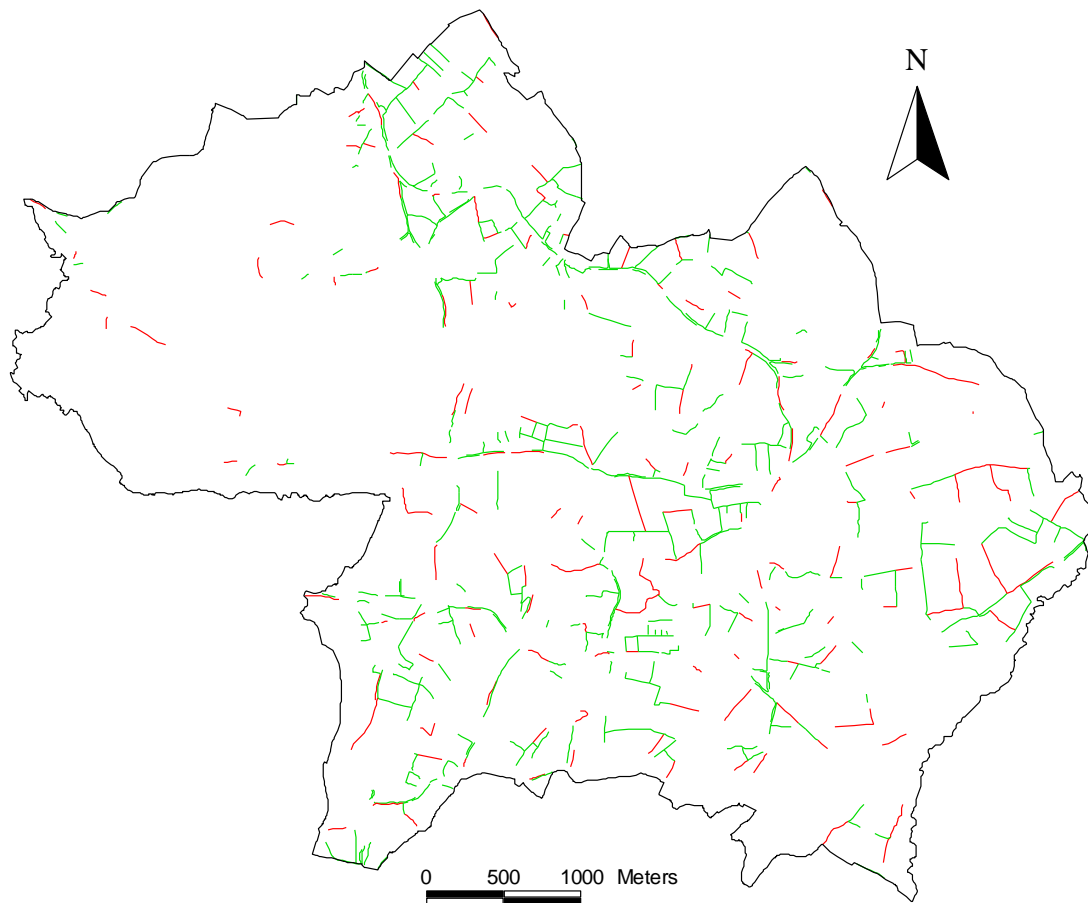


Figure 1. Map of hedgerows in Lamberhurst Parish.
Red= Hedgerows surveyed; Green=Hedgerows not surveyed

Key Results

The Hedgerow Survey Handbook (2nd Edition, in press) describes Key Results for the data collected using the Field Survey Form. A table summarising the Key Results can be found in Appendix 3, some of these results are displayed below.

Hedgerow Length

Of the original 163 hedgerows identified from the aerial photographs for survey, 25 (15.33%) were found not to be hedgerows during the field surveys. When this is extrapolated out to the entire survey area, the number of hedgerows in Lamberhurst Parish is reduced from an expected 627 to 530. As a result of this overestimation, the length of hedgerows in the survey area falls from an expected 79250.52 metres to 67362.94 metres (67.36 km).

The 148 hedgerows surveyed had a total length of 22211.22 metres or 22.21 km, equating to an average length of 150 metres per hedgerow.

Adjacent land use, associated features and connections

How the hedgerows in the survey relate to the wider landscape

- 1) *Adjacent land use*
 - a. % of total number of 30m hedgerow sample sides immediately adjacent to land use types (Figure 2):

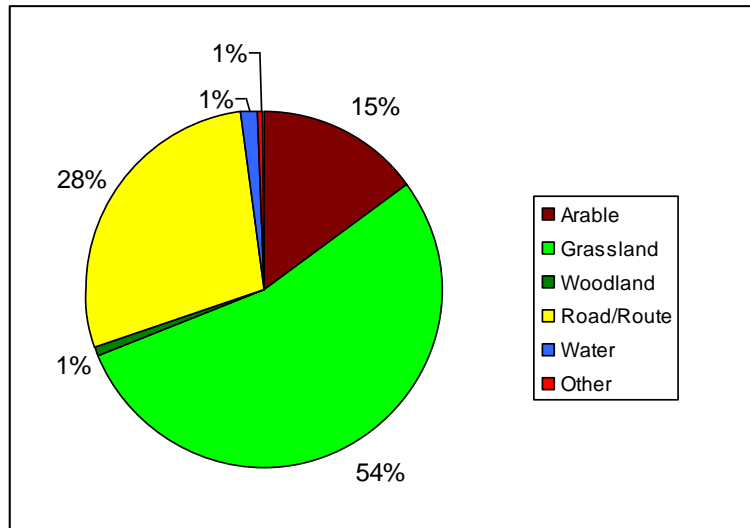


Figure 2. % of surveyed hedgerow sides adjacent to each land-use category

- b. % of total number of hedgerow sample sides surveyed adjacent to improved grassland compared to semi-improved and unimproved grassland (Table 1).

	% of total hedgerow sides surveyed	% of grassland surveyed
Improved grassland	7.46	13.8
Semi-improved grassland	39.66	73.6
Unimproved grassland	6.78	12.6
<i>Grassland overall</i>	53.90	

Table 1. % of surveyed hedgerow sides adjacent to grassland types.

2) Connections

- a. Average number of connections per hedgerow. **The average number of hedgerow connections per hedgerow surveyed was 1.5. The average number of hedgerow and woodland connections per hedgerow surveyed was 2.3.**

3) Hedgerow management shape

- a. % of total number of hedgerows surveyed in each shape category (Figure 3):

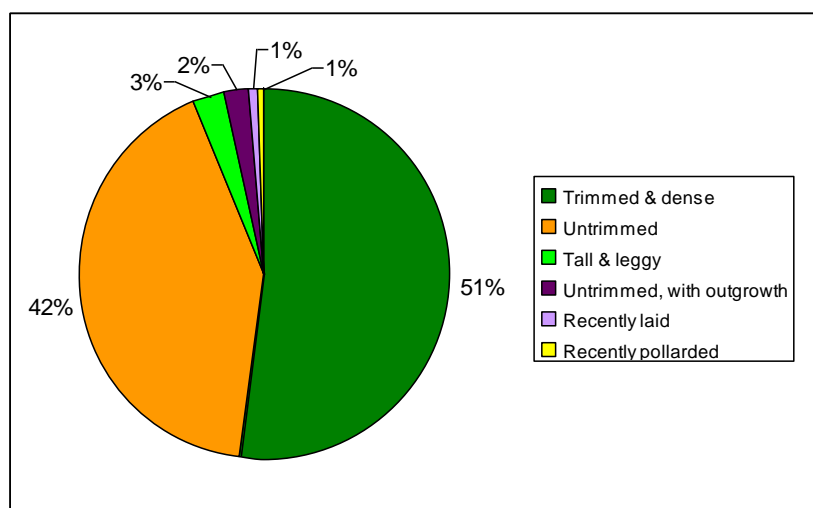


Figure 3. % of surveyed hedgerows in each management category

4) *Isolated hedgerow trees*

- a. % of trees of size 1-5cm diameter at breast height (DBH) among the total number of trees in the sample. **1.5% of the trees in the sample had size 1-5cm DBH (young trees).**
- b. % of trees of 100cm or more DBH among the total number of trees in the sample. **12% of the trees in the sample had 100cm or more DBH (veteran trees).**
- c. Total number of hedgerow trees in the survey area. **From these survey results, the total number of hedgerow trees in Lamberhurst Parish is estimated to be 5417.**

5) *Woody species*

- a. % of hedgerow survey sections that are species-rich – containing at least 5 structural species. **57% of the surveyed hedgerow sections were species-rich.**
- b. Average number of qualifying species (excludes neophytes and climbers) per 30m section. **Average of 4.66 qualifying species per 30m section surveyed.**
- c. % composed of mainly native species. **91% of the surveyed hedgerow sections were composed mainly of native species.**

Condition Assessment

A range of attributes are considered by the Habitat Action Plan Steering Group for (ancient and/or species-rich) hedgerows to contribute to favourable condition. These attributes and the results for this survey are set out below.

Percentage of 30m hedgerow samples achieving favourable condition for:

1) *Dimensions of hedgerows.*

- a. BAP favourable condition threshold for average height is at least 1 metre. **100% of surveyed hedgerows achieved favourable condition for hedgerow height.**
- b. BAP favourable condition threshold for average width is at least 1.5 metres. **97% of surveyed hedgerows achieved favourable condition for hedgerow width.**
- c. BAP favourable condition threshold for cross-sectional area is at least 3 m². **94% of surveyed hedgerows achieved favourable condition for hedgerow cross-sectional area.**

2) *Integrity/Continuity.*

- a. BAP favourable condition threshold for continuity of canopy along hedgerow (% gaps) is less than 10% gaps. **78% of surveyed hedgerows achieved favourable condition for continuity of canopy along hedgerow.**
- b. BAP favourable condition for size of gaps is achieved when no individual gap present is greater than 5 metres wide. **93% of surveyed hedgerows achieved favourable condition for width of individual gaps.**

3) *Height of base of canopy.*

- a. BAP favourable condition for average height of base of canopy is achieved where the canopy base is no higher than 0.5 metres. **80% of hedgerows surveyed hedgerows achieved favourable condition for height of canopy base.**

- 4) *Undisturbed ground and perennial herbaceous vegetation cover.*
 - a. BAP favourable condition threshold for average width of undisturbed ground is at least 2 metres. **92% of surveyed hedgerows achieved favourable condition for width of undisturbed ground.**
 - b. BAP favourable condition threshold of average width of perennial herbaceous vegetation is at least 1 metre. **91% of surveyed hedgerows achieved favourable condition for width of perennial herbaceous vegetation.**

- 5) *Recently introduced, non-native species.*
 - a. BAP favourable condition threshold for the presence of recently introduced, non-native species in the shrub-layer is no more than 10%. **93% of surveyed hedgerows achieved favourable condition for the presence of recently introduced, non-native species in the shrub-layer.**
 - b. BAP favourable condition threshold for the presence of recently introduced, non-native species in the hedge-bottom is no more than 10%. **100% of surveyed hedgerows achieved favourable condition for the presence of recently introduced, non-native species in the hedge-bottom.**

- 6) *Overall condition assessment.*
 - a. BAP favourable condition is achieved when a hedgerow achieves favourable condition for every attribute. **47% of surveyed hedgerows achieved overall favourable condition.**

Although just 47% of the surveyed hedgerows were found to be in favourable condition, a further 38% failed on just one measurement. Figure 4 shows the distribution of failures for those hedgerows that failed on one count. Approximately a third of the hedgerows failed as a result of having either more than 10% gaps or with a gap larger than 5 metres wide. A further third failed the condition assessment due to having a canopy base height of more than 0.5 metres.

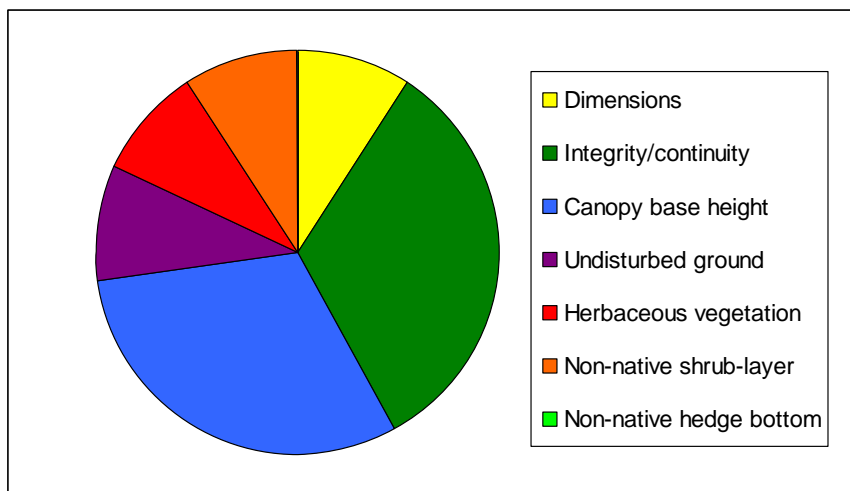


Figure 4. % of hedgerows with each favourable condition measurement failure

Additional use of data

Abundance of woody species

Relative abundances for each woody species across all surveyed hedgerow sections are displayed in Figure 5. Woody plant species were dominated by hawthorn (*Crataegus*, 28%) and hazel (*Corylus avellana*, 20%), followed by English oak (*Quercus robur*, 7%) and field maple (*Acer campestre*, 6%). Of the woody species recorded, least abundant were wild service tree (*Sorbus torminalis*, 0.02%) and wayfaring tree (*Viburnum lantana*, 0.08%).

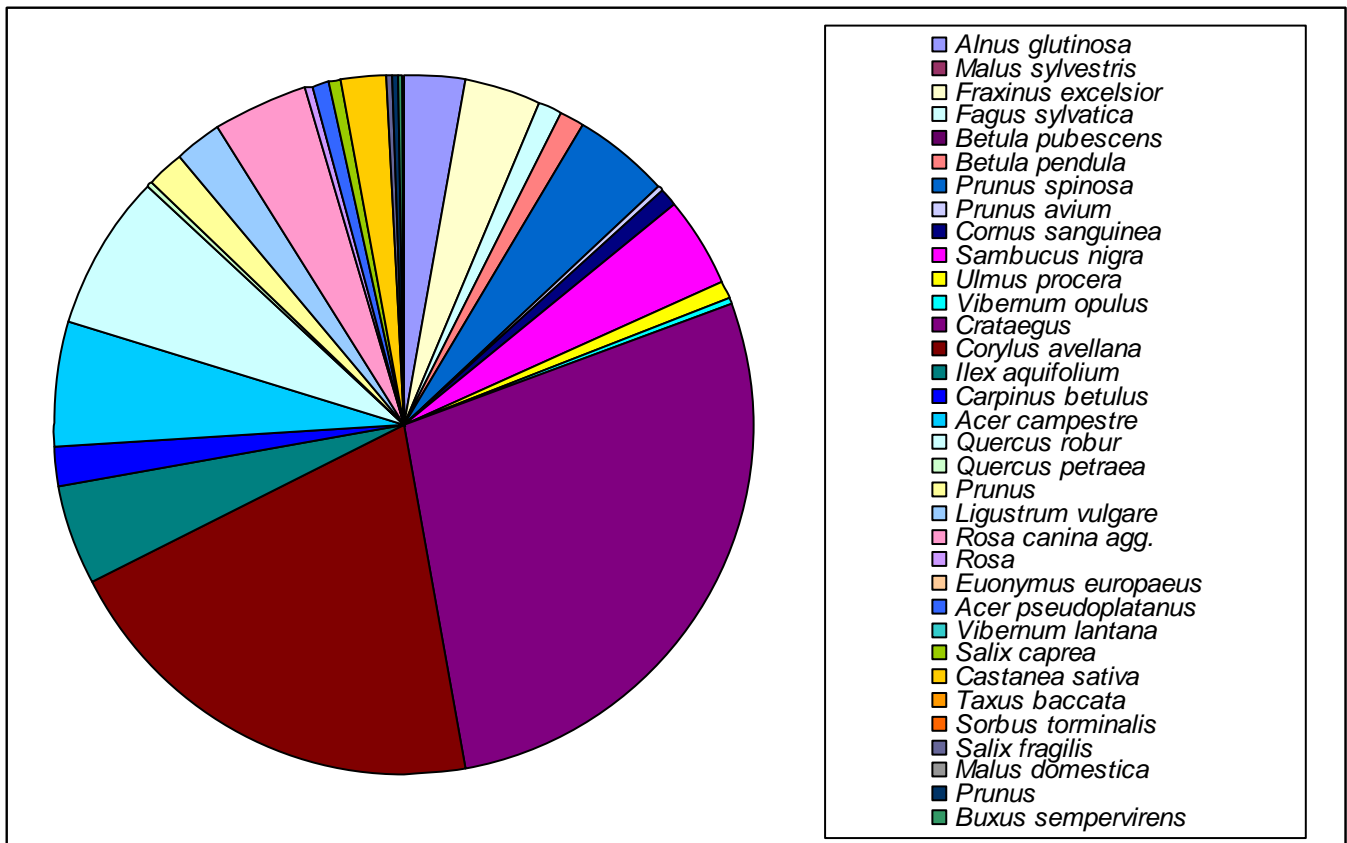


Figure 5. % abundance for each woody species (excluding neophytes and climbers)

Hawthorn is considered to be the dominant hedgerow species in the UK (Croxtton & Sparks, 2002), Philp (1982) describes hawthorn as “very common” in Kent, with English oak and hazel also commonly occurring in hedgerows throughout the County. Wild service tree is described by Philp (1982) as locally frequent within the three main areas of distribution in Kent; Lamberhurst is on the outskirts of one such area. Wayfaring tree is commonly distributed on the chalk of Kent (Philp, 1982), indicating why it was recorded at such a low abundance on the clay and sandstone geology of Lamberhurst Parish.

Comparing 1995 to 2006 – species-richness and hedgerow tree presence.

The 1995 Kent Wildlife Habitat Survey used Phase 1 habitat survey methodology to record the species diversity, presence of trees and stock-proof nature of hedgerows. Species-richness and hedgerow tree presence can be compared to the current survey. The current survey recorded the percentage of gaps and any gaps larger than 5m within the surveyed hedgerows. It was considered that this could not be directly compared to the defunct and intact (stock-proof) hedgerow survey data recorded in 1995. Defunct and intact hedgerows within each category have therefore been amalgamated to make more effective comparisons between the datasets.

The use of aerial photograph interpretation (API) to determine the presence of hedgerows in Lamberhurst Parish for this survey resulted in 626 hedgerows being identified initially, 530 after correcting for errors in API, compared to 291 identified during the 1995 survey. The reasons for this discrepancy are unclear; however this could have led to a significant underestimation of hedgerows in Kent during the 1995 survey. 148 hedgerows were assessed for this survey. Of these, 80 had been surveyed during the 1995 survey.

Although the methodology for each of the surveys differs, the 80 hedgerows that were looked at in both 1995 and 2006 can be compared in terms of their species-richness and the presence of

hedgerow trees. This could indicate any changes in the hedgerows in Lamberhurst Parish during this period but may also reveal discrepancies in the methods used to collect the data.

In keeping with the 1995 dataset, all the hedgerows in the current survey were allocated to one of the following categories:

- Species-poor (PH). Hedgerow containing less than 5 woody species;
- Species-poor with trees (PHT). Hedgerow containing less than 5 woody species plus hedgerow tree(s);
- Species-rich (RH). Hedgerow containing five or more woody species;
- Species-rich with trees (RHT). Hedgerow containing five or more woody species plus hedgerow tree(s).

A comparison of the two datasets can be seen in Table 2:

	2006 PH	2006 PHT	2006 RH	2006 RHT	Total
1995 PH	11	6	13	5	35
1995 PHT	0	3	5	4	12
1995 RH	10	1	14	1	26
1995 RHT	1	1	4	1	7
Total	22	11	36	11	80

Table 2. Comparison of results for hedgerows surveyed in both 1995 and 2006

Whereas in the 1995 survey, 47 hedgerows were found to be species-poor or species-poor with trees, the results of the 2006 survey show 33 of the hedgerows to be in these categories. Twenty-nine of the hedgerows were found to be in the same category in both 1995 and 2006. The 2006 survey shows 47 hedgerows as being species-rich or species-rich with trees, compared with 33 in 1995. When looking at the individual hedgerows, the results show that 34 of the hedgerows showed an improvement between 1995 and 2006 (either in species-richness or with the presence of hedgerow trees in 2006 where there had been none in 1995). Seventeen of the hedgerows showed a decline.

The 1995 survey identified a total of 291 hedgerows in Lamberhurst Parish. The percentages of species-richness and tree presence for the 80 hedgerow subsets reflect both of their parent datasets (Figure 6). This provides further evidence to suggest that there has been an improvement in species diversity and hedgerow tree presence in Lamberhurst Parish since 1995.

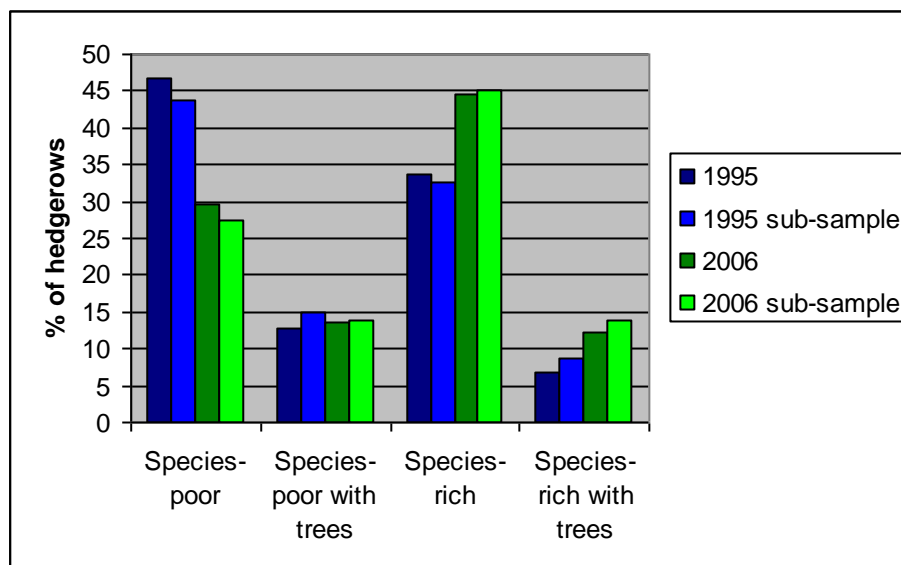


Figure 6. Chart comparing species diversity and tree presence in Lamberhurst Parish hedgerows 1995 and 2006

These results can be interpreted in two ways, either the 1995 survey underestimated the species-richness of the hedgerows, or the hedgerows in Lamberhurst have seen an improvement in species-richness and the presence of hedgerow trees. It is also possible that a combination of these factors have led to the perceived changes in hedgerow species diversity and hedgerow tree presence.

Hedgerows as Ecological Corridors

In addition to forming important wildlife habitats in themselves, hedgerows also act as corridors between habitats, allowing wildlife to travel between fragmented areas of woodland, for example (Tew, 1994).

During this survey, data were collected on the number of connections to each hedgerow, with the results showing that each hedgerow was connected to an average of 2.3 other hedgerows or areas of woodland. Figure 7 shows that over 60% of the surveyed hedgerows were connected to either one or two areas of woodland. This is probably due to Lamberhurst Parish having a relatively high density of woodland but also indicates the potential of hedgerows as wildlife corridors between woodland areas.

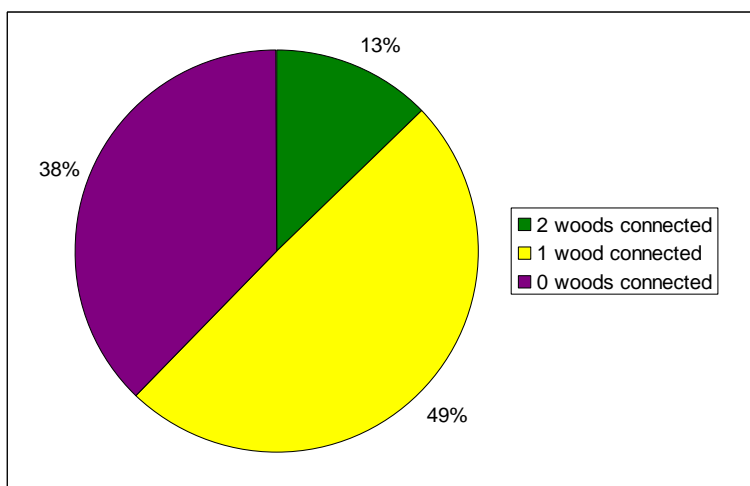


Figure 7. % of surveyed hedgerows connected to woodland

Using GIS, woodland data from the 2003 Kent Habitat Survey and the 1997 Ancient Woodland Inventory were overlaid with the hedgerows identified during this survey. As can be seen in Figure 7, isolated areas of both ancient woodland and other woodland exist within Lamberhurst Parish. Although some hedgerows connect two fragments of woodland (Figure 6), it is the network of hedgerows seen in Figure 8 that allows wildlife to travel more widely between wooded areas.

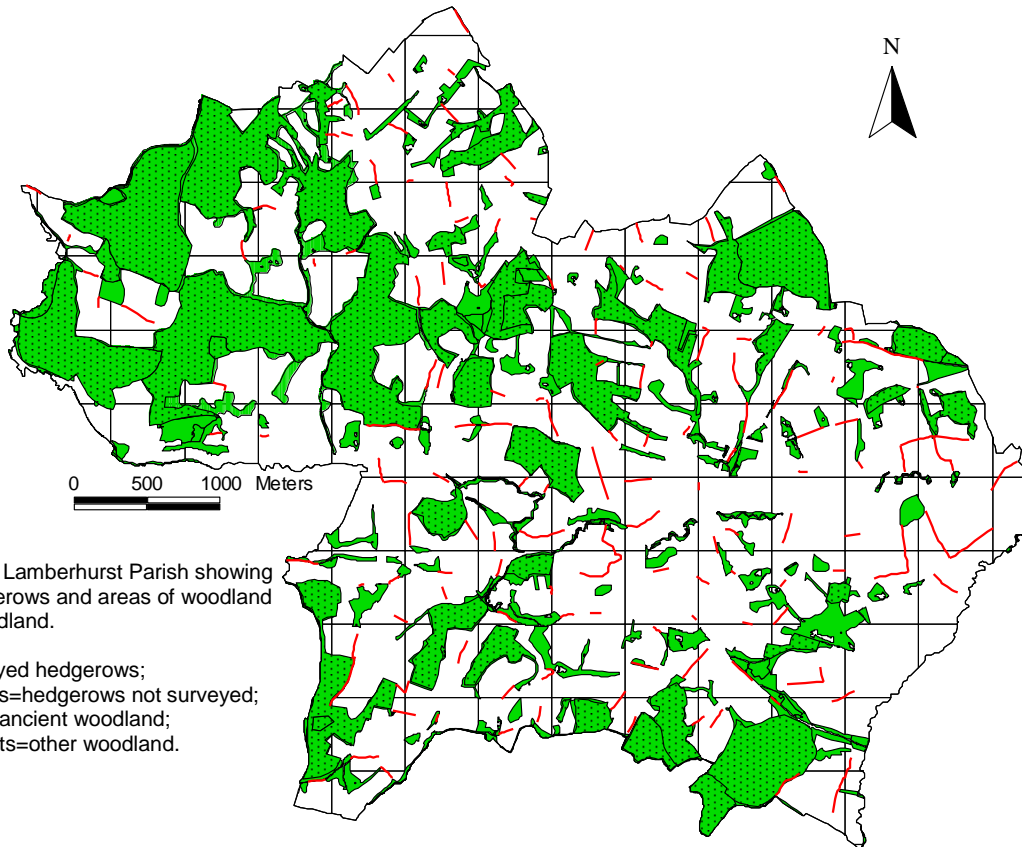


Figure 8. Map of Lamberhurst Parish showing network of hedgerows and areas of woodland and ancient woodland.

Red lines=surveyed hedgerows;
 dashed grey lines=hedgerows not surveyed;
 green with dots=ancient woodland;
 green with no dots=other woodland.

Historic nature of the hedgerows

Digitised versions of the 1840 Tithe maps and 1860 Ordnance Survey 1st Edition were compared with the current survey's hedgerow distribution using GIS. By overlaying the datasets it was possible to make some judgements as to whether boundary features identified in the current survey existed historically. Using this method, the current survey hedgerows could be represented on the historic maps as a boundary line between fields, roads and tracks; a boundary containing trees or as an area of former woodland. Although these features may not all represent ancient hedgerows, it was felt that within the bounds of this survey, these criteria would give an indication of the historic nature of the hedgerows.

Remarkably, approximately 90% of the hedgerows surveyed for this project were featured on both of the historic maps either as boundary features or wooded areas (Figure 9). It is difficult to say what proportion of these boundary features were actually hedgerows but it is likely that the vast majority were as field boundary walls or banks in Lamberhurst Parish are uncommon.

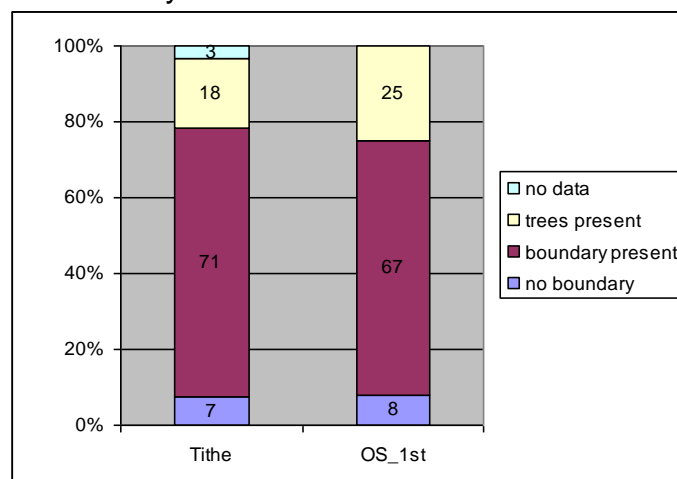


Figure 9. Chart showing the % status of the surveyed hedgerows on the Tithe and 1st Edition Ordnance Survey maps
 Kent Local Hedgerow Survey 2006

The results of the comparisons of the historic maps with the species-richness results are summarised in Figure 10. There seems to be a correlation between the lack of a boundary feature on the historic maps and a species-poor hedgerow in the current survey. This is perhaps to be expected as in general older hedgerows contain a greater number of woody species (Hooper, 1974).

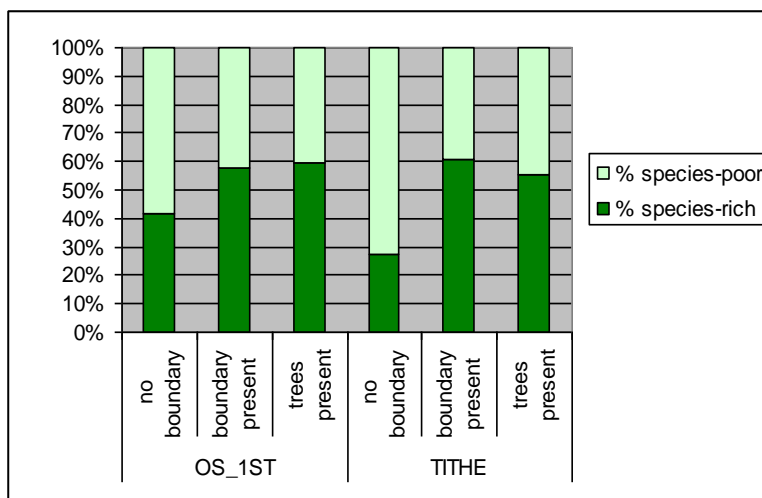


Figure 10. Chart showing species-richness and historic nature of the surveyed hedgerows

Hedgerows under Stewardship Agreement

Of the hedgerows surveyed in Lamberhurst Parish, 33 (22% of the hedgerows) were partly or wholly under either a Countryside Stewardship Agreement (CSA) or Environmental Stewardship Agreement (ESA). This is too small a dataset to say definitively whether the Stewardship Agreements are having a positive effect on the condition or species-richness of the hedgerows, it may though give an indication of the effects.

When considering all of the hedgerows in the current survey, 47% were found to be in favourable condition while 57% were found to be species-rich. Figure 11 displays the combined data for both of these results.

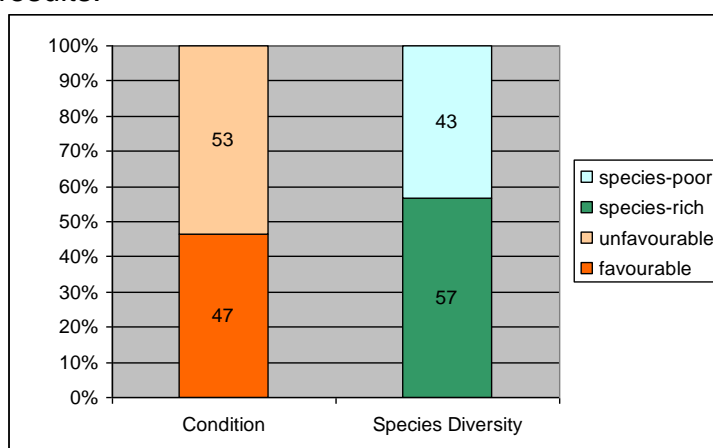


Figure 11. Chart showing % condition and species-richness status for all hedgerows

These data can then be used as a baseline when considering the possible effect of the Stewardship Agreements on the species-richness and condition of the hedgerows. There appear to be some differences in the condition and status of hedgerows within the CSA and ESA areas (Figures 12 and 13). Figure 12 shows that 53% of the hedgerows surveyed within CSA areas were found to be in favourable condition, compared to 44% of the hedgerows in ESA areas. When combined, 48% of the hedgerows in Stewardship Agreement areas were in

favourable condition, a result higher than both the remaining survey data (46%) and the baseline entire dataset (47%).

CSA areas were found to be comprised of 60% species-rich hedgerows, higher than both the percentage species diversity for the whole dataset (57%) and for the non-Stewardship Agreement areas (59%). In comparison, the ESA areas had a species diversity of just 39% (Figure 13).

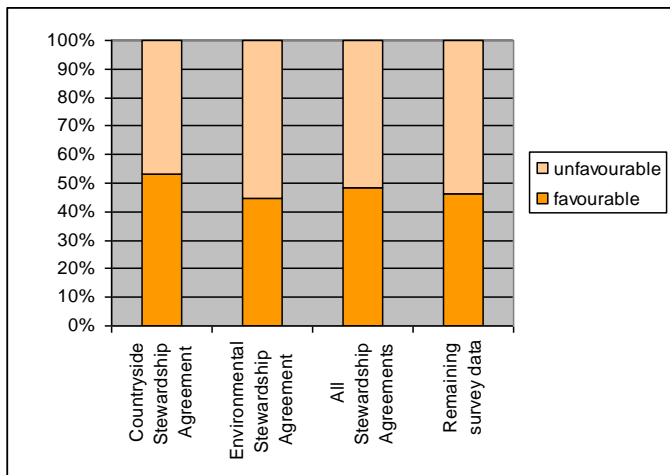


Figure 12. % condition of hedgerows in each category

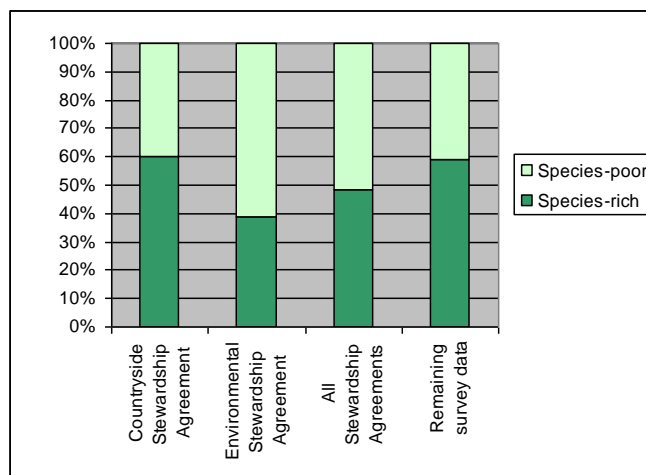


Figure 13. % species diversity status of hedgerows in each category

When combining the condition and the species diversity of the hedgerows for the Stewardship Agreement areas, the CSA areas were found to have the highest percentage of the 'best' combination with 47% of the hedgerows being both in favourable condition and species-rich. Figure 14 displays these data alongside the overall results. The CSA areas were also the only category to have more than 50% of hedgerows in favourable condition. In contrast, the ESA areas had the highest percentage of hedgerows in unfavourable condition (56%).

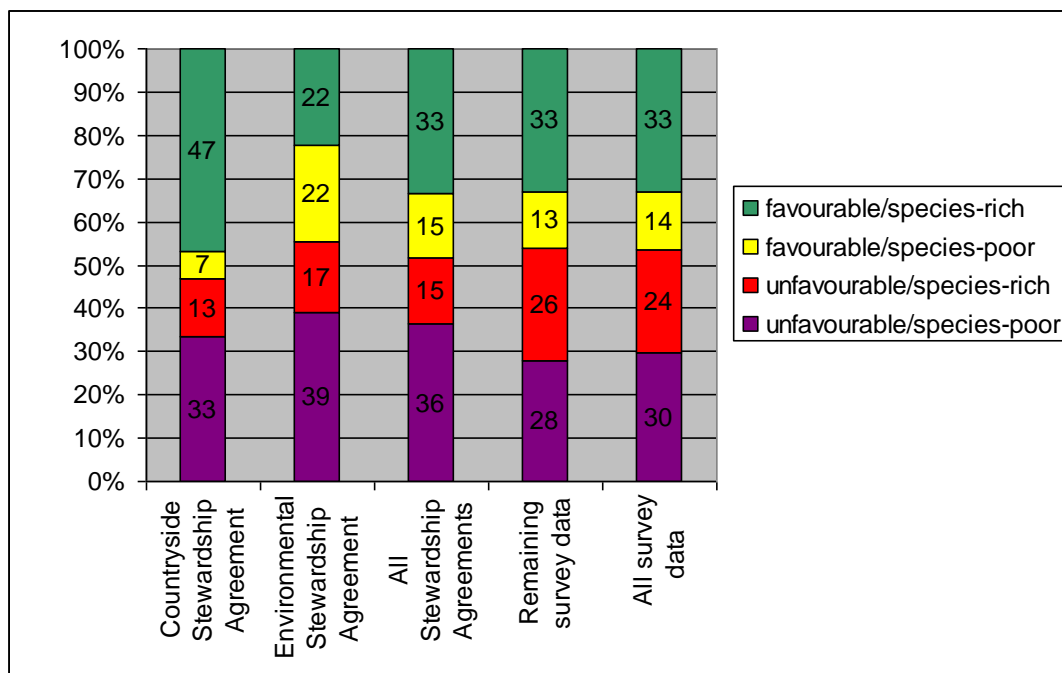


Figure 14. % combined condition and species diversity status of hedgerows in each category

Only one of the hedgerows was under a Hedgerow Management Option within an Environmental Stewardship Agreement area. This hedgerow was found to be species-rich but in unfavourable condition due to failing on integrity/continuity.

It should be noted when considering the hedgerow data in relation to Stewardship Agreement areas that the time-scales, both individually and as a whole, relating to the Agreements have not been accounted for in this simple analysis. CSAs are currently being phased out, with ESAs their replacement. It is therefore possible that, having been in place for a longer period of time, CSAs had been more effective at maintaining/enhancing hedgerows at the time of this survey. It should also be noted that most of the Stewardship Agreements in place did not have a specific Hedgerow Management Option in place.

Biological Records

Over 1400 species records from 106 different species were collected during this Pilot Assessment of Biological and Historical Hedgerow Features in Lamberhurst. The main focus of the survey was the woody species in the hedgerows and overall 68 different plant species were recorded. Figure 15 shows the number of hedgerows containing each woody species. All other records were incidental. Twenty-one invertebrate species, six bird species and eleven mammal species were recorded (see Appendix 4 for a full list of species).

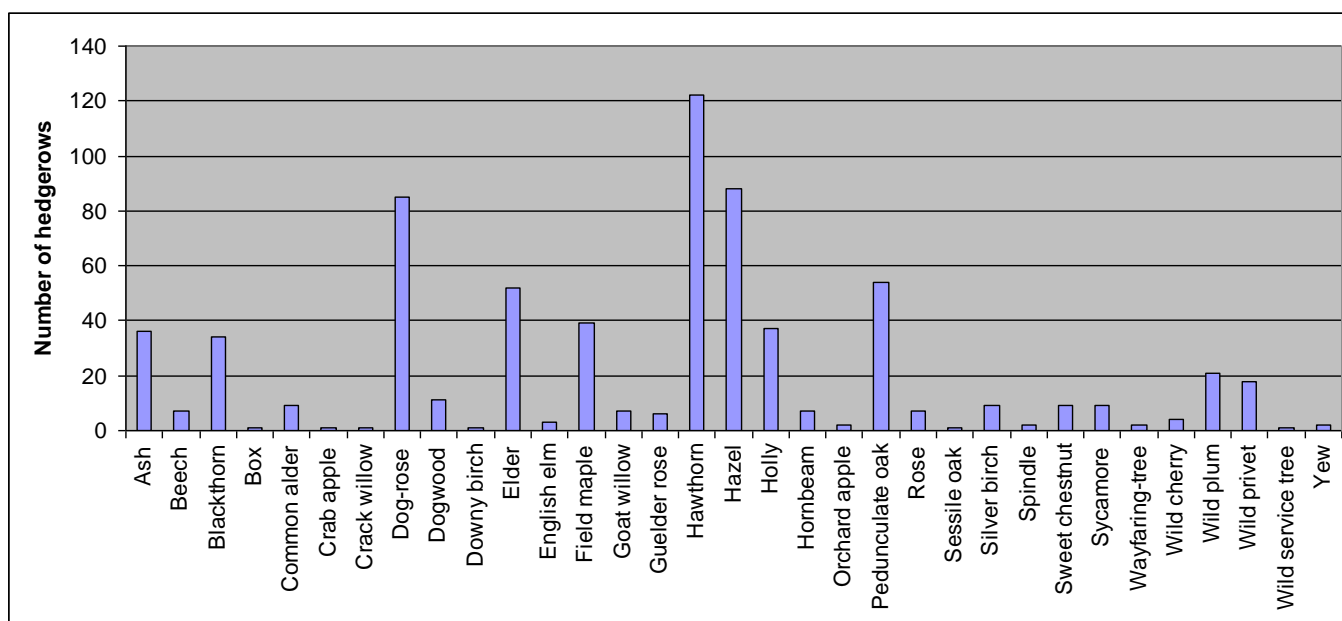


Figure 15. Number of surveyed hedgerows containing each woody species (excluding neophytes and climbers)

CONCLUSIONS

This survey was ambitious in its coverage of a variety of aspects relating to hedgerows within Lamberhurst Parish. The many organisations that contributed to the development of the survey enabled initial assessments to be made that could form the basis of further studies and investigations within Kent.

The overall percentage of surveyed hedgerow sections that were species-rich was 57% and the average number of woody species (excluding neophytes and climbers) per section was 4.66. In addition, over 90% of the surveyed hedgerows were comprised, in terms of percentage cover, of mainly native species.

Although just 47% of the surveyed hedgerows were found to be in favourable condition, a further 38% failed on just one measurement. The two measurements that produced the majority of the failures were the integrity/continuity and the canopy base height of the hedgerows. The integrity/continuity variable is designed to pick up evidence of neglect to a hedgerow as a result

of management activities such as cutting and replanting having stopped, a reduced integrity or continuity may also be caused by over-intensive cutting reducing the plants' capacity to regenerate. The canopy base height measurement can give an indication of the presence of overgrazing to the hedgerow resulting in reduced habitat at the hedge bottom. Targeted management of hedgerows would help to resolve the failures.

The differences between the data collected during the 2006 survey and that of the 1995 Kent Wildlife Habitat Survey highlight the need for an up-to-date hedgerow survey for the County. In this time of increased development pressure for the South East, it is particularly important that those hedgerows of biological significance are recognised.

The use of historic maps to establish whether current-day hedgerows were present in the 1800s indicated that over 90% of the hedgerows surveyed for this Project did form some kind of boundary feature on the Tithe or Ordnance Survey 1st Edition maps. For those hedgerows that showed no boundary feature on the historic maps, there was a higher percentage of species-poor hedgerows. This reinforces the need for further survey and interpretation of historic maps to determine the extent of potentially ancient hedgerows in Kent.

It was interesting to analyse possible links between the occurrence of Stewardship Agreement areas and the condition and species-richness status of the hedgerows. The higher percentages of species-richness and favourable condition of hedgerows within Countryside Stewardship Agreement areas suggest that these Agreements may be beneficial to hedgerows. This is a subject though that requires a more detailed study over a wider area using more specific information on the individual Agreements.

ASSESSMENT OF BIODIVERSITY ACTION PLAN TARGETS

An assessment of how the area surveyed is meeting targets for ancient and/or species-rich hedgerows as part of the Kent and National Biodiversity Action Plans.

Kent Biodiversity Action Plan for Ancient &/or Species-rich Hedgerows

Objective 1: *Ensure no net loss of ancient and/or species-rich hedgerows.*

Targets: *Determine complete extent and condition of ancient and/or species-rich hedgerows in Kent; establish short, medium and long-term targets to ensure no net loss.*

The data collected for this survey allows the progress of Objective 1 to be assessed for Lamberhurst, a Parish within Kent. When compared with the results of the 1995 Kent Wildlife Habitat Survey, the 2006 survey shows an increase in species-rich hedgerows for the Parish (41% compared with 59%). The findings of and the methodology used in this survey will also be provided to inform the ongoing assessment of the County as a whole.

Objective 2: *Continue to encourage the positive management, restoration and re-creation of hedgerows.*

Targets: *Provide advisory services to farmers and landowners; promote restoration of ancient hedgerows and encourage new hedgerow planting through Environmental Stewardship uptake.*

Although this survey did not look at recently planted hedgerows as part of the species-richness and condition assessment (as the Hedgerow Survey Handbook recommends), there was evidence of recent planting at several locations within Lamberhurst Parish, particularly within areas under Environmental Stewardship. Some of the landholders/owners in Lamberhurst Parish could benefit from receiving direct advice with regard to the positive management of the

hedgerows on their land, particularly those whose hedgerows are failing on just one of the favourable condition measurements.

Objective 3: *Raise awareness to the benefits of a positively managed hedgerow for biodiversity and farming.*

Targets: *Promote to farmers and landowners events and activities relevant to the conservation of ancient and/or species-rich hedgerows and biodiversity in Kent.*

Many of the landholders/owners contacted with regard to this survey were keen to find out more about the management of hedgerows for biodiversity and how this can be achieved without detrimental effect to their business aims. There was evidence to suggest that landowners/holders do have access to advice on hedgerow management but this information could be made more widely available, particularly with regard to how managing for biodiversity does not necessarily conflict with farming aims.

National Biodiversity Action Plan for Ancient &/or Species-rich Hedgerows

Target 1: *Halt the net loss of species-rich hedgerows through neglect and removal by the year 2000.*

The comparison of data from the 1995 Kent Wildlife Habitat Survey and the 2006 survey shows an increase in species-rich hedgerows (41% in 1995 and 59% in 2006).

Target 2: *Halt all loss of hedgerows which are both ancient and species-rich by 2005.*

The comparison of the 1995 data with the 2006 survey shows that of the 80 hedgerows assessed for both surveys, 13 (16%) went from being species-rich to species-poor.

Target 3: *Achieve favourable condition for 25% of species-rich and ancient hedges by 2000.*

Of the 148 hedgerows assessed for this survey, 143 were either species-rich or formed a boundary feature on the OS 1st Edition and/or Tithe maps. 48% of these hedgerows achieved favourable condition in the 2006 survey.

Target 4: *Achieve favourable condition for 50% of species-rich and ancient hedges by 2005.*

Of the 148 hedgerows assessed for this survey, 143 were either species-rich or formed a boundary feature on the OS 1st Edition and/or Tithe maps. 48% of these hedgerows achieved favourable condition in the 2006 survey. When the hedgerows are separated out, 58% of the species-rich hedgerows were in favourable condition; 49% of the OS 1st Edition boundary features were in favourable condition and; 50% of the Tithe map boundary features were in favourable condition in 2006.

Target 5: *Maintain the overall national number of individual hedgerow trees through ensuring a balanced age structure.*

There was no baseline tree number with which to compare the 2006 survey data. The number of hedgerows containing trees though has increased, from 24% in the 1995 survey sample to 29% in the 2006 survey sample.

ASSESSMENT OF THE PRACTICALITY OF USING THE PROCEDURES FOR LOCAL SURVEYS SET OUT IN THE HEDGEROW SURVEY HANDBOOK

The Hedgerow Survey Handbook (HSH) is a valuable resource for Local Surveys, giving a standard methodology for assessing hedgerows that allows comparisons across the country to be carried out.

The HSH procedures for carrying out hedgerow surveys are fairly scientific in nature, enabling surveys to be carried out thoroughly and consistently. There are however a couple of areas of potential weakness.

The HSH 2nd Edition has been under review during the period that this survey took place: a draft version was used to carry out the survey. Invaluable to the interpretation of the HSH was Colin Barr, who provided explanatory guidance to the various confusing terms that are used within the HSH and how the methodology works in practise.

If the HSH is to be widely recommended it would be advisable to have someone providing national back-up in this way, if only to ensure that results recorded at local levels can be accurately compared between each other.

At a practical level, full training from an experienced surveyor is to be recommended when implementing the HSH methodology. Even then, the use of percentage abundance estimates could vary significantly between surveyors.

REFERENCES

Britt, C., Churchward, J. & Wright, B. (In Press) *Hedgerow Survey Handbook, 2nd Edition*. Defra.

Croxton, P.J. & Sparks, T.H. (2002) A farm-scale evaluation of the influence of hedgerow cutting frequency on hawthorn (*Crataegus monogyna*) berry yields. *Agriculture, Ecosystems & Environment* 93:1-3 pp 437-439.

Hooper, M.D. (1974) *Dating Hedges*. Area 4, 63-5.

Philp, E.G. (1982) *Atlas of the Kent Flora*. Kent Field Club

Tew, T.E. 1994. Farmland hedgerows: habitat, corridors or irrelevant? A small mammal's perspective. In: Watt, T.A. & Buckley, G.P. (Eds.) *Hedgerow management and nature conservation*. Wye College Press, Wye, Ashford, Kent TN25 5AH.









Appendix 1: Local Hedgerow Field Survey Form – Kent Version

Date:	D	D	M	M	Y	Y	Y	Y	Hedgerow Ref:						
Surveyor(s):									Side Surveyed:	N E S W Both					

Part A: Record for entire hedgerow

1 HEDGEROW TYPE			
Shrubby	Line of trees	Shrubby with line of trees	Hedgerow remains
2 LENGTH & LOCATION			
Length (m): <small>Between nodes, to nearest 5m</small>		GPS End 1:	Error:
		GPS End 2:	Error:
3 CONNECTIONS			
		End 1	End 2
Number of other hedgerows connected to survey hedgerow			
Woodland connected to survey hedgerow (Enter Broadleaved, Conifer or Mixed)			

Part B: Record for 30m survey section

4 LOCATION OF 30M SURVEY SECTION							
GPS start end:		Error:					
GPS finish end:		Error:					
5 ADJACENT LAND USE							
		Side A	Side B			Side A	Side B
Arable	Arable crop			Road/Route	Major road		
	Uncropped margin				Minor road		
Grass	Improved				Track		
	Semi-improved				Footpath		
	Unimproved				Rail		
Woodland	Young			Water	Canal		
	Semi-mature				River		
	Mature				Stream		
Other - state					Lake/pond		
6 DIMENSIONS							
6a Average Height (m) <small>Excluding bank to nearest 25cm</small>		6b Average Width (m) <small>Estimate for widest point of canopy</small>					
7 INTEGRITY							
7a % Gaps <small>Percentage gaps to nearest 5%</small>		7b Any gaps >5m	Y / N	7c Average height of canopy base (m) <small>To nearest 25cm</small>			
8 HEDGEROW SHAPE							
What shape is the hedgerow? - Circle diagram of cross-section that most closely resembles hedgerow.							
							
a) Trimmed & dense	b) Intensively-managed	c) Untrimmed	d) Tall & leggy				
							
e) Untrimmed, with outgrowth	f) Recently coppiced	g) Recently laid	h) Other - Sketch				

Species	Shrubs % cover	Trees No.	Trees DBH
Alder, common (<i>Alnus glutinosa</i>)			
Apple, crab (<i>Malus sylvestris</i>)			
Ash (<i>Fraxinus excelsior</i>)			
Aspen (<i>Populus tremula</i>)			
Beech (<i>Fagus sylvatica</i>)			
Birch, downy (<i>Betula pubescens</i>)			
Birch, silver (<i>Betula pendula</i>)			
Blackthorn (<i>Prunus spinosa</i>)			
Broom (<i>Cytisus scoparius</i>)			
Buckthorn (<i>Rhamnus cathartica</i>)			
Cherry, wild (<i>Prunus avium</i>)			
Dogwood (<i>Cornus sanguinea</i>)			
Elder (<i>Sambucus nigra</i>)			
Elm, English (<i>Ulmus procera</i>)			
Elm, wych (<i>Ulmus glabra</i>)			
Elm, (<i>Ulmus</i> sp.)			
Gorse (<i>Ulex europaeus</i>)			
Gorse, western (<i>Ulex gallii</i>)			
Guelder rose (<i>Viburnum opulus</i>)			
Hawthorn (<i>Crataegus</i> sp.)			
Hazel (<i>Corylus avellana</i>)			
Holly (<i>Ilex aquifolium</i>)			
Hornbeam (<i>Carpinus betulus</i>)			
Horse chestnut (<i>Aesculus hippocastanum</i>)			
Lime, large-leaved (<i>Tilia platyphyllos</i>)			
Lime, small-leaved (<i>Tilia cordata</i>)			
Maple, field (<i>Acer campestre</i>)			
Oak , pedunculate (<i>Quercus robur</i>)			
Oak, sessile (<i>Quercus petraea</i>)			
Pear (<i>Pyrus communis</i> sensu lato)			
Pine, Scots (<i>Pinus sylvestris</i>)			
Plum, wild (<i>Prunus domestica</i>)			
Poplar, black (<i>Populus nigra betulifolia</i>)			
Poplar, grey (<i>Populus x canescens</i>)			
Poplar, white (<i>Populus alba</i>)			
Privet, wild (<i>Ligustrum vulgare</i>)			
Rose, dog- (<i>Rosa canina</i>)			
Rose, field- (<i>Rosa arvensis</i>)			
Rose (<i>Rosa</i> sp.)			
Rowan (<i>Sorbus aucuparia</i>)			
Spindle (<i>Euonymus europaeus</i>)			
Sycamore (<i>Acer pseudoplatanus</i>)			
Wayfaring-tree (<i>Viburnum lantana</i>)			
Willow, grey (<i>Salix cinerea</i>)			
Willow, goat (<i>Salix caprea</i>)			
Bramble (<i>Rubus fruticosus</i> agg.)			
Honeysuckle (<i>Lonicera periclymenum</i>)			
Ivy (<i>Hedera helix</i>)			
Traveller's-joy (<i>Clematis vitalba</i>)			

LIST OF RECENTLY INTRODUCED SPECIES	
Woody Species	
Broom, Montpellier	<i>Genista monspessulana</i>
Butterfly-bush	<i>Buddleja</i> spp.
Cherry laurel	<i>Prunus laurocerasus</i>
Cornelian cherry	<i>Cornus mas</i>
Dogwood, red-osier	<i>Cornus sericea</i>
Dogwood, white	<i>Cornus alba</i>
Fuchsia	<i>Fuchsia magellanica</i>
Gorse, Spanish	<i>Genista hispanica</i>
Norway maple	<i>Acer platanoides</i>
Oak, evergreen (holm)	<i>Quercus ilex</i>
Privet, garden	<i>Ligustrum ovalifolium</i>
Rhododendron	<i>Rhododendron ponticum</i>
Rose, Japanese	<i>Rosa rugosa</i>
Shallon	<i>Gaultheria shallon</i>
Snowberry	<i>Symphoricarpos albus</i>
Stag's-horn sumach	<i>Rhus typhina</i>
Tamarisk	<i>Tamarix gallica</i>
Conifers	
Cedars	<i>Cedrus</i> spp.
Cypresses	<i>Chamaecyparis</i> spp.
Douglas fir	<i>Pseudotsuga menziesii</i>
Firs	<i>Abies</i> spp.
Hemlock-spruces	<i>Tsuga</i> spp.
Larches	<i>Larix</i> spp.
Lawson's cypress	<i>Chamaecyparis lawsoniana</i>
Leyland cypress	<i>x Cuprocyparis leylandii</i>
Pines	<i>Pinus</i> spp.
Spruces	<i>Picea</i> spp.
Western red cedar	<i>Thuja plicata</i>
Ground Flora/Climbers	
Ground-elder	<i>Aegopodium podagraria</i>
Hogweed, giant	<i>Heracleum mantegazzianum</i>
Indian balsam	<i>Impatiens glandulifera</i>
Knotweed, giant	<i>Fallopia sachalinensis</i>
Knotweed, hybrid	<i>Fallopia x bohemica</i>
Knotweed, Japanese	<i>Fallopia japonica</i>
Montbretias	<i>Crocsmia</i> spp.
Russian vine	<i>Fallopia baldschuanica</i>
Winter heliotrope	<i>Petasites fragrans</i>

NOTES

This list is not exclusive – there will be other recently introduced species that occur in hedgerows which are not included above.

The following species, though introduced, should not be considered as 'recent introductions' for the purposes of this survey: sycamore (*Acer pseudoplatanus*), horse chestnut (*Aesculus hippocastanum*), sweet chestnut (*Castanea sativa*) and wild plum (*Prunus domestica*) (and the plum sub-species bullace/damson, *P. domestica* ssp. *insititia*).

Appendix 2: Kent Local Hedgerow Field Survey Form - Entry Protocol Short Version

Methodology used with thanks to the Hedgerow Survey Handbook

Hedgerows to be surveyed have been selected using a random sampling method. These are indicated on the aerial photographs.

Once at the hedgerow to be surveyed, complete the top section of the Survey Form:

- *Date* of survey
- *Hedgerow ref* should be taken as marked on the aerial photograph – 1km grid reference and hedge number, e.g. TQ9999-9
- *Surveyor(s)* names
- Both *sides* of the hedgerow should be *surveyed* and 'Both' circled if possible. If access restrictions or other reasons prevent this, please indicate the general direction that the surveyed side faces.

Part A - Record for the entire hedgerow:

1. *Hedgerow Type*

- *Shrubby* – 'classic' shrubby hedgerow, line of woody hedgerow plants that have some or all of their leafy canopies less than 2m from the ground.
- *Line of trees* – line of trees where the base of the canopy is greater than 2m from the ground – appears as a 'line of lollipops'
- *Shrubby with line of trees* – shrubby hedgerow which has a distinct line of trees extending above it – appears as a 'shrubby layer plus lollipops'
- *Hedgerow remains* – very gappy hedgerows, if the gaps >20m and woody sections <20m, don't survey.

2. *Length & Location*

- *Length* – measure the length between the hedgerow's nodes (points of connection with other hedgerows or habitats) to the nearest 5m
- *GPS* – Record GPS readings for End 1 (End 1 = the hedgerow node with the cross on the aerial photograph) and End 2 (End 2 = the other node).
- Also record the GPS error reading for each.

3. *Connections*

- Record the number of hedgerows connected at each End of the hedgerow.
- Record *B*, *C* or *M* if there is *Broadleaved*, *Coniferous* or *Mixed Woodland* connected to the hedgerow at either End.
- Enter *None* if there is no woodland connected to the hedgerow.

For working out % cover, of the 30m survey section 1m=3.33%, 5m=16.66%, 10m=33.33%

Part B – Record for 30m survey section

4. ***Location of 30m Survey Section*** – Measure 30m from End 1, the next 30m is the survey section
 - *GPS* – Record GPS readings for the start end (the end nearest the hedgerow node with the cross on the aerial photograph) and the finish end.
 - Record the GPS error reading for each.
5. ***Adjacent Land-use***
 - Tick any/all that apply. If the land-use on the far side cannot be visited and is not visible, mark the entries as 'not known'.
6. ***Dimensions***

- *Average height* – Estimate the hedgerow’s modal average height, excluding banks, gaps and hedgerow trees. Record in metres, to the nearest 25cm.
- *Average width* – Estimate the hedgerow’s modal average width for the widest point of the canopy, excluding banks, gaps and hedgerow trees. Record in metres, to the nearest 25cm.

7. **Integrity**

- *% Gaps* – Estimate the hedgerow gaps (places where there are complete breaks in the canopy) to the nearest 5%.
- *Any gaps >5m?* – Circle Y or N.
- *Average height of canopy base* – Estimate the modal average height of the lowest leafy growth, to the nearest 25cm.

8. **Hedgerow Shape** – Place the hedgerow in the most appropriate category

- *A. Trimmed & dense* – hedgerow retaining basic shape with a generally ‘neat’ appearance.
- *B. Intensively managed* – hedgerow suffering the effects of severe and frequent flailing and/or browsing by high densities of livestock.
- *C. Untrimmed* – hedgerow with a straggly appearance, having not been recently trimmed. An unmanaged and slightly overgrown version of A.
- *D. Tall & leggy* – hedgerow not trimmed for many years, lacks significant foliage on the lower parts.
- *E. Untrimmed, with outgrowths* – overgrown, usually very wide hedgerow with no clear evidence of the original shape.
- *F. Recently coppiced* – coppiced within the last 5 years, contains coppice stools from which multiple thin woody stems are re-growing.
- *G. Recently laid* – laid within the previous 2-3 years.

9. **Associated Features** – If not present, write N/a

- *Bank* – estimate the height (in metres) if there is a bank present, to the nearest 25cm.
- *Verge* – the verge is any uncropped margin adjacent to the outer edge of the 2m band from the centre-line of the hedgerow. The margin may be distinguishable and/or managed differently to the main field. Estimate to the nearest metre.
- *Average vegetation height* – estimate to the nearest 5cm, the average height of herbaceous vegetation on the bank or verge (if present).
- *Fence* – record ‘Yes’ if a fence is present on either side (or within) the hedgerow.
- *Ditch* – record ‘Yes’ if a ditch is present within (internal) the hedgerow, if a ditch is present next to (external) the hedgerow, record ‘Yes’ and Side A or B. Record as either wet or dry as at the time of survey.

10. **Undisturbed Ground**

- *Average width of undisturbed ground* – estimate (to the nearest 50cm up to 2m wide then to the nearest 1m) from the centre-line of the hedgerow to the edge of any ploughed or otherwise cultivated or disturbed land.
- *Average width of perennial herbaceous vegetation* – measure the average width of continuous perennial herbaceous vegetation (to the nearest 50cm up to 2m wide then to the nearest 1m) between the centre-line of the hedgerow and adjacent areas of disturbed bare ground (ignore very small patches) or annual crops. It is likely to be less than the width of undisturbed ground because of the presence of bare ground beneath most hedges.

11. Recently Introduced, Non-native Species

- Estimate the percentage cover of the recently introduced species (see list on Page 4 of the Field Survey Form) in the *Shrub layer*. Estimate cover as a percentage of the total area of the vertical face of the hedgerow on the side being assessed. Estimate to the nearest 5%, or just record the names if there is less than 5% cover.
- Estimate the percentage cover of the recently introduced species (see list on Page 4 of the Field Survey Form) in the *Hedge-bottom*. Estimate the percentage cover of any relevant species within a 2m-wide band parallel with the centre-line of the hedgerow. Estimate to the nearest 5%, or just record the names if there is less than 5% cover.

12. Nutrient Enrichment Indicators

- Estimate the percentage cover of each of the *Indicator species* listed. Estimate to the nearest 5%, in a 2m-wide band parallel with the centre-line of the hedgerow.

13. Notes

- Add notes relating to any evidence of fauna associated with the hedgerow.
- Record should be made of hedgerows that have been planted or replanted recently.
- Take photographs of the hedgerow at Start and Finish points of the 30m survey section. Try to include landmarks/identifying features for future reference.
- Species photographs and specimens collected should also be made a note of with details regarding the relevant section on the Survey Form. For section 14 record the percentage cover if it is a shrub species. If it is a tree species, record the number of stands and the DBH of each.

14. Woody Species

- Record all species in the woody canopy of the hedgerow. There is space on the Survey Form to add additional species.
- Differentiate between shrub layer species and hedgerow trees – hedgerow trees have a clear trunk/stem and/or are twice the average height of the hedgerow.
- Estimate the percentage cover of each shrub layer species. Record to the nearest 5%. If less than 5% cover is present, record to the nearest 1%.
- Record the number of times a species occurs as a hedgerow tree. For each hedgerow tree, also record an estimate of the diameter at breast height (DBH – measured at 1.3m from the ground).
- For species that occur in both groups, enter details into all columns, but ensure that only the specimens occurring in the shrub layer are used to estimate percentage cover.

Appendix 3: Key Results

Hedgerow Length		
Total length of hedgerows in survey area	67362.94 metres (67.36 km)	
Total length of surveyed hedgerow	22211.22 metres (22.21 km)	
Number of hedgerows surveyed	148	
Average length of surveyed hedgerow	150 metres	
Condition Assessment (% in favourable condition for each attribute)		
Average height	100%	
Average width	97%	
Cross-sectional area	94%	
Continuity of canopy	78%	
Size of gaps in canopy	93%	
Average height of base of canopy	80%	
Average width of undisturbed ground	92%	
Average width of perennial herbaceous vegetation	91%	
Non-native species in shrub-layer	93%	
Non-native species in hedge-bottom	100%	
Overall condition assessment	47%	
Adjacent land use (% immediately adjacent to each land use)		
Arable	15%	
Grassland	54%	
Woodland	1%	
Road/Route	28%	
Water	1%	
Other	1%	
% adjacent to arable land compared to arable land with 2m+ wide margins	15% compared to 6% (43% of hedgerow sides adjacent to arable land have margins of 2m+)	
Comparison of % adjacent to different grassland types:		
	% of total hedgerow sides surveyed	% of overall grassland surveyed
Improved grassland	7.5%	13.8%
Semi-improved grassland	39.7%	73.6%
Unimproved grassland	6.8%	12.6%
Associated features and connections		
Average hedgerow connections per hedgerow	1.5	
Average hedge & wood connections per hedgerow	2.3	
% of hedgerows associated with:		
Banks	54%	
Verges or margins	75%	
Ditches	29%	
% of hedgerows in management shape:		
Trimmed & dense	52%	
Intensively managed	0%	
Untrimmed	42%	
Tall & leggy	3%	
Untrimmed, with outgrowth	2%	
Recently coppiced	0%	
Recently laid	<1%	
Other (recently pollarded)	<1%	
% of isolated hedgerow trees 1-5cm DBH	1.5%	
% of isolated hedgerow trees 100cm+ DBH	12%	
Average no. of hedge trees per metre surveyed	0.016 hedgerow trees/metre	
Total hedge trees in survey area	5417	
Replacement rate (trees/year in surveyed area)	0.65	
% with >20% nutrient enrichment indicator species	68%	
% species-rich	57%	
Average number of qualifying species per hedge	4.66 species/hedge	
% composed of mainly native species	91%	

Appendix 4: Species list

Latin name	Common name	Group
<i>Pteridium aquilinum</i>	Bracken	Plant
<i>Larix decidua</i>	European larch	Plant
<i>Pinus sylvestris</i>	Scots pine	Plant
<i>x Cupressocyparis leylandii</i>	Leyland cypress	Plant
<i>Taxus baccata</i>	Yew	Plant
<i>Berberis thunbergii</i>	Barberry sp.	Plant
<i>Skimmia japonica</i>		Plant
<i>Ulmus procera</i>	English elm	Plant
<i>Humulus lupulus</i>	Hop	Plant
<i>Urtica dioica</i>	Nettle	Plant
<i>Juglans regia</i>	Common walnut	Plant
<i>Fagus sylvatica</i>	Beech	Plant
<i>Fagus sylvatica purpurea</i>	Copper beech	Plant
<i>Castanea sativa</i>	Sweet chestnut	Plant
<i>Quercus petraea</i>	Sessile oak	Plant
<i>Quercus robur</i>	Pedunculate oak	Plant
<i>Quercus cerris</i>	Turkey oak	Plant
<i>Betula pendula</i>	Silver birch	Plant
<i>Betula pubescens</i>	Downy birch	Plant
<i>Alnus glutinosa</i>	Common alder	Plant
<i>Alnus incana</i>	Grey alder	Plant
<i>Carpinus betulus</i>	Hornbeam	Plant
<i>Corylus avellana</i>	Hazel	Plant
<i>Rumex</i>	Dock	Plant
<i>Tilia x vulgaris</i>	Common lime	Plant
<i>Populus</i>	Poplar	Plant
<i>Populus alba</i>	White poplar	Plant
<i>Populus nigra 'Italica'</i>	Lombardy poplar	Plant
<i>Populus balsamifera</i>	Eastern Balsam poplar	Plant
<i>Salix fragilis</i>	Crack willow	Plant
<i>Salix caprea</i>	Goat willow	Plant
<i>Salix cinerea oleifolia</i>	Grey sallow	Plant
<i>Salix calodendron</i>	Holme willow	Plant
<i>Rubus fruticosus agg</i>	Bramble	Plant
<i>Rosa arvensis</i>	Field rose	Plant
<i>Rosa canina agg</i>	Dog rose	Plant
<i>Prunus</i>	Plum	Plant
<i>Prunus cerasifera</i>	Myrobalan plum	Plant
<i>Prunus spinosa</i>	Blackthorn	Plant
<i>Prunus domestica</i>	Plum	Plant
<i>Prunus avium</i>	Wild cherry	Plant
<i>Crataegus sp</i>	Hawthorn	Plant
<i>Malus sylvestris</i>	Crab apple	Plant
<i>Malus domestica</i>	Orchard apple	Plant
<i>Sorbus torminalis</i>	Wild service tree	Plant
<i>Epilobium montanum</i>	Broad-leaved willowherb	Plant
<i>Cornus sanguinea</i>	Dogwood	Plant
<i>Aucuba japonica</i>		Plant
<i>Euonymus europaeus</i>	Spindle	Plant
<i>Ilex aquifolium</i>	Holly	Plant
<i>Buxus sempervirens</i>	Box	Plant
<i>Mercurialis perennis</i>	Dog's mercury	Plant

<i>Acer campestre</i>	Field maple	Plant
<i>Acer pseudoplatanus</i>	Sycamore	Plant
<i>Acer platanoides</i>	Norway maple	Plant
<i>Impatiens glandulifera</i>	Himalayan balsam	Plant
<i>Hedera helix</i>	Ivy	Plant
<i>Solanum dulcamara</i>	Woody nightshade	Plant
<i>Calystegia sepium</i>	Hedge bindweed	Plant
<i>Fraxinus excelsior</i>	Ash	Plant
<i>Ligustrum vulgare</i>	Wild privet	Plant
<i>Galium aparine</i>	Cleavers	Plant
<i>Sambucus nigra</i>	Elder	Plant
<i>Viburnum opulus</i>	Guelder-rose	Plant
<i>Viburnum lantana</i>	Wayfaring tree	Plant
<i>Lonicera periclymenum</i>	Honeysuckle	Plant
<i>Arum maculatum</i>	Lords and ladies	Plant
<i>Tamus communis</i>	Black bryony	Plant
<i>Cepaea hortensis</i>	White-lipped snail	Invertebrate
<i>Anax imperator</i>	Emperor dragonfly	Invertebrate
<i>Forficula auricularia</i>	Common earwig	Invertebrate
<i>Dolycoris baccarum</i>	Hairy shieldbug	Invertebrate
<i>Tytthaspis 16-punctata</i>	16-spot ladybird	Invertebrate
<i>Coccinella 7-punctata</i>	7-spot ladybird	Invertebrate
<i>Harmonia axyridis</i>	Harlequin ladybird	Invertebrate
<i>Lycaena phlaeas</i>	Small copper butterfly	Invertebrate
<i>Vanessa atalanta</i>	Red admiral butterfly	Invertebrate
<i>Vanessa cardui</i>	Painted lady butterfly	Invertebrate
<i>Polyommatus icarus</i>	Common blue butterfly	Invertebrate
<i>Polygonia c-album</i>	Comma butterfly	Invertebrate
<i>Pararge aegeria</i>	Speckled wood butterfly	Invertebrate
<i>Phalera bucephala</i>	Buff-tip caterpillar	Invertebrate
<i>Euproctis similis</i>	Yellow-tail caterpillar	Invertebrate
<i>Diplolepis rosae</i>	Robin's pincushion gall	Invertebrate
<i>Andricus kollari</i>	Marble gall	Invertebrate
<i>Andricus quercuscalicis</i>	Knopper gall	Invertebrate
Ichneumonidae	Ichneumon	Invertebrate
<i>Vespa crabro</i>	Hornet	Invertebrate
<i>Aceria erineus</i>	Gall mite	Invertebrate
<i>Picus viridis</i>	Green woodpecker	Bird
<i>Erithacus rubecula</i>	Robin	Bird
<i>Turdus merula</i>	Blackbird	Bird
<i>Parus major</i>	Great tit	Bird
<i>Sitta europaea</i>	Nuthatch	Bird
<i>Phasianus colchicus</i>	Pheasant	Bird
<i>Talpa europaea</i>	Mole	Mammal
<i>Oryctolagus cuniculus</i>	Rabbit	Mammal
<i>Sciurus carolinensis</i>	Grey squirrel	Mammal
<i>Vulpes vulpes</i>	Fox	Mammal
<i>Rattus norvegicus</i>	Brown rat	Mammal
<i>Apodemus</i>	Wood/yellow-necked mouse	Mammal
<i>Clethrionomys glareolus</i>	Bank vole	Mammal
<i>Mustela nivalis</i>	Weasel	Mammal
<i>Mustela vison</i>	American mink	Mammal
<i>Meles meles</i>	Badger	Mammal
<i>Dama dama</i>	Roe deer	Mammal