Devon Hedgerow Surveys

2007 - 2009

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1. Acknowledgements

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- Financial support for the Devon Hedgerow Survey Project was provided by the Aggregates Levy Sustainability Fund administered by Natural England.

- Exmoor National Park Authority for providing access to results obtained from the Exmoor Parish Hedgerow Survey project.

- Natural England provided list of farm holdings within the parishes concerned

- Natural England kindly provided licensed maps for the purpose of this report

- Farmers and landowners granted us permission to survey their hedges.

- The Devon Hedge Group has provided guidance and support, thanks in particular to Rob Wolton.

Summary

During the summer of 2009 FWAG Devon undertook a hedgerow survey across the parish of Spreyton in West Devon funded through Defra's Local Hedgerow Survey fund. As part of the project FWAG were requested to produce a report summarising the results obtained from 8 previously surveyed parishes and one surveyed by the Exmoor National Park Authority Parracombe parish.

- In total 1308 hedges have been surveyed using the Defra methodology across 10 parishes, surveying principally for species richness and hedge condition.

- 66% of surveyed hedges were found to be species rich (containing 5 or more species in a 30 metre stretch) increasing to 76% if Exmoor's single species beech hedges are omitted. This is above the 42% national average (UK BAP for ancient and/or species-rich hedgerows).

- Spreyton had the highest proportion of species-rich hedges at 92%.

- 38% of surveyed hedges are in favourable condition; this is 3% above the national HAP target of 35% by 2010. Spreyton had the highest percentage of favourable hedges at 69%.

- Main reason for unfavourable condition is a lack in height and width of the hedge (30%) followed by height of canopy being above 50 cm (27%).

- No conclusive evidence that adjacent land use significantly affects hedge condition.

- 30% of surveyed hedges would benefit from changes in flail practice by increasing the overall size of the hedge.

- Only 2% of hedges have received some form of traditional management in the last 0–2 years with the majority being in areas of high agri-environment scheme uptake.

- 88% of hedges were located on the traditional Devon hedge bank with 71% being in condition A.

1 Background

A number of hedgerow surveys have been carried out by Devon Farming and Wildlife Advisory Group and the Exmoor National Park Authority since 2007 using the standard methodology as described in the *Hedgerow Survey Handbook* (defra 2nd ed 2007) to asses species richness and hedgerow condition. This report has been requested to consolidate and summarise the results from these surveys.

FWAG obtained funding from the Local Hedgerow Survey Fund (LHS) to run a pilot project in the parish of Bradninch during 2007; the aim was to trial the standard defra survey methodology for the larger Devon Hedgerow Survey Project (DHSP). With funding obtained through the Aggregates Levy Sustainability Fund FWAG were able to survey an additional 6 parishes across Devon in the locality to aggregate extraction sites. During 2008 both FWAG and ENPA obtained LHS funding for an East Devon Survey, across the parishes of Farway and Southleigh and an Exmoor survey, across Exford and Parracombe. Spreyton parish in West Devon was surveyed by FWAG during 2009 via LHS funding.

Hedgerows are a significant part of the English natural landscape; they not only have an aesthetic quality but provide a valuable source of food and shelter for a wide range of plant and animal species. It is estimated that Devon has the highest percentage of hedgerows than any other county in the UK and around 25% of the national reserve of species rich hedgerows. It is therefore imperative that advisory bodies and land managers are able to fully understand the current threats and opportunities which exist to ensure the survival of Devon's hedges for future generation

Besides Devon's hedgerows being a BAP habitat in them selves a number of priority BAP species are associated with them; making the distinctive Devon hedge and bank of particular conservation importance. These include the Greater and Lesser horseshoe bats, Brown hare, dormouse, cirl bunting, bullfinch and pearl-bordered fritillary.

There is concern that Devon's hedgerows are dependent on the continuation of traditional management techniques such as laying or coppicing to maintain them in a condition that provides value to wildlife and acts as a barrier against stock. With the introduction of Higher Level Stewardship target areas and the phasing out of classic schemes such as Countryside Stewardship there is a lack of availability to hedgerow management grants for many farmers. It is therefore the aim of FWAG and ENPA to assess the current quality of Devon's hedgerows and highlight areas where simple management techniques or focused advice could improve hedgerow condition.

2. Aims and objectives

The hedgerow surveys that have been carried out across Devon have three principal aims; a survey of existing hedgerows, to give farmers and landowners guidance on appropriate future management and to contribute towards Devon's Biodiversity Action Plan.

Hedgerow survey objectives:

- detailed survey of hedges across 10 Devon parishes;
- contribute to Devon and UK BAP targets for ancient and species rich hedgerows, which are a priority habitat;
- identify hedges requiring additional management to enhance wildlife or local landscape character value.

Hedgerow management objectives:

- promote appropriate management/restoration techniques;
- promote the benefits of agri-environment schemes, particularly hedgerow Entry Level Stewardship options to appropriate farmers and landowners.

Awareness objectives:

- provide feedback on the key findings from the project;
- raise awareness to the local community, landowners and quarry operators about the environmental importance of hedgerows as wildlife corridors and the benefits of adopting appropriate management techniques;
- promote the wider benefits of sustainable agriculture as a tool for managing and enhancing habitat value in Devon and championing the work of landowners at the local level.

3. Survey methodology

All surveys carried out in Devon have used the standard Defra methodology as set out in the *"Hedgerow Survey Handbook"* (Defra 2nd ed 2007) and have contributed towards the national dataset. The following methodology describes the approach taken by FWAG to set up the survey projects but is in principle very similar to that used by ENPA.

3.1. Identifying hedges and landowners

The Defra protocol for conducting a random sample survey suggests using a hedge density of 9hedges/km^2. This was achieved by dividing the 1 km^2 grids on an Ordinance Survey map into 333 m^2 blocks, the hedge closest to the centre of each block was then selected for surveying (full details are described in the Defra Hedgerow Survey Handbook 2nd ed). Hedges located in urban areas or along residential buildings were omitted from the survey.

Contact details for landowners in some parishes was kindly provided by Natural England using RLR data; in other parishes a combination of cold calling and the use of phone books was required. Once contact details were established an initial letter was sent outlining the aims and objectives of the survey, this was then followed by a telephone call to gain access permission and arrange a time.

3.2. Field survey

The survey method stated in the Defra Hedgerow Survey Handbook 2nd ed was followed with compulsory section A being completed and adaptations made to non-compulsory section B. FWAG and ENPA collected different information within section B making this part of the survey non comparable. For further information on each survey please refer to the individual project reports.

All selected hedges were surveyed over a 30 m stretch on both sides. In some cases it was not possible to survey both sides of the hedge due to accessibility being denied from neighbours or being unable to make contact at time of survey. In some cases it was not possible to assess side B due to physical or safety factors.

Section A of the form was adapted in order for it to fit on three sides of A4 which ultimately saved paper wastage and reduced costs. All elements were still included but could be added onto the electronic database at time of entry. Information on hedge length and grid reference was obtained from digital maps in the FWAG office.

It was decided during previous surveys to omit a full basal floral count due to time constraints and replace it with a broad low, medium and high diversity scale. Although this information alone proved useful, the decision was made to include a more detailed record of floral species within 3 1m^2 quadrate areas across the 30 m section of hedge. This took significantly longer and became more difficult to complete accurately as the survey period stretched into autumn. Due to the availability of knowledgeable volunteers for the Exmoor survey, ENPA were able to continue with a full basal floral survey.

The participation in agri-environment schemes was formally included in this survey with type of scheme and whether hedge options/management had been undertaken. This additional information may prove useful in determining a positive correlation between hedge condition and hedge options/management. This information has only been collected as part of the East Devon and Spreyton surveys and due to the small sample size the data has not been included in this report, however anecdotal evidence of agri-environment scheme uptake across Devon has been. An example of the FWAG survey form is given in Appendix 3.

3.3. Recording

The completed survey forms have been entered onto a Defra designed Microsoft Access database for collation and analysis (with corresponding changes made to section B of the survey form). The data was then used in conjunction with ArcMap GIS to produce detailed maps of both species rich hedges and hedge quality across the survey area.

3.4. Hedgerow management advice

It was important that any feedback given to the farmers and landowners not only provided information on the survey results but also gave advice on the individual hedges on their holding.

3.4.1. On-site advice

During the survey phase, surveyors held face to face discussions with the farmer/landowner to identify their current hedgerow management regime and provide suitable advice to enhance hedgerow quality across the farm. In many instances the farmers showed an interest in their hedges and accompanied the surveyor around the holding. This provided the opportunity to discuss other environmental issues on the holding such as Cross Compliance or erosion issues.

An important part of the discussion centred around the uptake or otherwise of an agri-environment scheme such as Countryside Stewardship or Environmental Stewardship. For those that were eligible for Entry Level Stewardship (ELS) but had not joined, time was taken to explain the scheme with particular attention to the benefits of selecting hedge options. In a number of cases landowners who were not familiar with the application procedure or were experiencing problems in gaining points were able to join after a short conversation with the surveyor.

3.4.2. Farm hedgerow management plans

A basic site management plan was constructed for all the holding involved in the FWAG surveys using aerial photographs provided by Natural England. The plan identified which hedges had been surveyed, those that were species rich and gave recommendations for future management. An example is shown in Appendix 1.

For selecting the most appropriate management option the hedge was not only assessed on its current condition but also how it fitted into the landscape and the quality of habitat it provided, now and in the future. The ideal is to create a mosaic of different hedge structures and sizes across the farm to establish a range of habitat types.

The management options included in section B of the survey forms were condensed into three headings Maintain, Enhance and Restore; the description for each is printed on the reverse of the map (see Appendix 2). As there are many different thoughts on best practice for hedge management it was felt that only giving three options would keep the map concise and encourage the landowner to seek additional advice on individual hedges.

A full list of the species found in each holding with a composition for an average hedge was also provided to each landowner in a covering letter. It was felt that this information would be useful for any future hedge planting or restoration work taking place.

1. Results

The results for this report have been obtained from the FWAG surveys carried out during 2007 – 2009 and the ENPA Parracombe Parish survey of 2008. In some cases it has not been possible to include the Parracombe data in conjunction with the other surveys due to slight differences in the methods of storing the data and the voluntary information collected in section B. It is also important to note that any anecdotal evidence provided relates exclusively to the FWAG surveys and FWAG surveyors, experiences.

1.1. Hedgerow character

1.1.1. Hedgerow numbers

Both FWAG and ENPA have used a random sample technique of 9 hedges per 1 km² for selecting the hedges to be sampled. The total number of hedges surveyed within each parish is determined by both the overall area of the parish and the number of landowners that are willing to participate in the survey. As shown in figure 1 the number of hedges surveyed within each parish has varied between 114 in Burlescombe and 158 in Brayford with an average of 130. In total 1308 hedges have been surveyed since 2007 by both FWAG and ENPA using the standard Defra methodology.

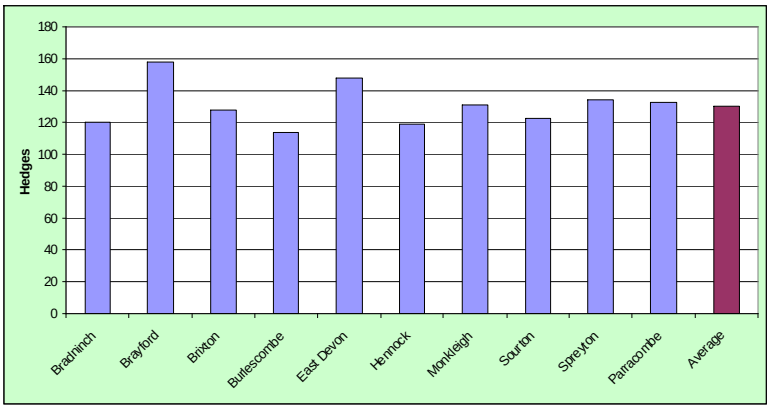
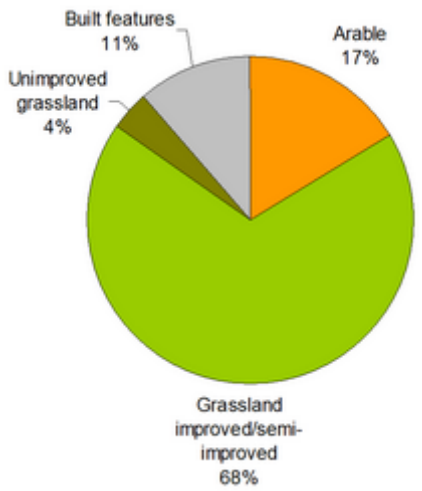


Figure 1: number of surveyed hedges per parish

1.1.2. Adjacent land use



From the 1308 hedges surveyed across the 10 parishes 17% were bounded by arable ground on side A, 68% by improved / semi-improved grassland, 4% by unimproved grassland and the remaining 11% by built features (this includes major and minor roads and farm tracks). Brixton was the only parish that was dominated by arable ground on side A at 48%, Sourton and Brayford had the lowest number of arable fields at 1%. East Devon had the highest number of hedges that bounded unimproved land at 11% followed by Brayford, Spreyton and Parracombe parishes at 8%.

Figure 2: Pie chart of adjacent land use

1.1.3. Boundary Type

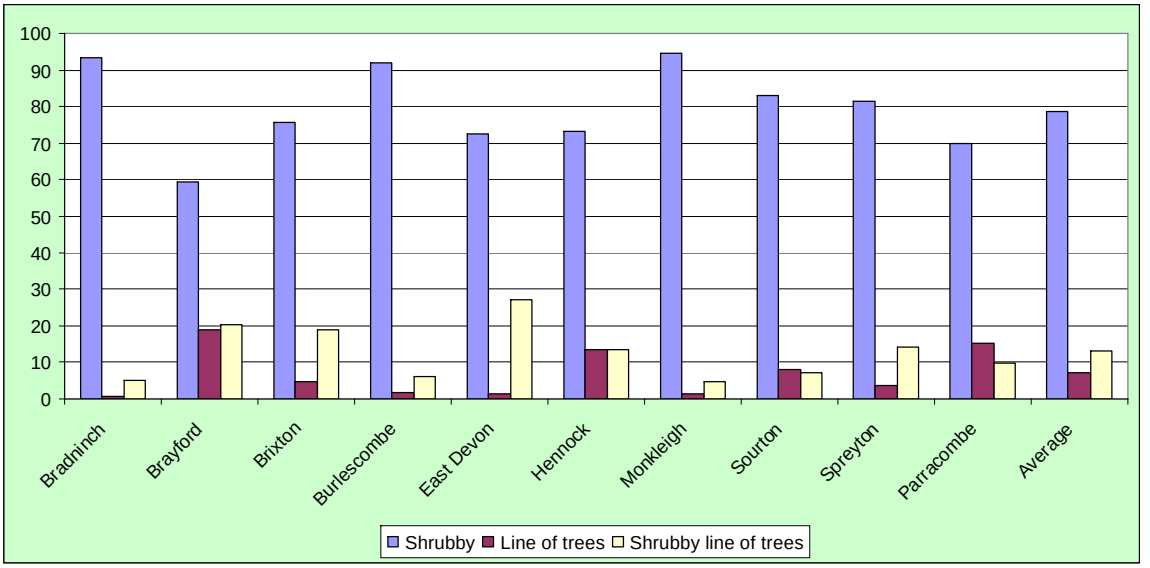


Figure 3: Boundary type per parish

On average 78% of the surveyed hedges can be categorised as being shrubby, 8% as lines of trees and 12% as shrubby line of trees. The parish of Monkleigh has the highest percentage of shrubby hedgerows at 95% and Brayford the lowest at 59%. Both Brayford and Parracombe surveys have recorded the highest percentage of hedgerows that have developed into lines of trees; both parishes are located on or directly adjacent to Exmoor National Park. The East Devon survey indicates that only 2% of hedgerows are lines of trees but 28% are developing from a shrubby state into lines of trees.

It is important to note that although the guidelines within the survey handbook are clear about how to classify hedgerow types it can be difficult to implement in the field. This may result in a slight deviation in the results gathered by different surveyors and surveying organisations.

1.1.4. Associated features

The survey has identified that 88% of hedges were located upon the traditional Devon bank. 71% of banks surveyed by FWAG were in condition A, excessive erosion from stock was the major cause for loss in bank quality across the survey area. 51% of surveyed hedges were fenced along side A with 14% having a wet or dry ditch running alongside.

Figure 4: Eroded bank from excessive stock access

1.1.5. Hedgerow length and connectivity

All hedgerows within this report have been surveyed across a random sample length of 30 m, as specified in the survey handbook. The full lengths of each individual hedge and the numbers of connections have subsequently been recorded from GIS software to increase accuracy. There was little variation between the average hedgerow lengths between each parish with Parracombe having the shortest hedges at 168 m and Burlescombe the longest at 218 m, the average across the entire survey area was 188 m. 6 of the 10 parishes had an average of 3 connections for each hedge with the remaining 4 having 4 connections, expected to be 2 hedgerows at each end.

1.2. Hedgerow management and condition

1.2.1. Hedgerow management

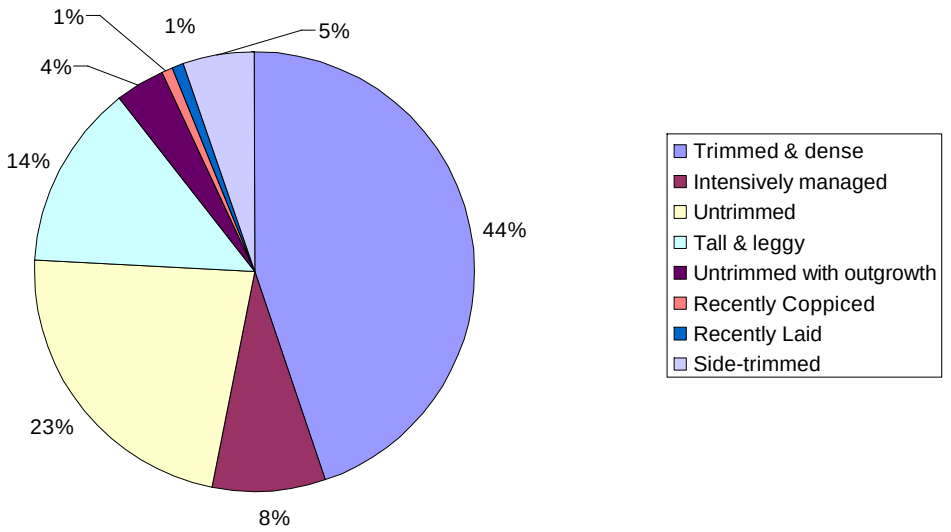


Figure 5: Pie chart showing hedgerow shape across all 10 surveyed parishes.

Figure 5 indicates that the vast majority of hedges within the survey area have been categorised as being trimmed and dense at 44%, this indicates that they are being managed on a regular basis by mechanical flail, either annually or biennially. It is encouraging to note that only 8% of hedges appear to have been intensively managed but 41% fall within the low or no management categories (untrimmed, untrimmed with outgrowth and tall and leggy). Only 2% of hedges across the survey area appear to have recently been managed by traditional techniques such as laying or coppicing.

Figure 6 shows the hedgerow shape for each of the surveyed parishes, the category for trimmed and dense has been omitted in order to display the other results easily. Trimmed and dense was the most common form of management across all parishes apart from Brayford and Parracombe.

The parishes of Burlescombe and Parracombe have the highest number of untrimmed hedges at 43% and 42% with Brixton the lowest at 9%, Brixton also has the highest percentage of intensively managed hedges with 24%. Monkleigh parish shows a contradictory result as 13% of hedges are managed intensively and 16% appear to be

untrimmed. It is possible that a large farm with a particular management regime has skewed the result for this parish. It is interesting to note that many of the parishes that show signs of traditional forms of management have a high proportion of hedges that fall within the untrimmed and tall and leggy category; it is possible that these hedges are being let up for laying.

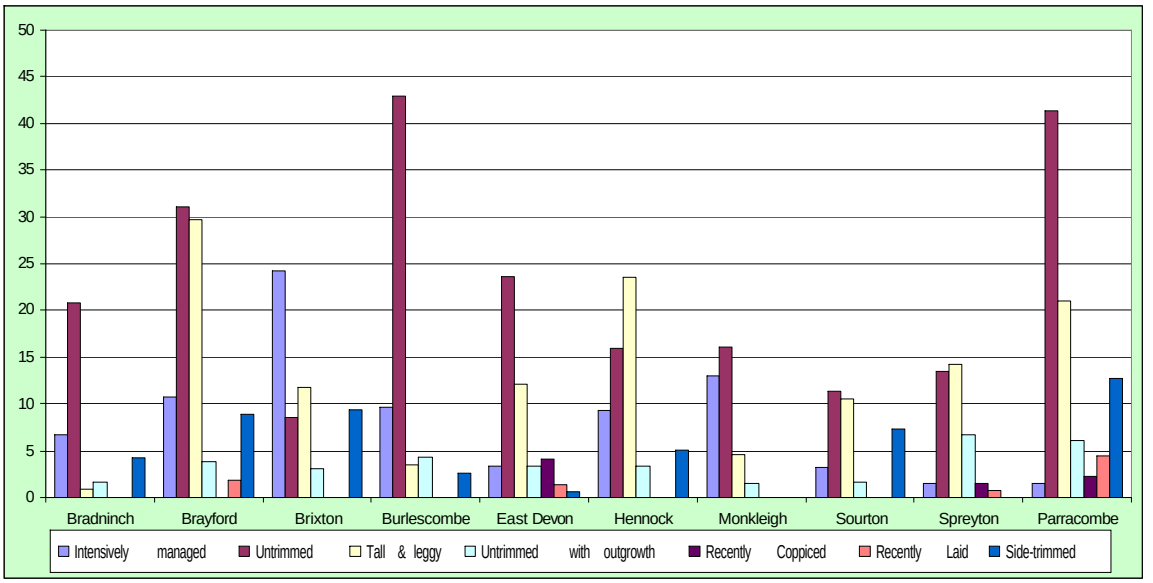


Figure 6: Bar graph showing hedgerow shape for each parish

1.2.2. Management against adjacent land use

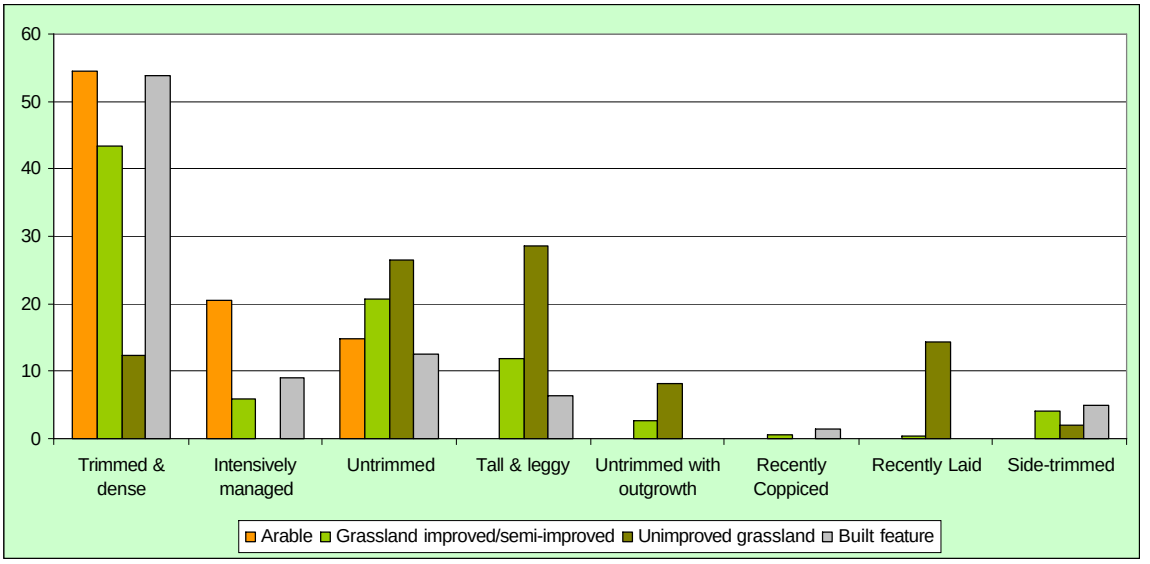


Figure 7: Bar graph showing land use against hedgerow shape

Figure 7 relates to information that has been gathered from the 9 FWAG hedgerows surveys due to data accessibility problems. The graph indicates that over 50% of hedges adjacent to arable land and built features are flailed on a regular basis and 42% of improved / semi – improved grassland. Unimproved grassland has the lowest proportion of regularly trimmed hedges at 11% but the highest proportion of both untrimmed and tall and leggy hedgerows. Again it is possible that these hedges have been let up for laying as 14% of hedgerows adjacent to unimproved grassland show signs of recently being laid. It is possible that these fields and boundary features are being managed for their wildlife value under an agri – environment scheme.

Over 20% of arable hedges and 10% of built feature hedges appear to have been intensively managed.

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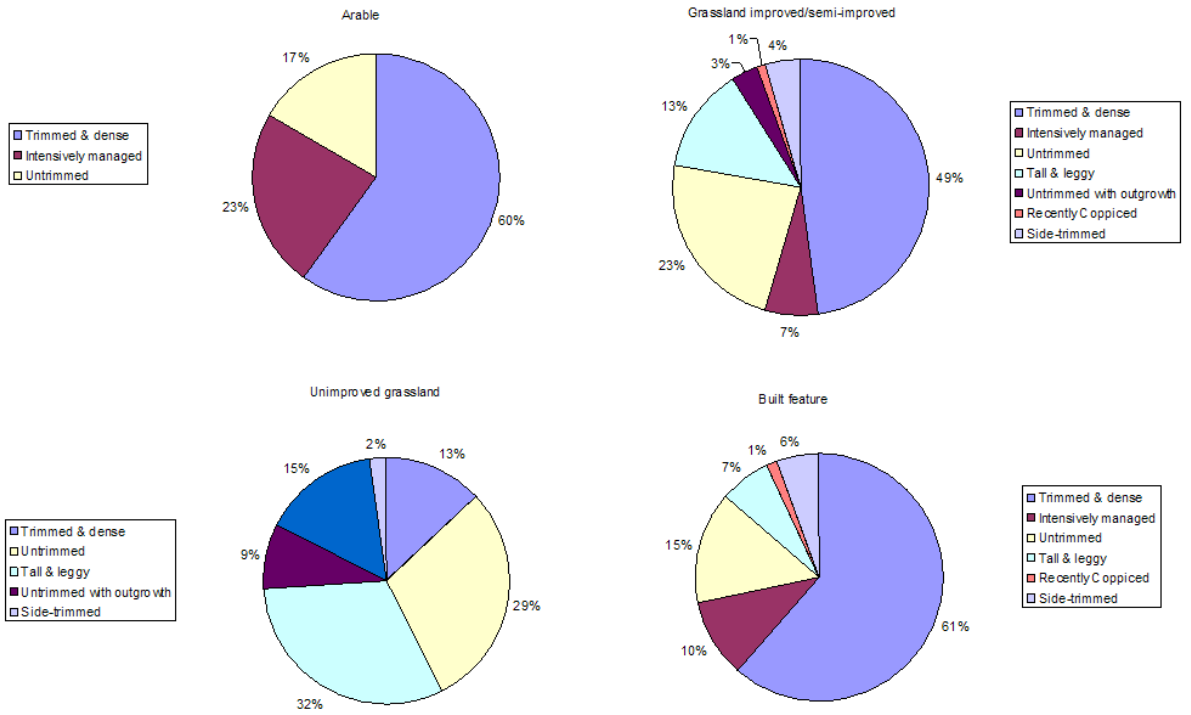


Figure 8: Pie charts showing hedgerow shape for adjacent land use type

1.2.3. Hedgerow management over time

In conjunction with hedgerow shape the survey has also identified the types of management that each individual hedge has been subjected to over a given time period. It is important to note that although this can provide some very accurate results for the 0 – 2 year period it becomes more difficult to determine management practice over a prolonged period, particularly for hedge coppicing. In some cases these hedges may have been classified as having no form of management.

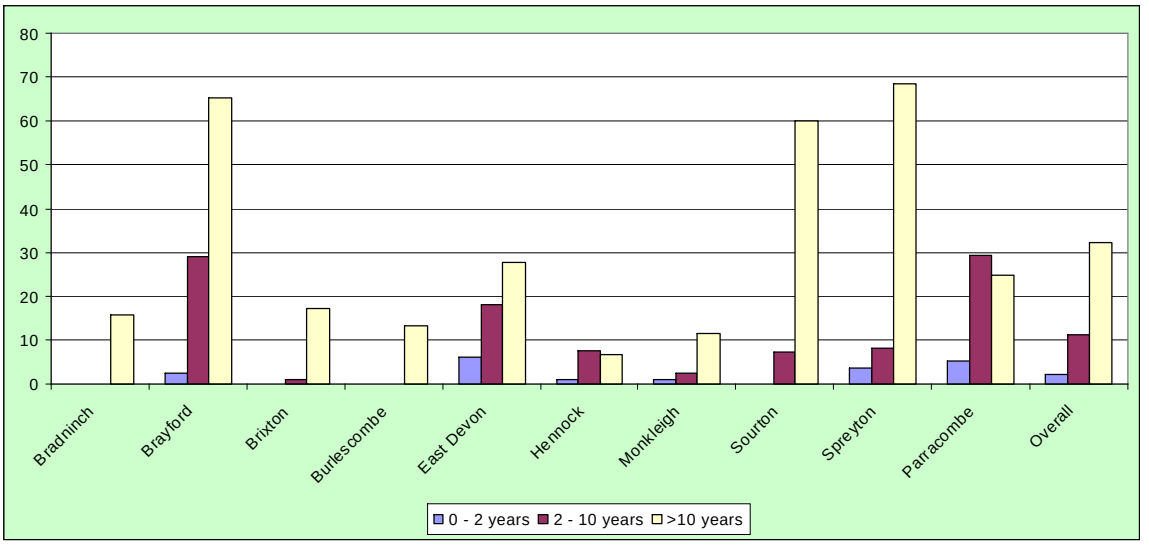


Figure 9: Traditional management over time for each parish

Figure 9 describes the number of hedges within each parish that have been subjected to a form of traditional management in each time period. For the purposes of this report traditional management refers to laying and coppicing and not restoration to the bank component.

On average only 2% of hedgerows within the survey area have received any form of traditional management within the 0 – 2 year time frame; East Devon showed the highest figure at 6% followed by Parracombe at 5%. There was no evidence of traditional management in the 0 - 2 year period for 4 of the 10 parishes. Evidence of traditional management increases to 11% between the 2 – 10 year period and is present in all but Bradninch parish. All parishes show an increase in the number of hedges that have been traditionally managed over 10 years apart from Hennock and Parracombe, the overall average for the survey area is 32%. It is possible that a number of landowners within these two parishes were able to access agri-environment schemes in the late 1990's resulting in a large number of hedgerows being laid in the 2 – 10 year period.

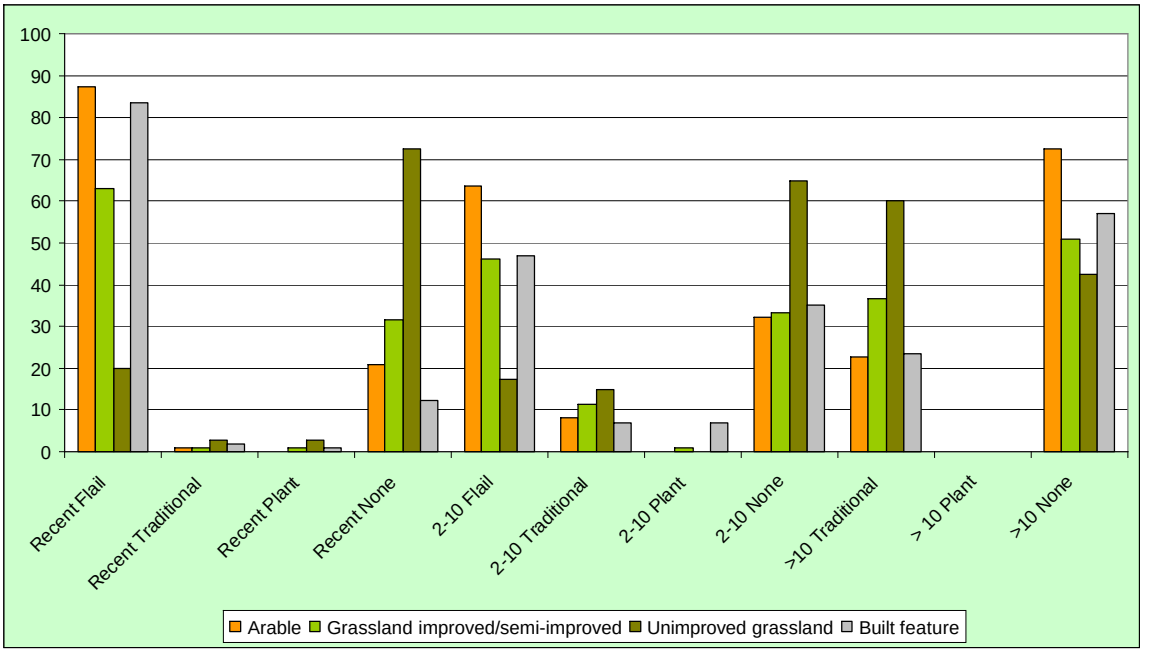


Figure 10: Bar graph describing traditional management against adjacent land use

Cross referencing hedgerow management against adjacent land use for the 9 FWAG surveys indicates that the majority of hedges that have received some form of traditional management in the last 0 – 2 years are located against unimproved grassland at 3% and built features at 2%. Only 1% of hedges adjacent to arable ground and improved / semi-improved grassland have been managed traditionally in the last 0 – 2 years. 72% of hedges adjacent to unimproved grassland have not received any management within the last 0 – 2 years and 65% in the 2 – 10 year period. It is possible that these hedges have been let up for laying as part of an on going agri-environment scheme, or they are too inaccessible for mechanical management. Hedges adjacent to unimproved grassland have a sustained history of traditional management with 60% being managed in the greater than 10 year period.

It is possible that the large number of hedges within the '>10 none' category for arable ground are as a result of the difficulties in identifying traditional management over a long period of time, particularly if the hedge has been regularly flailed.

1.3. Hedgerow condition

The *"Hedgerow Survey Handbook"* (Defra 2nd ed 2007) details 5 thresholds that have to be met to classify a hedgerow as in favourable condition.

- Undisturbed ground and perennial herbaceous vegetation cover: at least 2m of undisturbed ground and 1m of herbaceous vegetation cover from the hedge centre line.
- Nutrient enrichment: less than 20% cover combined of nettles, cleavers and docks.
- Recently introduced non native species: Non native herbaceous species (maximum 10%), non native woody species (maximum 10%).
- Size: at least 1m high, at least 1.5m wide, at least 3m² cross-sectional area.
- Integrity/continuity: less than 10% gaps, no gaps greater than 5m, base of canopy less than 0.5m above ground.

Since production of the handbook, the decision has been made to omit nutrient enrichment from the condition criteria due to the lack of scientific evidence that 20% cover of indicator species has a significant detrimental impact on hedgerow condition. For the purpose of this report nutrient enrichment is shown in graphs and referred to but does not act as a favourability indicator. There were no records of non native species within any of the surveyed parishes and so this threshold is no longer referred to in this report. It was felt that a number of hedges had failed due to base of canopy being above 0.5m so this criterion has been separated from integrity / continuity for this report.

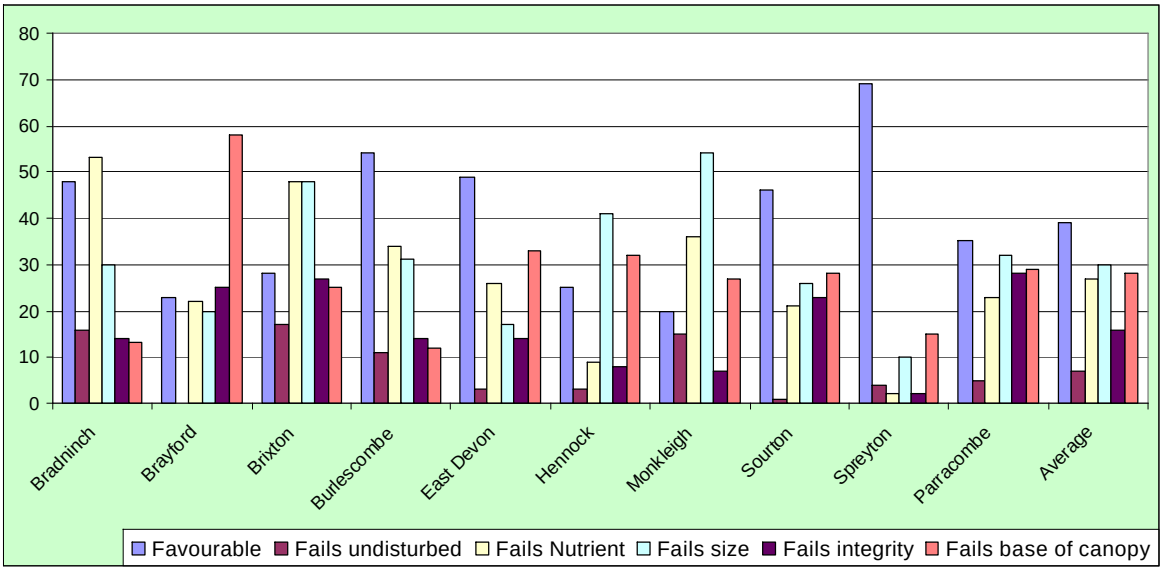


Figure 11: Bar graph describing hedge favourability per parish

From the 1308 hedges surveyed across Devon 38% are currently in favourable condition. Hedgerow size was the largest cause of failure at 30% followed by height of base of canopy at 28%. Although nutrient enrichment has not been included as a condition score in this report 27% of surveyed hedges would have failed this criterion.

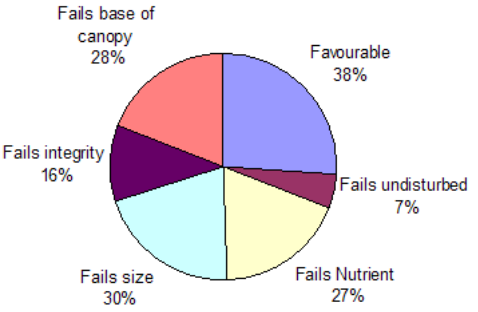


Figure 12: Pie chart of overall favourability

Spreyton had the highest number of favourable hedges at 69% followed by Burlescombe and East Devon, Monkleigh has the least number of favourable hedges at 20%. Hedgerow size is a common cause of failure across all parishes but most commonly in Monkleigh where 54% of hedges failed and Brixton with 48%. Lack of hedgerow integrity was a common issue in 3 of the 10 parishes with Brixton having the highest proportion at 27%. Failing height of base of canopy is a common failure across many if the parishes but particularly for Brayford with 58% and East Devon.

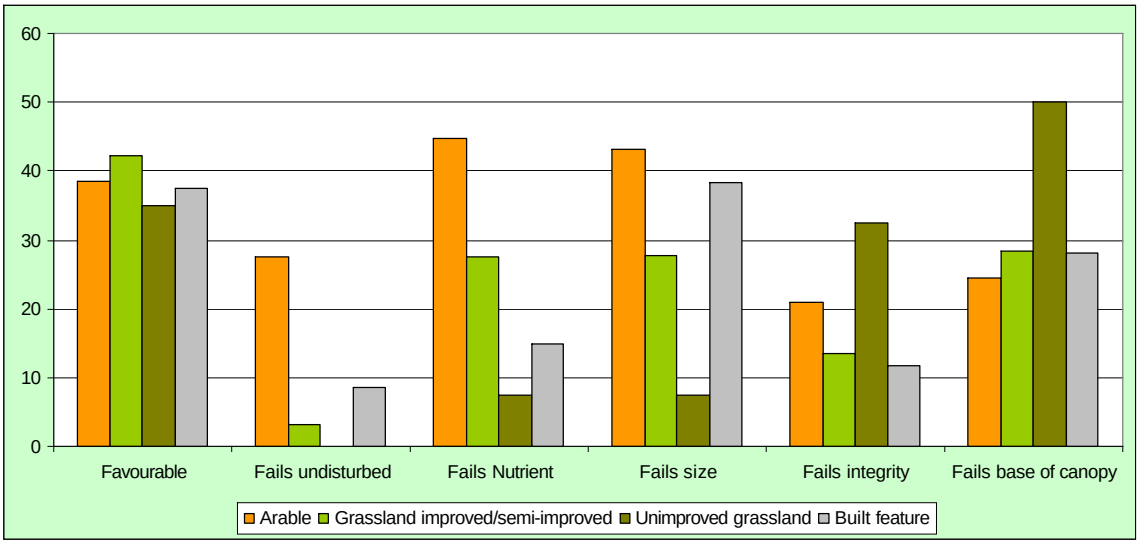


Figure 13: Bar graph describing hedgerow favourability against adjacent land cover

Figure 13 relates to data obtained from the 9 FWAG surveys; it is also important to note that 68% of hedges were adjacent to improved/semi – improved grassland resulting in the other categories coming from a comparatively small sample size. These results can therefore only identify trends within the Devon survey and should not be used in a wider context.

There appears to be no clear link between adjacent land use and hedgerow condition as all 4 categories are within 5% of each other. As expected, 28% of arable hedges are failing due to infringements within 2 m of the hedge bottom and 43% due to lack of hedge height and width. Excessive nutrient enrichment along the hedge bottom appears to be an issue for both arable and improved/semi-improved grassland hedges, possibly as a result of inaccurate fertiliser and slurry applications in the past.

Figure 13 also indicates that hedges adjacent to unimproved grassland are commonly failing due to gappiness and height of base of canopy; very few are failing due to size and nutrient enrichment. The results indicate towards a link between the lack of management across unimproved grassland hedges and the condition thresholds that they are failing.

An increase in the numbers of hedges being traditionally managed via laying or coppicing could significantly improve the condition of unimproved grassland hedges by reducing height of base of canopy and gappiness across the length of the hedge.

1.4. Species composition

1.4.1. Species richness

A species rich hedge is defined as one that contains 5 or more woody species across a 30m length, this figure is reduced to 4 species in an upland environment. Hedges that are classified as being species rich are of particular conservation interest as they can support a wide range of associated hedgerow dependent species throughout the year.

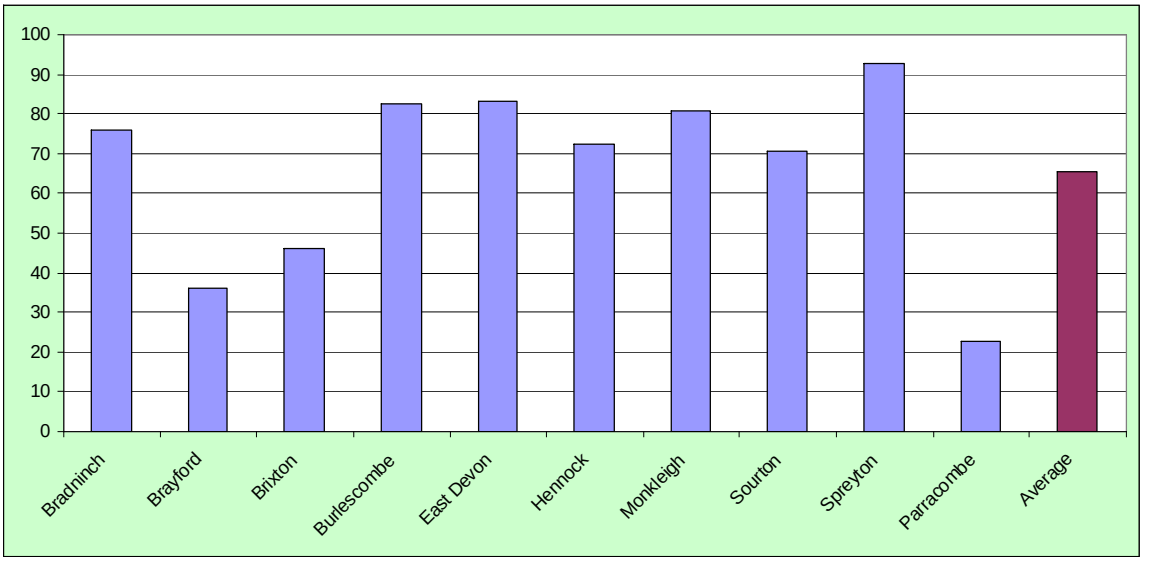


Figure 14: Bar graph showing the percentage of species rich hedges per parish

Across the 10 surveyed parishes 66% of hedges can be classified as being species rich, this is above the 42% national average that is quoted within the UK Steering Group Report, HMSO, 1995. This figure would increase to 76% if the two Exmoor based surveys (Parracombe and Brayford) were removed as there is a tradition for single species beech hedges within this area. Spreyton had the highest proportion of species rich hedges at 92% and an average of 7 species per 30m, followed by Burlescombe and East Devon. Brixton had the lowest percentage of species rich hedges for a non Exmoor parish at 46%.

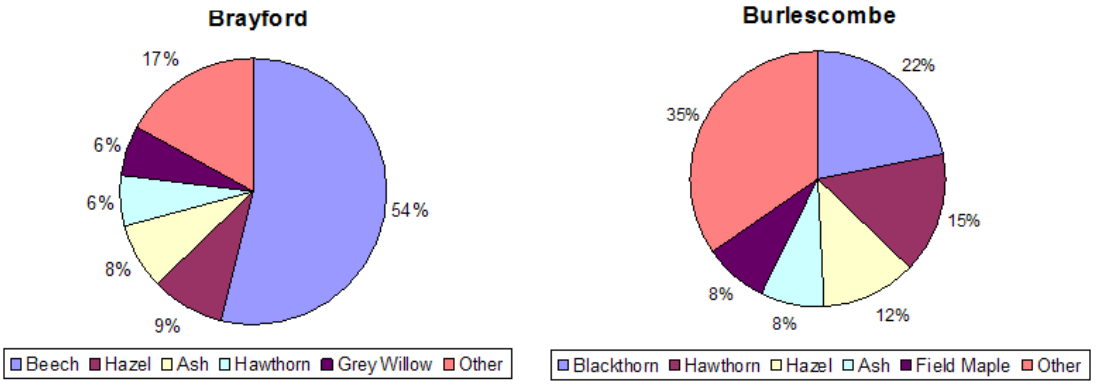


Figure 15: Pie chart describing the species composition of an average Brayford and Burlescombe hedge

There is a startling difference between the composition of an average Brayford hedge and those found in the lowlands such as in Burlescombe. There is a clear dominance of Beech within the Brayford hedges, in many cases this was recorded at 100% and a

lack of shrubby species such as blackthorn, hawthorn and hazel. The 35% classified as other within Burlescombe indicates that there is a great number of species of less than 8% dominance.

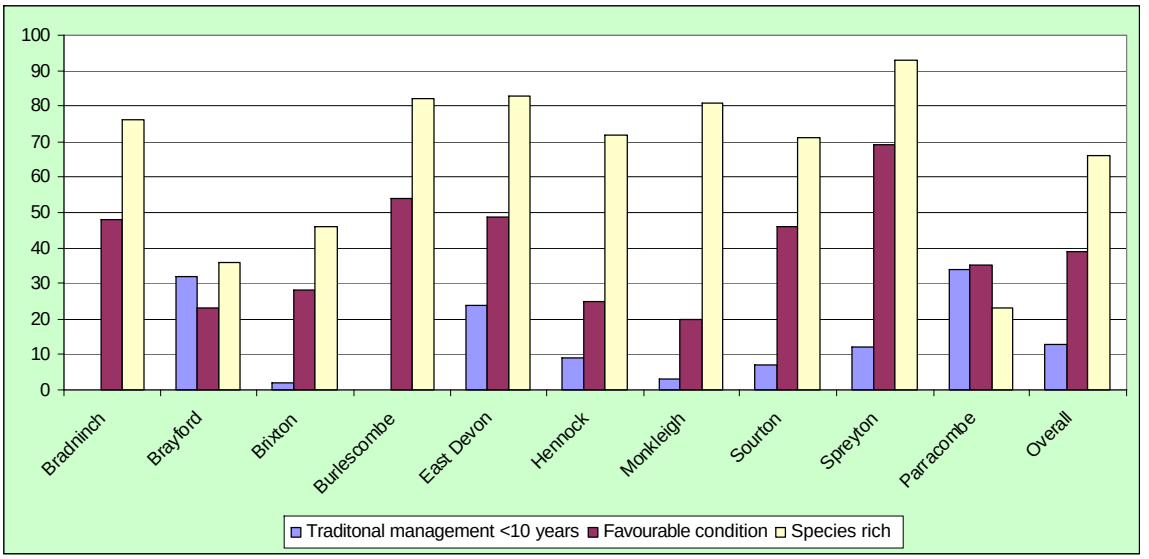


Figure 16: Bar graph showing the percentage of hedges traditionally managed, those in favourable condition and species rich for each parish

The results have indicated that there is no clear link between species richness, favourability and traditional management within the survey area. It would have been expected that parishes with high levels of traditional management would also have many favourable and species rich hedges and those with no management would have few favourable hedges. This does not appear to be the case when Brayford and Burlescombe are compared.

1.4.2. Hedgerow trees

The hedgerow survey has identified that a total of 1427 isolated hedgerow trees were present within the survey area giving an average of 1 tree per 30m or 3 per 100m. This is an unexpectedly high figure and it is believed that a number of non isolated trees with interlocking canopies have also been included. As a result it is difficult to determine the true population of isolated trees but from the data it is evident that there is a good number of recruited young trees within the 6 – 20 cm band but few emerging in the 0 – 5 cm.

Figure 17: Bar graph showing number of trees within diameter bands

2. Discussion

2.1. Hedgerow character

The results for this report have been obtained from10 local hedgerows surveys conducted by both the Farming and Wildlife Advisory Group and the Exmoor National Park Authority from 2007 – 2009. A number of additional surveys have been carried out by other organisations and interest groups but have not used the standard methodology making it difficult to make accurate comparisons. However, the parishes selected by FWAG and ENPA give a good geographical representation of Devon with an adequate sample size from each to ensure robust statistics can be obtained. It was the initial intention of FWAG to randomly survey a minimum of 150 hedges per parish; it became apparent that this was an unrealistic target due to difficulties in gaining access to private land. In many cases this was not landowners refusing access but problems in identifying who owned the land and obtaining contact details, particularly in Hennock and Burlescombe where a large number of hedges were managed by second home owners.

2.1.1. Adjacent land use

The survey results for adjacent land use are in line with expectations as the vast majority of hedges are adjacent to improved/semi-improved grassland, quintessential to the pastoral landscape of Devon. Only 17% of hedges in the survey area were adjacent to arable ground with Brixton being the only parish with an arable majority. Parishes such as Bradninch, Spreyton and the East Devon survey had 20% arable ground with many farmed by one landowner, this can skew the result as one particular management style may be being applied across all the farms hedges. Only 4% of hedges bounded unimproved grassland with the majority being located within the rural parishes of Spreyton, East Devon and the two on Exmoor. These parishes have a long history of agri-environment schemes such as Countryside Stewardship, Environmentally Sensitive Area agreements and Higher Level Stewardship which all have capital work elements for hedgerow restoration. It would be expected that these hedges should be in better condition due to the availability of grants. Hedges adjacent to this land type are of particular conservation importance as they provide connectivity between habitats, provide a valuable food source and add landscape character.

Although the sample size for adjacent land use types, other than improved/semi-improved grassland, is comparatively small it is felt that they are representative of the Devon landscape as a whole and can suggest trends within the survey area. The details and trends within each adjacent landscape type will be discussed fully in subsequent sections of this report.

2.1.2. Boundary type

It is encouraging to note that over 78% of hedges across the survey area can be classified as shrubby; this indicates that they have a dense woody component at the base providing shelter of birds and small mammals whilst fulfilling the primary function as a stock barrier. A number of parishes show signs that the hedges are reverting from a shrubby state into shrubby lines of trees, particularly in Brayford and the East Devon survey. Although these hedges can still provide a suitable habitat for associated species they are in danger of fully reverting into lines of trees which are of less wildlife

value. It becomes difficult to bring hedgerows classified as lines of trees back into regular management as coppicing is often the only option, this can be very expensive if large trees require felling. These types of hedges are often abandoned and turn into relic boundaries ranched by stock. It is therefore important that landowners are able to identify the stage that each hedgerow is in and instigate an appropriate management practice.

Figure 18: examples of both a shrubby hedgerow and shrubby line of trees nearing the point of restoration

2.2. Hedgerow management

The results for hedgerow management based on hedgerow shape have identified that 44% of hedges across the county are managed regularly by mechanical flail and only 8% appear to have been managed intensively. The results have also highlighted that 31% of hedges have the potential to be laid and coppiced (those categorised as Untrimmed, Tall & Leggy and Untrimmed with Outgrowth) but only 2% appear to have been managed as such in recent years. This situation is highlighted in Burlescombe where there is a high level of untrimmed hedges but no evidence of traditional management; it is however important to note that there are very few tall and leggy hedges within the parish so a number of management options are still available. It is possible that these hedges are being managed on a biennial or triennial rotation under Entry Level Stewardship and appear to be untrimmed at time of surveying.

The lack of traditional management occurring across Devon is clearly shown in Figure 9 where only 6 parishes have shown any signs of laying or coppicing in the 0 – 2 year category. Both the East Devon Survey and the Parracombe survey have the highest number of traditionally managed hedges in this time frame. It is believed that this is a direct result of the accessibility to grant funding from agri-environment schemes. It is also worth mentioning that there is a strong tradition of hedge laying within the East Devon parishes with many farmers working as hedge contractors and competing in local and national competitions; as a result they practise on their own hedges.

Figure 19: Recently laid East Devon hedge

2.2.1. Hedgerow management with adjacent land use

The results have identified that hedges adjacent to improved / semi-improved grassland, arable and built features are more likely to be managed on a regular basis, typically by annual flail. This is not unsurprising as many dairy farmers are keen to keep hedgerows tightly trimmed as they are conscious about overhanging branches earthing electric fences and causing eye injuries to grazing cattle. Roadside hedges are also required to be trimmed regularly for safety purposes.

Although it is encouraging to note that only a small fraction of hedges are intensively managed the greatest proportion are adjacent to arable ground. There is a tendency for some arable farmers to flail hedges hard during August and September at a level that would last two seasons; this is under the premise that there may not be time the following year or soil conditions may not allow. This would explain the 15% of untrimmed arable hedges as both 2007 and 2008 harvests were very wet resulting in crop sowing being a priority over flailing. A solution to resolve this apparent flux between over trimmed and undertrimmed hedges would be to encourage the voluntary uptake of 2m margins with the adjacent hedge managed on a biennial trimming option under Entry Level Stewardship. This would alleviate the pressure on hedge trimming during harvest and allow for hedges to be cut at a more sympathetic time for wildlife and in suitable conditions.

Figure 20: Picture of field margin with shrubby hedgerow

The results have also indicated that hedgerows adjacent to unimproved grassland are more likely to be managed sympathetically for wildlife as a large proportion have been classified as untrimmed, tall & leggy and untrimmed with outgrowth. These hedgerow shapes are of significant value as they yield large levels of fruit whilst offering shelter, nesting sites and transport links for a wide variety of insect, bird and bat species. It is also evident that a greater proportion of these hedges are being managed by traditional techniques but it is still only around 2% in the 0 – 2 year category. It is important that this type of management continues or increases to ensure that those hedges categorised as tall & leggy do not develop into lines of trees and fall outside the realm of affordable management.

2.3. Hedgerow condition

It is the intention of the Hedgerow Action Plan (HAP) to bring 35% of England's hedgerows into favourable condition, excluding nutrient enrichment, by 2010. It is apparent from the surveys carried out across Devon that we are above this figure in 6 of the 10 parishes with an overall average of 38%. It is also believed that some simple changes in management could have a significant impact on hedge quality across the remaining 4 parishes.

For the purposes of this report integrity/continuity has been sub divided to highlight the importance of height of base of canopy as a condition failure, without this division integrity/continuity would be the most significant cause of failure at 44%.

With the division in integrity/continuity, the largest reason for condition failure across the survey area was due to height and width of the hedge being too small; particularly for hedges adjacent to arable ground and built features. As discussed previously, the encouragement of farmers to enter into Entry Level Stewardship and only side flailing roadside hedges could result in a significant increase in hedgerow favourability. This is particularly prevalent on the eve of the introduction of the Campaign for the Farmed Environment. The encouragement of dairy farms to establish larger hedges is more difficult as there is the additional animal welfare aspect.

The separation of integrity/continuity has identified that height of base of canopy is an issue that is affecting 28% of hedges across Devon; especially in Brayford, East Devon and Hennock; all of these parishes have high levels of hedges categorised as being untrimmed or tall & leggy. It is believed that this condition score is directly linked to the need for traditional management such as laying or coppicing. This would rejuvenate the hedge and encourage new growth at the base giving a shrubby, dense appearance. Laying of the hedge would also have a positive impact with reducing the 11% of hedges failing due to gappiness within the integrity/continuity threshold.

Figure 21: Gappy Exmoor hedge

The recent introduction of Upland Entry Level Stewardship with its hedgerow restoration option may increase the numbers of hedges being laid within the Severely Disadvantaged Area but will not benefit hedges in the lowlands. It is felt that a similar scheme within the standard ELS with an in option to restore over 200m within the 5 years would have a reasonable uptake. This could encourage farmers outside of Higher Level Stewardship target areas to traditionally manage their hedges without direct grant aid.

It is important to note that although anecdotal evidence and theory is there to suggest that traditional management techniques are beneficial to hedgerow condition, there is no obvious link in this survey data. It would be expected that parishes such as Brayford, Parracombe and East Devon which have relatively high levels of traditional management in the last 10 years would also have large numbers of favourable hedges. This does not appear to be the case in our survey area; furthermore Bradninch and Burlescombe have high numbers of favourable hedges and no evidence of traditional

management. Both of these parishes have significantly high numbers of untrimmed hedges that are not quite at the stage of being classified as tall and leggy. In order to maintain these hedges in favourable condition some form of management such as flailing or use of a shaping saw will be needed to rejuvenate re-growth from the bottom to prevent the hedge becoming gappy. Alternatively, the hedges could be let up for laying; this would then require a dramatic increase in the use of traditional management to maintain hedgerow condition.

It is felt these results indicate that some form of management, whether it be mechanical flail, shaping saw, laying or coppicing is better than no management at all and the approach described by Hedgelink in '*The Hedgerow Management Cycle'* leaflet should be applied wherever possible.

Figure 22: Tractor mounted shaping saw

Although nutrient enrichment has been omitted from the favourability threshold, 27% of hedges within the survey area have excessive levels of detrimental indicator species. This can have a significant impact on the floral diversity of the hedge bottom. Few management options are available to improve this figure as soil nutrient levels are very slow to deplete; increased accuracy in fertiliser applications combined with cross-compliance and voluntary field margins will help.

2.4. Species richness

The surveys have identified that the vast majority of Devon's hedges can be classified as being species rich with many containing 7 or more species; this is significantly above the 42% national average.

Although there does not appear to be a direct link between traditional management, hedge condition and species richness in the survey area it is felt that having a diversity of species can prolong hedge condition. It appears that parishes such as Brayford and Parracombe with high proportions of single species dominated hedges have an inherent disadvantage in being maintained in favourable condition. Species such as beech and ash can make a good quality hedge but continual management is required as they can quickly develop into lines of trees. In situations such as Brayford where there is a dominance of these species with a small component of shrubby ones the hedge can lose favourability very fast as canopy base height exceeds 0.5m. Species

such as hazel and hawthorn take much longer to develop into trees resulting in hedges with a good mix of these species remaining within the favourability threshold for a greater period of time.

2.5. Additional survey data

There is an optional element within part B of the survey form which allows additional information relevant to the individual parish to be recorded. Both FWAG and ENPA have taken slightly different approaches in the methodology used to asses features such as fence condition, veteran trees and ground flora making it impossible to compare data. The decision has therefore been taken to omit these sections from this report. If further information is required please refer to the '*Devon Hedgerow Survey Project'* (FWAG 2008), *'East Devon Hedgerow Survey'* (FWAG, 2008) and the *'Exmoor Parish Hedgerow Survey'* (ENPA, 2008). Detailed reports on hedge bottom floral diversity is also available via the hedgelink website (www.hedgelink.org.uk).

3. Key points to take forward

- High proportion of species-rich hedges

  It was known before the hedgerow surveys were carried out that Devon has a high proportion of species-rich hedgerows, now there is some objective evidence to back up this claim. 66% of surveyed hedges in Devon have been found to be species-rich; this would increase to 76% if the beech dominated Exmoor hedges are omitted. This figure is above the 42% national average as quoted in the United Kingdom BAP for Hedgerows.

- Majority of hedges are in unfavourable condition

  38% of surveyed hedges are currently in favourable condition; this is 3% above the 35% national target for 2010. Hedgerow size and height of base of canopy are the primary causes for hedges failing to be favourable.

- Low uptake of good hedge trimming practice

  Changes to flail techniques would have a considerable effect on reducing the number of hedges failing on size (over 20% of hedges sampled), particularly increasing the height progressively over a number of years. Encouraging and advising farmers and landowners to choose hedge options such as biennial trimming in an ELS application may be one method of achieving this.

- Traditional hedgerow management / availability of grant

  Only 2% of surveyed hedges have received some form of traditional hedgerow management over the last 2 years, with the majority only being in areas with a high uptake of agri-environment schemes with capital work grants. 30% of surveyed hedges failed the condition score due to height of canopy being above 50 cm and excessive gappiness. These condition thresholds are directly attributed to the lack of traditional management such as laying or coppicing. There is concern that hedges outside HLS target areas will receive no form of traditional management due to lack of incentive; this will have a dramatic affect on the long term sustainability of the UK's hedgerows if the '*Hedgerow Management Cycle'* approach is used. The adoption of new options under UELS into ELS may help to resolve this issue and encourage farmers to lay/coppice their hedges.

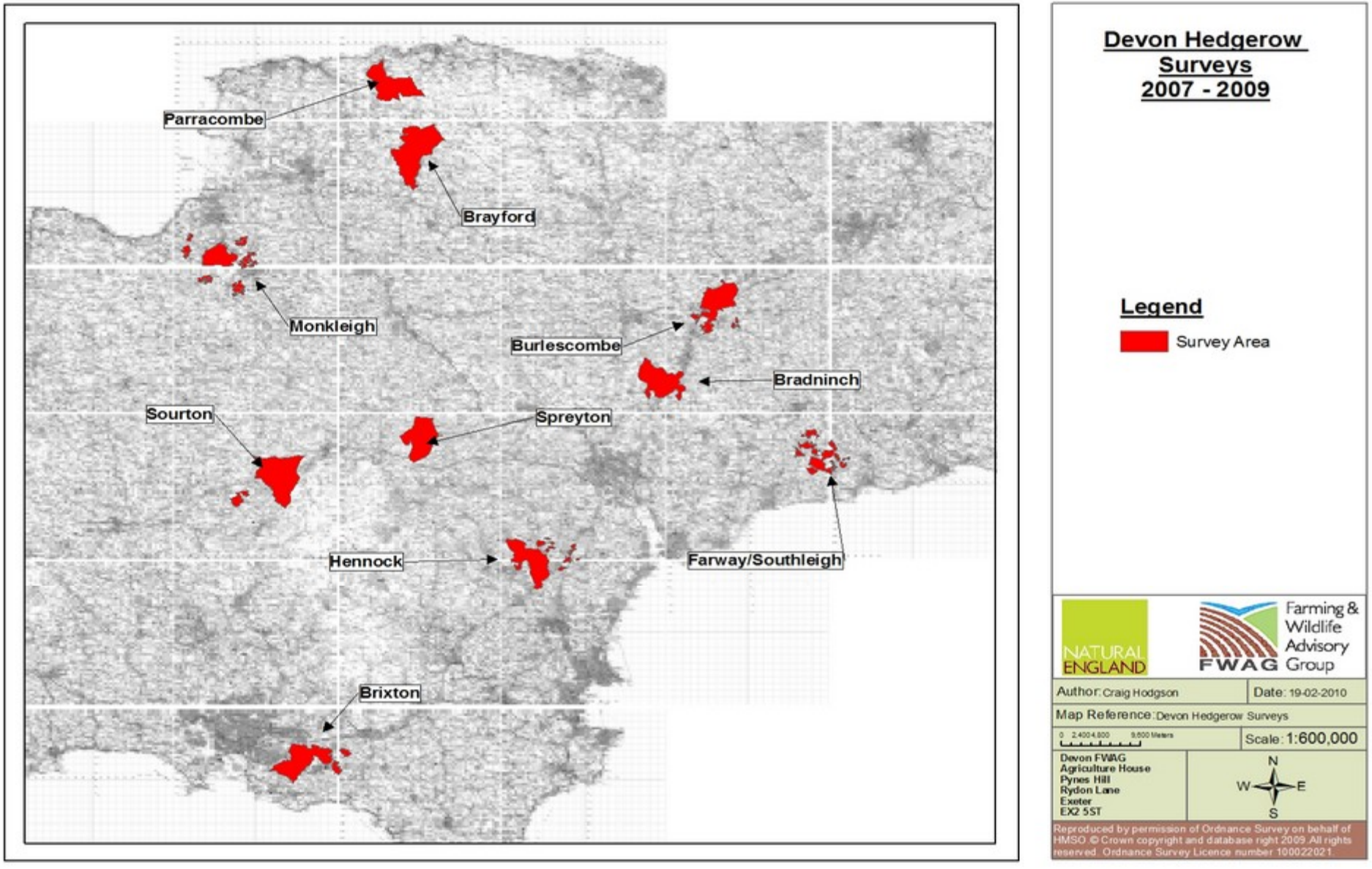
- Many hedges suffer from nutrient enrichment at their base

  Despite introduction of Cross Compliance buffer strips, 27% of the hedgerows sampled suffer from nutrient enrichment. Although this is no longer a direct contributor to hedgerow favourability' coarse aggressive weed species can have a significant detrimental impact on floral diversity. There is a need for provision of advice to farmers and landowners on appropriate field edge management.

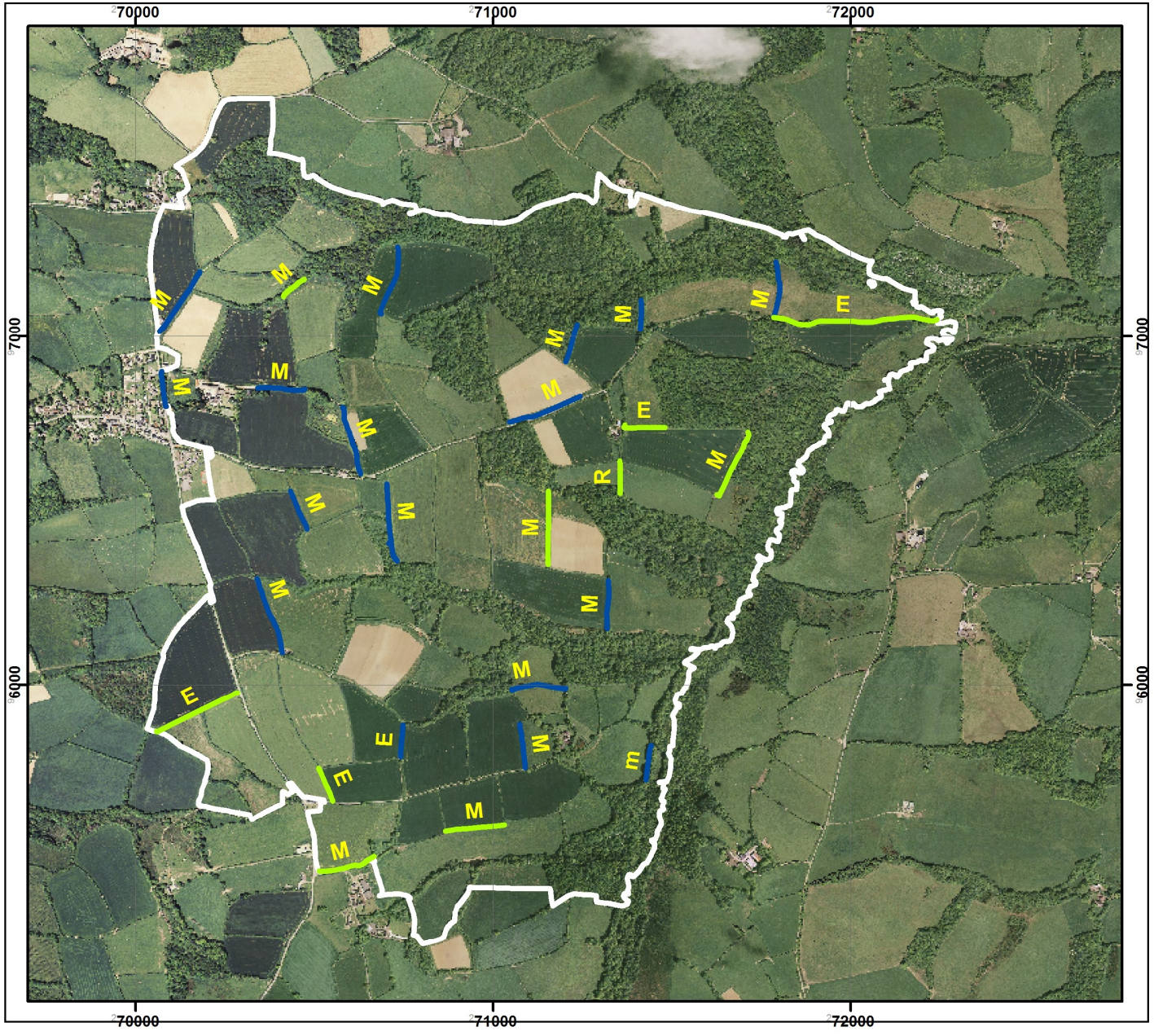
- Adjacent land use

  The surveys suggest that adjacent land use may have an impact on the condition of a hedge and the type of management to which it is subjected. Additional surveys are required as the statistics stem from relatively small sample sizes, particularly for arable and unimproved grassland.

Appendix 1: Surveyed Parishes in Devon



Appendix 2: Hedgerow Management Plan



Hedgerow Survey

Legend

Hedge Management

- M Maintain
- E Enhance
- R Restore

Surveyed Hedges

- Favourable and species-rich
- Favourable
- Fails on 1 CA
- Fails on 2 CA
- Fails on 3 CA

Farming & Wildlife Advisory Group FWAG

NATURAL ENGLAND

NextPerspectives™

Author: Craig Hodgson	Date: 01.12.2009
Map Reference: Devon Hedge Project	
0 50 100 200 Meters	Scale: 1:15,000

Devon FWAG
Agriculture House
Pynes Hill
Rydon Lane
Exeter
EX2 5ST

N W E S

Species Rich Hedges

defra
Department for Environment Food and Rural Affairs

SIGNIFICANCE - It is estimated that 450,000 km of hedgerows remain in the UK at present of which 53,000 km are located in Devon including 20% of all species rich hedges, those that contain 5 or more woody plant species per 30m length. The importance to wildlife is huge with over 600 flowering plants, 1,500 insects, 65 birds and 20 mammals being associated as living or feeding within hedgerows.

SUGGESTED MANAGEMENT

MAINTAIN AS IS - The hedge is of a comparatively good standard and is not an immediate priority for restoration or replanting. Trimming should ideally be done on a 2 or 3 year rotation as this will retain the hedges structure and provide a suitable wildlife habitat. Establishing a diversity of hedge shapes and sizes across the farm can provide the ideal habitat for a wide range of plant and animal species.

ENHANCE - The hedge currently offers little benefit to the surrounding wildlife, raising the flail each year to a height greater then 1.5m can increase fruit production and provide a valuable nesting location for farmland birds. It may be worth considering not flailing hedges in awkward corners or on steep banks and allowing them to establish into larger shrubby hedges.

RESTORE - Hedges within this category may require a number of management techniques to bring them back to a standard where they offer value to wildlife and provide an adequate barrier against stock. Any gaps greater than 5 m should be replanted with a local species such as Hazel and Blackthorn. Tall outgrown hedges with gaps at the base may need to be laid or coppiced to reinvigorate growth, this also gives the opportunity to carryout bank restoration using the local style.

Hedges marked in Blue have been identified as being both species rich and in 'favourable condition' using Defra's standard scoring method, this makes them particularly important and sympathetic management should be used wherever possible.

Hedges appear frequently in local biodiversity action plans throughout Devon and can attract funding under ELS/OELS applications and restoration payments under the HLS scheme. Please get in contact with FWAG for further details.

'Dedicated to providing environmental and wildlife conservation advice to farmers and landowners'

www.fwag.org.uk Email: info@fwag.org.uk

FWAG Farming & Wildlife Advisory Group

Appendix 3: Survey Form

Field Survey Form

Parish							
Date	/ /	Hedgerow No					
Surveyor(s):		Side Surveyed - Both Y/N		30m section Y/N			

1 - NAME OF LANDOWNER	
1a - Permission granted to enter details onto database YES/NO	
1b - Permission granted to publish ownership information (if relevant) YES/NO	

2 - SURVEY TIMES AND WEATHER/OTHER CONDITIONS THAT MAY AFFECT THE SURVEY			
2a – Start time:	2b - Finish time:	2c - Weather:	
2d - Were there any difficulties in surveying the hedgerows? If so please describe.		Y/N	
Difficulty(ies):			

3 - HEDGEROW TYPE					
3a - Shrubby hedgerow		3b - Line of trees		3c - Shrubby with line of trees	

4 - LENGTH (m) - between nodes or intersections with other hedgerows, to nearest 5m	

5 - CONNECTIONS - total number of other hedgerows connected to each end of the hedgerow	End 1	End 2	Total

7 - ADJACENT LAND USE							
		Side A	Side B			Side A	Side B
7a - Arable	Arable crop			7e - Road/Route	Major Road		
	Uncropped margin				Minor Road		
7b - Grass	Improved				Track (unsurfaced)		
	Semi-improved				Footpath		
	Unimproved				Rail		
7c - Woodland	Young				Canal		
	Semi-mature			7f - Water	River		
	Mature				Stream		
7d - Other					Lake/pond		

8 - ASSOCIATED FEATURES – See also Part B section 18				
	Side A	Side B		
8a - Bank - Height (in metres) to nearest 25cm			8f - Ditch - internal - Dry (tick)	
8b - Average herb vegetation height (cm) to nearest 5cm			8g - Ditch - internal - Wet (tick)	
8c - Fence (tick)				
8d - Ditch - external - Dry (tick)				
8e - Ditch - external - Wet (tick)				

9 - UNDISTURBED GROUND (measured from the centreline of the hedgerow)	Side A	Side B
9a - Average width of undisturbed ground (m) to nearest 50cm*		
9b - Average width of perennial herbaceous vegetation (m) to nearest 50cm*		
NB * mark N/A or road etc if a road or built feature or hedge is adjacent to grassland or woodland		

10 – NUTRIENT ENRICHMENT GROUND FLORA INDICATOR SPECIES								
Estimate % cover of each species within a 2m wide band alongside the hedgerow (to nearest 5%)								
	Side A	Side B		Side A	Side B		Side A	Side B
10a – Nettles			10b - Cleavers			10c - Docks		

11 - INTRODUCED, NON-NATIVE SPECIES	% A	% B		% A	% B
Ground elder			Japanese Knotweed		
Giant hogweed			Russian vine		
Indian balsam					
Giant knotweed					

11b - I, NON-NATIVE WOODY SPECIES	% A	% B		% A	% B
Butterfly bush			Norway maple		
Cherry laurel			Rhododendron		
Red osier dogwood			Garden Privet		
White dogwood					
Fuchsia					

12 - HEDGEROW SHAPE – See also Part B section 19a			
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 (facing view)	g) Recently laid (facing view)	h) Other - Sketch

13 - DIMENSIONS			
13a - Average Height (m) Excluding bank, to nearest 25cm		13b - Average Width (m) At the widest point of canopy; excluding bank, to nearest 25cm	

14 - INTEGRITY - Continuity and height of canopy along hedgerow			
14a - % GAPS - percentage gaps, to nearest 5%			
14b - Any gaps >5m? (Y/N)		14c - Average height of base of canopy (m) to nearest 25cm	

15 - ISOLATED HEDGEROW TREES – See also Part B section 21			
Use one row per specimen or one row and a number if there are many individuals of the same species in the same size class. Estimate DBH to nearest 5cm or nearest 1cm if DBH less than 5cm.			
Species	DBH (cm)	Species	DBH (cm)

16 – NOTES – Whole hedgerow or 30m survey section
16a - Fauna (evidence of)
16b - Features (including evidence of recent planting)
16c - Photograph numbers (and locate on map)

17 - WOODY SPECIES IN 30m SURVEY SECTION ONLY – Add any others, including non-natives.					
Species	Shrubs % cover	Trees No.	Species	Shrubs % cover	Trees No.
Alder, common (*Alnus glutinosa*)			Pine, Scots (*Pinus* sylvestris)		
Apple, crab (*Malus sylvestris*)			Plum, wild (*Prunus domestica*)		
Ash (*Fraxinus excelsior*)			Poplar, black (*Populus nigra betulifolia*)		
Aspen (*Populus tremula*)			Privet, wild (*Ligustrum vulgare*)		
Beech (*Fagus sylvatica*)			Rose, dog- (*Rosa canina*)		
Birch, downy (*Betula pubescens*)			Rose, field- (*Rosa arvensis*)		
Birch, silver (*Betula pendula*)			Rose (*Rosa* sp.)		
Blackthorn (*Prunus spinosa*)			Rowan (*Sorbus aucuparia*)		
Broom (*Cytisus scoparius*)			Spindle (*Euonymus europaeus*)		
Buckthorn (*Rhamnus cathartica*)			Sycamore (*Acer pseudoplatanus*)		
Cherry, wild (*Prunus avium*)			Wayfaring-tree (*Viburnum lantana*)		
Dogwood (*Cornus sanguinea*)			Willow, grey (*Salix cinerea*)		
Elder (*Sambucus nigra*)			Willow, goat (*Salix caprea*)		
Elm, English (*Ulmus procera*)					
Elm, wych (*Ulmus glabra*)					
Elm, (*Ulmus* sp.)					
Gorse (*Ulex europaeus*)					
Gorse, western (*Ulex gallii*)					
Guelder rose (*Viburnum opulus*)					
Hawthorn (*Crataegus* sp.)					
Hazel (*Corylus avellana*)					
Holly (*Ilex aquifolium*)					
Hornbeam (*Carpinus betulus*)					
Lime, large-leaved (*Tilia platyphyllos*)					
Lime, small-leaved (*Tilia cordata*)			Bramble		
Maple, field (*Acer campestre*)			Honeysuckle (*Lonicera periclymenum*)		
Oak, pedunculate (*Quercus robur*)			Ivy (*Hedera helix*)		
Oak, sessile (*Quercus petraea*)			Traveller's-joy (*Clematis vitalba*)		
Pear (*Pyrus communis* sensu lato)			% Gaps/access openings		

PART B - OPTIONAL ASSESSMENTS

18 - ASSOCIATED FEATURES						
18a – Banks						
Typical cross section of hedgerow-banks where present (please circle one)			Bank type and management			
				Side A	Side B	
			Stone			
			Earth			
			Condition			
			Reason			
a) Half-bank	b) Full hedge-bank	c) Other (sketch)				

Fence	Side A	Side B*		Side A	Side B*
Height (m), to nearest 25cm			Distance from centre hedge m		
Condition (Good/Bad)					
Type	Side A	Side B*	Other fence - state		
Post & rail					
Post & netting					

19 - HEDGEROW/MARGIN MANAGEMENT						
19a - Hedgerow Management	Flailed/ trimmed	Coppiced	Laid	Planting/ Gapping	Pollarding trees	None
Signs of Recent Management <2 years						
Signs of Management 2-10 years						
Signs of older Management >10 years						

19b - Hedge-bottom Management	Mowing/cutting	Herbicides	Cultivation	Grazing	None
Signs of Recent Management <2 years					
Signs of Management 2-10 years					

20 – QUANTITY OF GROUND FLORA SPECIES ACROSS 30M SECTION											
Low			Moderate			High			Bare ground		%
Species	Q1	Q2	Q3	Species	Q1	Q2	Q3	Species	Q1	Q2	Q3
Primrose				Greater Stitch W				Garlic must			
Bluebell				Lords + ladies				Wood anemone			
Dogs Mercury				Crp cinquefoil				Cow parsley			
Hedge Wound				Ivy Leaved SpW				Common Knap			
Fox Glove				Violet				Hedge bedst			
Red Campion				Yarrow				Herb Robert			

22 – MANAGEMENT ADVICE												
Maintain			Enhance			Restore						
ESA		CSS		ELS		HLS		Other		Hedge opt		

23 - NOTES