



# **The Condition Of Traditional Orchards in The West Weald Landscape Area**

**By**

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**November 2011**



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**Key words:** Traditional Orchards, Habitat Action Plan, West Weald Landscape Project

## Summary

This report describes the condition of traditional orchards across the West Weald Landscape area based on survey work carried out in 2010 and 2011. It highlights important features of orchards for biodiversity and provides a basis for targeted landowner advisory visits by the WWLP.

PTES Orchards Project had identified a potential 109 orchards in the West Weald Landscape area through a desk-based study of aerial photographs. Volunteer surveyors for the West Weald Landscape Project (WWLP) then ground-truthed a total of 76 of the 109 orchards. As part of the surveys, a number of features were recorded including species of fruit trees, numbers of trees, current management and features important for biodiversity such as standing and fallen dead wood. Analysis of the results revealed that of the 76 orchards, 10 were no longer in existence, 4 were classed as in Excellent condition, 32 as Good and 31 as Poor. There was no evidence of the rare Noble Chafer beetle and only 3 orchards appeared to provide suitable conditions for it.

## Introduction

### Traditional Orchards

Since the Roman occupation, fruit and vine species have been grown across the UK and orchards became a part of our British landscape and heritage. They are particularly concentrated in areas such as Cambridgeshire, Kent, Somerset, Worcestershire and Gloucestershire. These orchards consist of some rare English fruit varieties and many have been managed over centuries through old traditions, customs and valuable knowledge (Burrough *et al.*, 2011).

The PTES definition of a traditional orchard is ‘at least five fruit or nut trees with crown edges less than 20m apart’ (PTES, 2010). They can be described as mosaic habitats made up of other tree species, meadow, scrub and deadwood and are usually associated with other habitats such as hedgerows, hedgerow trees, walls, woodlands edges, streams and ponds. On a larger landscape scale they are a part of wider habitat networks including ancient woodlands and hedgerows (Lush *et al.*, 2009).

In the late twentieth century, with EU funding, many orchards were grubbed up to make way for more profitable crops or simply for development. Many other traditional orchards have been lost through neglect. On the other side has been the development of intensive production orcharding, often associated with managed monocultures of bush-styled trees, grown at a high density over sterile and chemically-treated ground. These modern methods have had a drastic impact on the wildlife of traditional orchards (Burrough *et al.*, 2011).

## Orchard Biodiversity and management

Traditional orchards are host to a range of rare and threatened species. They can be described as hotspots for biodiversity, in particular for fungi, epiphytic lichens and bryophytes, wildflowers and saproxylic (deadwood) invertebrates (Lush *et al.*, 2009). Species of conservation interest associated with orchards include the Noble Chafer, *Gnorimus nobilis*, the Mistletoe Marble Moth, *Celypha woodiana*, Waxcap fungi and the Orchard Tooth Fungus, *Sarcodontia crocea* (Burrough *et al.*, 2011).

Standing and fallen deadwood provides a wide range of niches for many rare and scarce saproxylic invertebrates, for example, the rare Noble Chafer beetle which benefits from the decaying wood in the hollows of mature and veteran fruit trees (Lush *et al.*, 2009). It has been demonstrated that orchards are a refuge for such 'old-growth' invertebrates. Dense stands of fruit trees were historically allowed to grow old as productivity increased with age and large trunks were left to hollow out. It is likely that some saproxylic invertebrates are present in traditional orchards whilst absent from ancient woodland (Alexander & Bower, 2011). Traditionally managed orchards containing well-spaced apple trees are also the preferred habitat of the UK's only species of mistletoe *Viscum album*. There are six Mistletoe-obligate invertebrates in Britain, along with several bird species which rely on the plant for its winter crop of berries. The Mistletoe Marble Moth is a UK BAP Priority Species which depends entirely on mistletoe for its life cycle. (Briggs, 2011).

Unimproved lowland meadows, as UK Biodiversity Action Plan habitats, are an important part of the orchard habitat mosaic (Lush *et al.*, 2009). Management by grazing and cutting for hay can provide a varied habitat for grasses, meadow flowers, bryophytes, fungi and scrub species. Using chemical inputs has been proven to reduce the diversity of the grass sward resulting in domination by a few common species. Conversely, a lack of management will result in the development of rank vegetation such as shrubs and young woodland, leading to the orchard scrubbing over. The density of fruit trees, their root systems, the shading effect of the canopy and quantities of fallen fruit all influence the grassland (Barker *et al.*, 2011).

Orchards are dynamic habitats with environmental conditions constantly changing through succession and dependent on management for their continued existence. A prime traditional orchard is made up of trees of varying ages, with standing and fallen deadwood, and grazed grassland. It is generally managed in a low-intensity way. Best management includes careful pruning of trees and little or no use of chemicals. Demographic variation within orchards is important for their perpetuation and renewal: where old trees die or are removed, new ones need to be planted. Mature and veteran trees of around 80 years old are important features of these traditional orchards, often containing old hollows, split bark and dead wood whether standing, in the canopy, or on the ground (Burrough *et al.*, 2011).

The removal of old trees, the pruning of deadwood and the lack of renewal or replacement planting, are problems for much orchard wildlife. Continued careful management of traditional orchards is essential for their long term viability and low intensity management is the most beneficial for wildlife (Barker *et al.*, 2011).



**Fig 1: Bark crevices**



**Fig 2: Trunk cavity**

### **The UK Biodiversity Action Plan (UK BAP)**

The UK BAP lists habitats and species of conservation priority, providing either Habitat Action Plans (HAP) or Species Action Plans (SAP) respectively (Barker *et al.*, 2011). The UK BAP was last reviewed in 2007 and, due to their nationwide decline, 60% in the last 50 years, and the key species they support, now includes Traditional Orchards (Lush *et al.*, 2009). Thus traditional orchards are now a conservation priority.

The Traditional Orchard HAP is jointly led by Natural England and the National Trust and together they lead the Orchard Network which has three primary aims:

1. Ensure there is no net loss of Traditional Orchards across the UK.
2. Improve Traditional Orchards to a favourable condition.
3. Increase the extent of Traditional Orchards across the UK.

(Barker *et al.*, 2011).

### **Aims**

A primary objective for all BAP habitats is to assess and monitor their condition. To this end, The People's Trust for Endangered Species (PTES) in conjunction with Natural England and with further support from the Esmée Fairbairn Foundation, have conducted a desktop study of maps and aerial photographs to identify traditional orchards nationwide and create a national inventory of orchards (Burrough *et al.*, 2011).

The West Weald Landscape Partnership (WWLP) runs a detailed programme of ecological studies to create an environmental information base which informs a programme of effective conservation measures in the area. A key objective of the project is to carry out diverse field surveys of important habitats, species and linkages in the landscape, creating a baseline from which we can monitor changes.

In 2010 the WWLP began working with the PTES with the following aims:

- Identify and assess the current condition of traditional orchards in the project area.
- Provide a landscape-scale baseline of data on traditional orchards for targeted landowner advisory visits by the WWLP.
- Increase landowner awareness of wildlife-friendly orchard management techniques.
- Identify sites for further survey priority.

## Methods

As part of the PTES Orchard Project, a desktop study was carried out to identify the traditional orchards throughout England on a county basis by aerial photographs and mapped boundaries. A Geographical Information Systems (GIS) layer was then compiled of all probable and possible orchards and confidence levels were assigned. West Weald Landscape Project area orchard locations are shown in Appendix 1. The orchards were then allocated on a post-code basis to volunteer surveyors for ground-truthing.

Surveys were planned for 2010 and 2011 field seasons. A training day was run by West Sussex County Council for volunteers in West Sussex to inform them about the Orchards Project, train them in the survey methodology, and allocate orchards for ground-truthing. The volunteers were asked to verify in the field the presence or absence of traditional orchards, collect other additional survey data, for example, on current management, and engage with the orchard owners when possible. Survey packs were provided with information sheets to help determine orchard type, species of fruit tree, suitability for the Noble Chafer and so on.

The survey consisted of two-parts: a preliminary (road-side) survey and an on-site survey. The purpose of the preliminary survey was to establish whether the orchard actually was present and its general condition based on observations which could be recorded from a distance, for example, orchard type (traditional or intensive), numbers of trees, age structure, fruit tree species, site management evidence and any adjacent habitats. The on-site part of the survey was to assess further the orchard condition, noting in particular any veteran tree features, signs of the Noble Chafer beetle and other significant associated species or habitats.

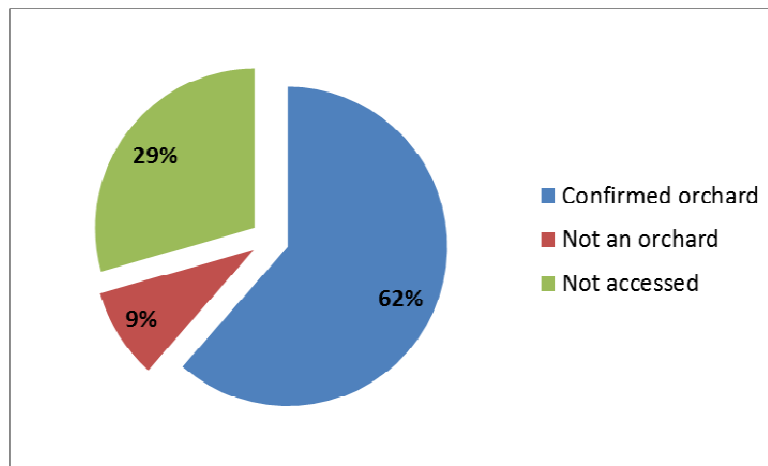
Engaging landowners is an important part of the West Weald Landscape Project, and an orchard owner's questionnaire was provided to gather further details about each orchard. This helped to clarify the history of sites, their current use and past management. Additional information was provided to landowners on sympathetic management of traditional orchards with contact information for orchard advice and support groups.

Survey data was sent to PTES for uploading. Each traditional orchard was graded Excellent, Good or Poor according to the PTES Traditional Orchard condition assessment criteria (Appendix 2). These criteria are unique to the Traditional Orchard HAP condition and based around the preliminary survey data including key management features, the absence/presence of dead wood and evidence of replacement planting.

## Results

### 1. Number of Orchards in the West Weald

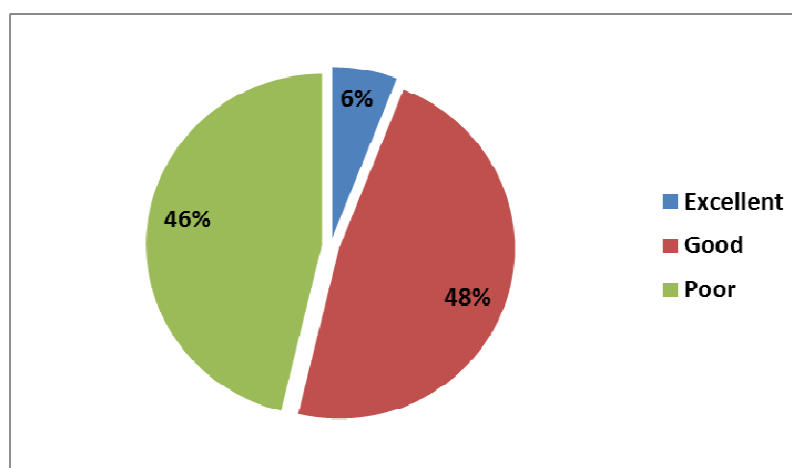
109 traditional orchards were identified from the PTES desktop study in the West Weald with two additional orchards being identified during the ground-truthing process.



**Fig 1. Ground-truthing of 109 orchards identified by aerial photographs of the West Weald.**

Of these, 67 (62%) were confirmed as being in existence and assessable for condition, 10 (9%) were confirmed as not being orchards or no longer present and 32 (29%) were either not accessible for survey or not accessed by surveyors.

### 2. Condition of West Weald Traditional Orchards



**Fig 2a. Habitat condition of Traditional Orchards in the West Weald**

Of 67 orchards assessed for condition, 4 (6%) were classed as in excellent condition, 32 (48%) as good and 31 (46%) as poor. 10 orchard owner questionnaires were returned.

The total number of traditional orchards listed by the Traditional Orchard Inventory is 656 for Surrey and 668 for West Sussex (Burrough *et al.*, 2011). 18% of the total number of traditional orchards in West Sussex were verified by volunteers.

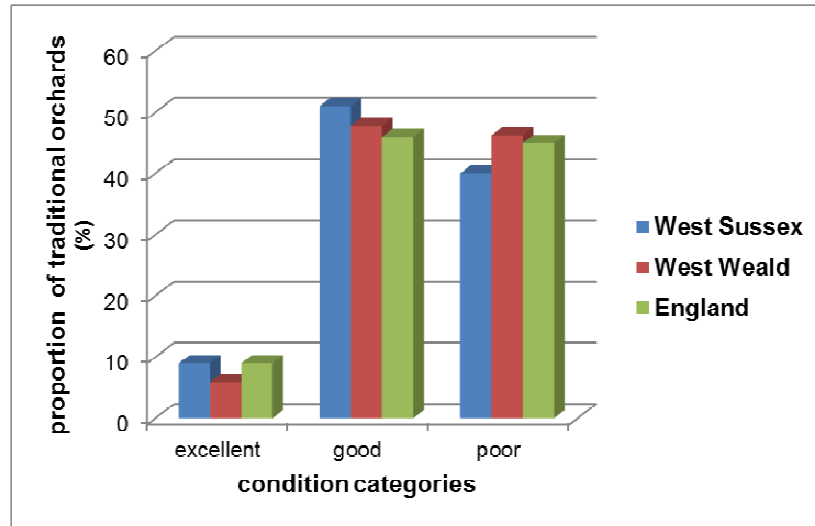


Fig 2b. Comparison of the conditions of Traditional Orchards in West Sussex, the West Weald and England overall.

The inventory report by Burrough *et al.* (2011) revealed that overall 9% of traditional orchards in the county are in excellent condition, 51% in good condition and 40% in poor condition. These results are similar to those of the West Weald.

### 3. Fruit Tree Species in West Weald Traditional Orchards

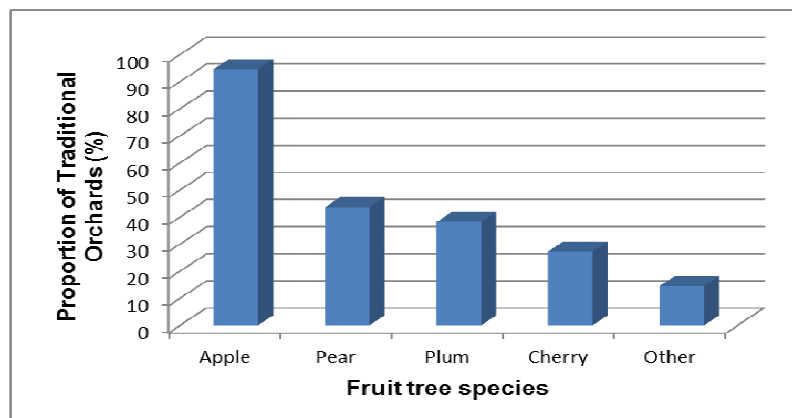
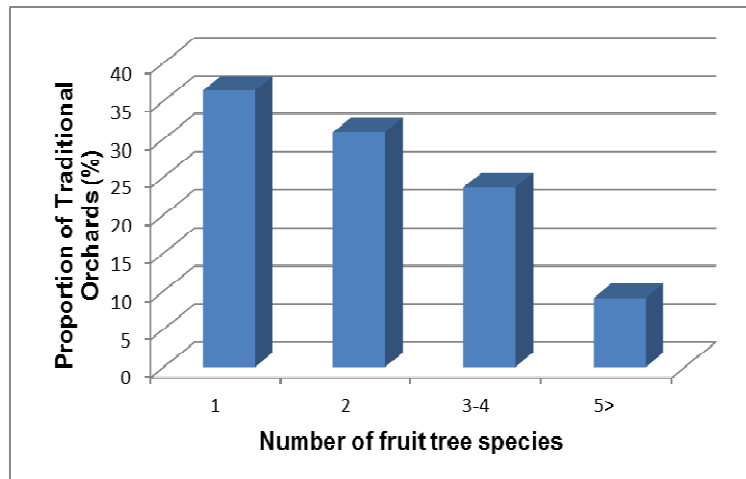


Fig 3a. Fruit tree species in traditional orchards of the West Weald.

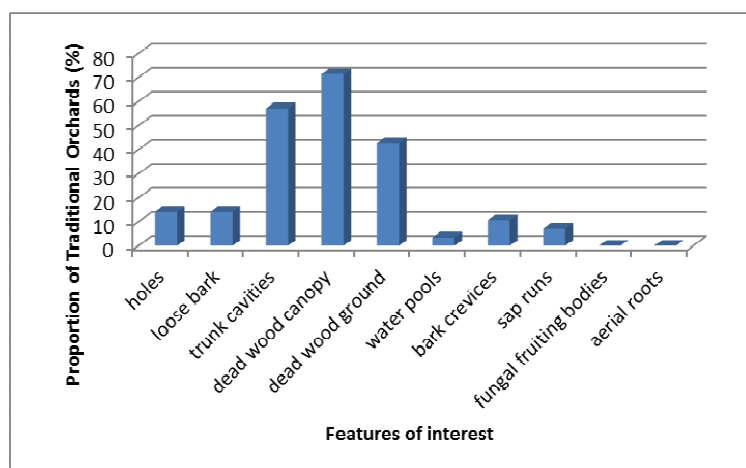
Apples were the most abundant fruit trees found across the West Weald, occurring in 52 out of the 55 orchards assessed for species composition. Pears occurred in 24, Plums in 21, Cherries in 15 and other types of fruit including damson, quince, walnut and medlar, occurred in just 8.



**Fig 3b. Fruit tree assemblages in traditional orchards of the West Weald.**

Of the 55 traditional orchards surveyed for fruit trees, 20 (36%) contained only 1 fruit tree species, 17 (31%) contained 2 species of fruit tree, 13 (24%) contained 3-4 and 5 (9%) of orchards contained more than 5 species.

#### 4. Veteran Tree Features in West Weald Traditional Orchards

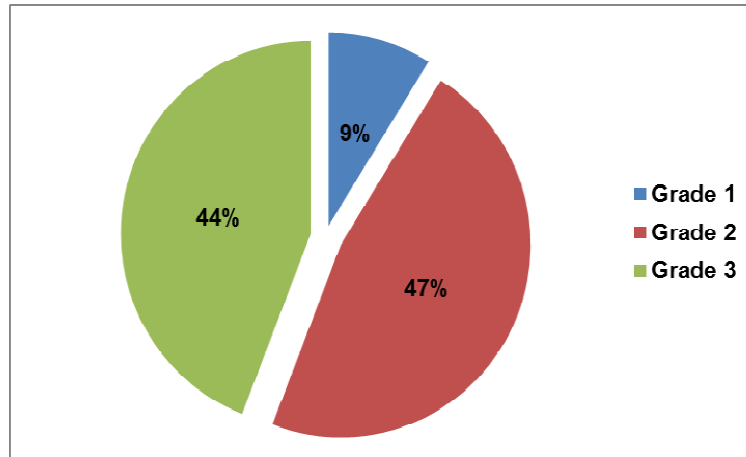


**Fig 4. In-depth survey of orchard veteran-tree features.**

28 traditional orchards were accessed onsite for a further detailed survey of old or veteran trees. Of these sites 20 (71%) had trees containing deadwood in the canopy, 12 (43%) had deadwood on the ground and 16 (57%) contained in trunk cavities. Less

than 11% of the sites contained water pools, bark crevices, loose bark, holes and sap runs. None of the sites were reported to have fungal fruiting bodies or aerial roots.

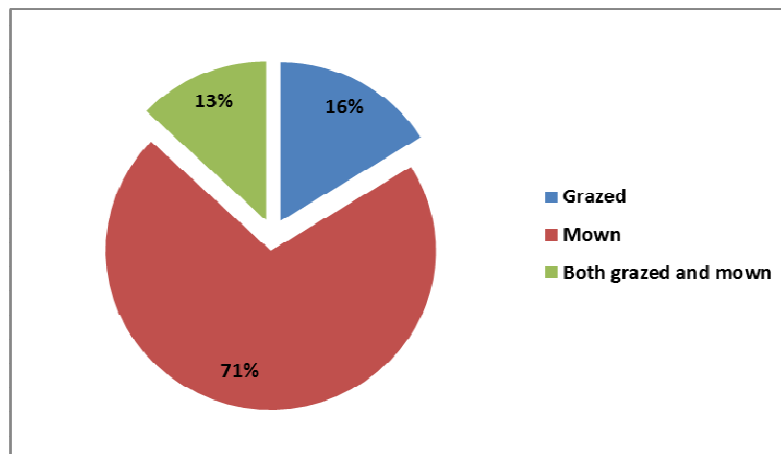
### 5. Site Suitability for Noble Chafer



**Fig 5. Noble Chafer site suitability grading:  
Grade 1 = Excellent, Grade 2 = Good, Grade 3 = Poor.**

Of 34 traditional orchards assessed for Noble Chafer suitability, 3 (9%) were classed as Excellent, 16 (47%) as Good and 15 (44%) were classed as a Poor. There was no evidence of Noble Chafer at these sites as might be expected from the national statistics of this elusive beetle.

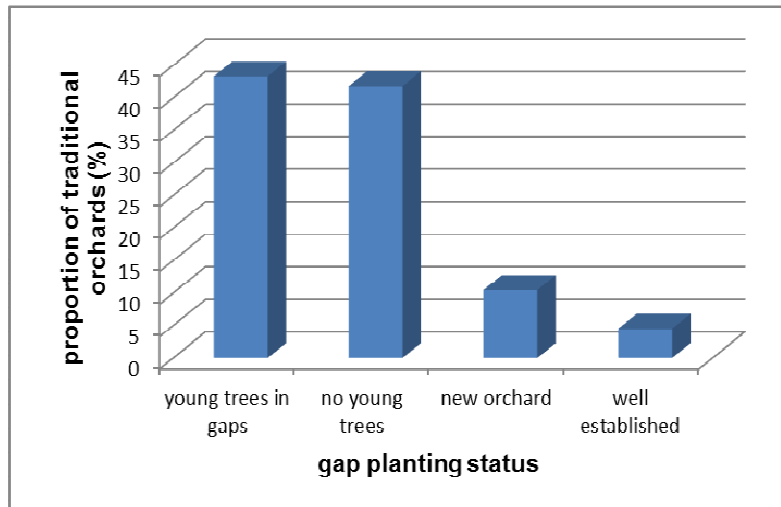
### 6. Orchard Management



**Fig 6a: Evidence of orchard management techniques**

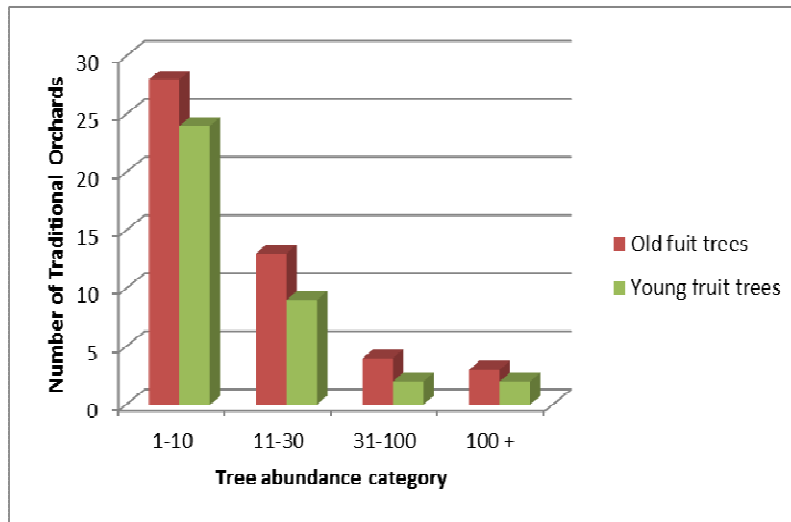
Of 62 orchards assessed on site, 44 (71%) showed signs of being mown, 10 (16%) were grazed and 8 (13%) had signs of both. Of those which were grazed, 5 were grazed by sheep, 5 by poultry and 1 by horses. Also, 2 orchards showed some

livestock damage and another was reported to have evidence of herbicide use under the trees.



**Fig 6b: Replacement Planting**

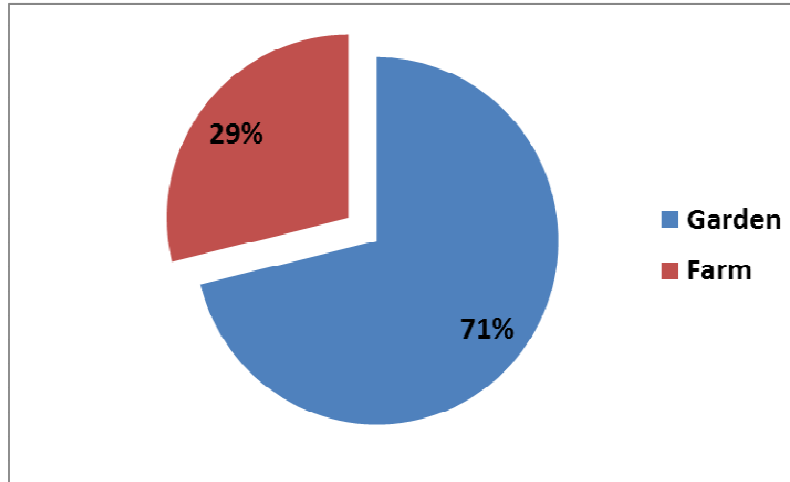
Of 67 traditional orchards, 29 (43%) orchards had signs of recent planting up of gaps and 28 (41%) had gaps with no young trees. Of the remainder, 7 (10%) orchards were newly planted and 3 (4%) were uniformly established with no evidence of recent gaps.



**Fig 6c: Fruit tree abundances and age-structure.**

Most of the 58 traditional orchards assessed for tree age structure contained a mix of both young and old trees. 28 orchards contained up to 10 young trees and 24 consisted of up to 10 old trees. 13 orchards contained between 11 and 30 old trees and 9 contained 11 to 30 young trees. 4 orchards contained between 31 and 100 old trees and 2 contained 31 to 100 young trees. Only 3 orchards had more than 100 old trees and 2 more than 100 young trees. 26 orchards contained both old and young trees. Overall, more orchards contained old trees than young.

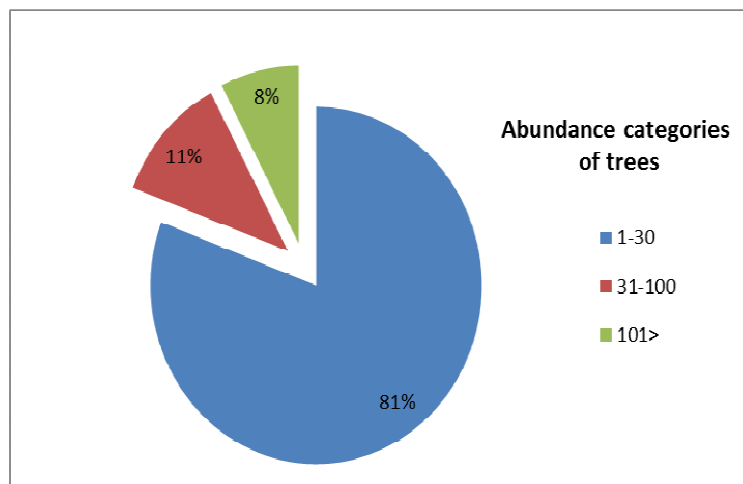
## 7. Locations of West Weald Traditional Orchards



**Fig 7: Locations of traditional orchards.**

Of the 66 traditional orchards, 47 (71%) were classed as garden orchards and 19 (29%) as farm/commercial orchards.

## 8. Size of Orchards



**Fig 8. Size of traditional orchards**

42 out of 52 traditional orchards were only small-scale plantations containing fewer than 30 trees. 6 orchards contained 31 to 100 trees. Only 4 of the orchards surveyed could be classed as large commercial-scale orchards with over 100 trees.

## Discussion and Conclusions

The results show that, of 67 orchards assessed in the West Weald Landscape area, only 4 (6%) were classed as in Excellent condition, with about half (32 or 48%) as Good and 31 (46%) as Poor. As a whole, the overall trend for orchard condition in the West Weald is similar to that for both West Sussex and England though slightly fewer are classed as excellent and slightly more as poor. These results suggest that there is considerable scope for improvement in orchard condition and much work to be done in the context of targeted landowner advice and support.

Almost all of the traditional orchards contained apple trees and most had no more than 1 or 2 species of fruit tree. This may be due to the locality, Kirdford being noted for its abundance of traditional apple orchards.

Many sites contained some form of deadwood and trunk cavities which are beneficial to saproxylic wildlife. There were no reported fungal fruiting bodies but most orchards were given only a preliminary survey and not the more detailed on-site survey that would have revealed the fungi. Also, this may have been influenced by the time of year or abilities of the surveyor. In terms of suitability for the Noble Chafer, the sites were generally a grade 2 or 3, with only 3 out of the 34 sites being a grade 1. It is unlikely that this very rare beetle is present in any significant number in the West Weald.

A large proportion of the orchards are mown, many tightly mown, which would reduce their value as lowland meadow habitat. However on the positive side, the majority had no signs of pesticide usage. Only ten orchard owner questionnaires were completed and more would be needed to confirm this.

Nearly half of the sites had evidence of young tree planting in gaps, however many also had unplanted gaps indicating neglect and so the potential for future orchard loss. Most of the traditional orchards are small in size, located in gardens and currently for domestic use. Very few are large-scale and being used commercially. This can be interpreted in two ways. Some gardens are intensively managed, with closely trimmed lawns, and dead wood cleared away. Such intensively managed garden orchards are of less value for biodiversity. In others, less intensive management is positive for orchard biodiversity, especially where the future of the orchard is secured with replacement planting. Overall though a greater number of the sites contained more old trees than young. This again raises concerns over their future viability with old and veteran trees probably not being replaced. Again, more orchard questionnaires would be required to analyse this further.

In terms of farm orchards, there are approximately 2800 ha of England's traditional orchards across the UK being managed within Environmental Stewardship schemes. This has resulted in the widespread replanting of new trees, bringing neglected orchards back into management, improvement of habitat for wildlife, job creation and encouraged the production of locally grown fruit (Barker *et al.*, 2011).

## **Possible future work:**

- These results cannot tell us the historical use, condition, management of the traditional orchards and the extent to which they have changed. This could be approached through historical surveys or further orchard owner questionnaires.
- A key outcome of this survey has been the identification of the orchards most in need of re-planting and revised management in order to provide targeted support and advice for landowners.
- Further surveys should be carried out on sites which scored highly for Noble Chafer suitability.

## **Acknowledgements**

This survey would not have been possible without the sterling work of a dedicated team of volunteer surveyors who freely gave their own time: Graham Ault, Paul Voice, Bonnie Holloway, and Rachel Bicker, as well as Petra Billings and Rich Howorth of the West Weald Landscape Partnership, and Tom Burns, West Sussex County Council (WSCC) Low Weald Rangers.

Julie Bolton, WSCC, and Anita Burrough, PTES, ran the survey training day in June 2010.

Anita Burrough of PTES, through the Traditional Orchards Project, not only provided the methodology and led the desk-top study to locate all the potential orchards, but gave unfailing support throughout the project. She and her colleague, Steve Oram, uploaded all the data and analysed orchard condition. Steve then provided the results electronically.

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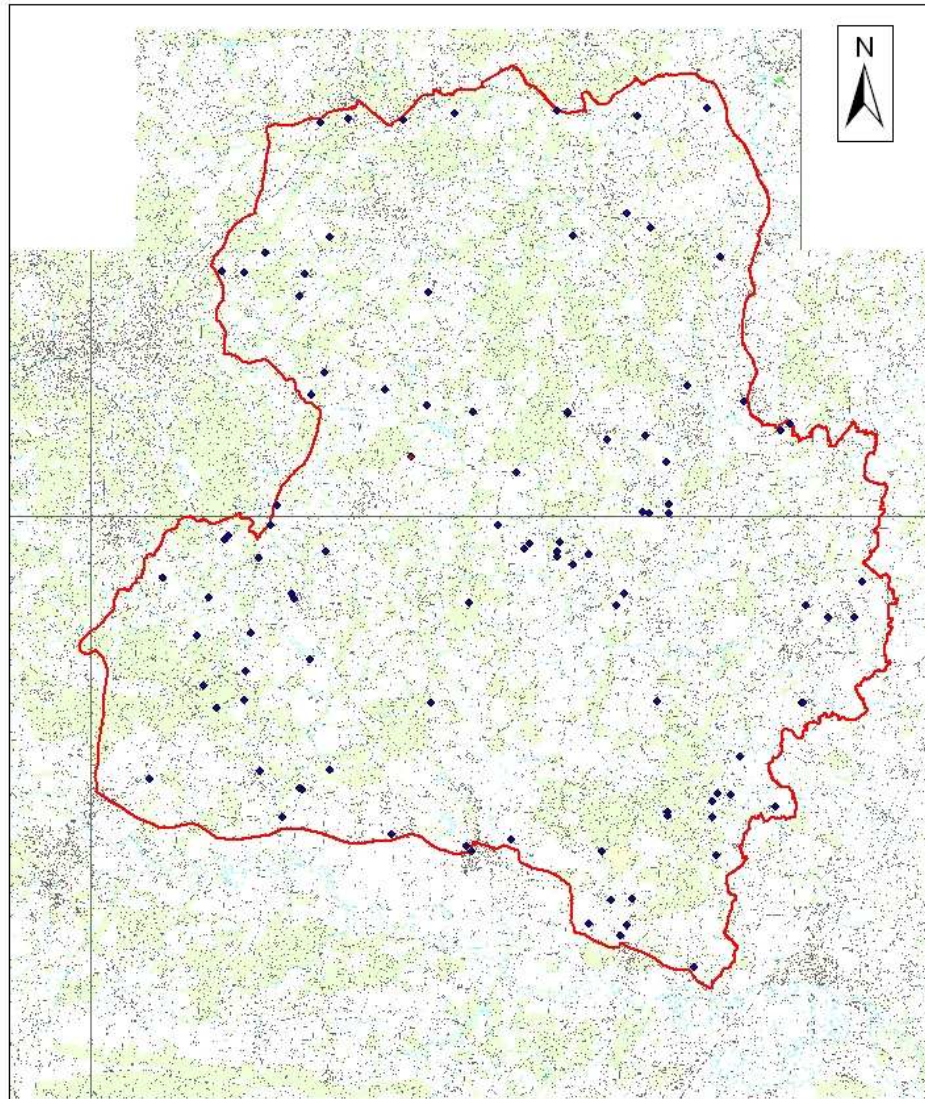
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## Appendix 1: Locations of Traditional Orchards



0 1.25 2.5 5 Kilometers

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Contact West Weald Landscape Project,  
Sussex Wildlife Trust, Woods Mill, Henfield, West Sussex BN5 9SD  
Tel: 01273 492630 westweald@sussexwt.org.uk

## Appendix 2: Orchard Condition Assessment\*

By Anita Burrough, Lucy Cordrey, Chris Wedge, Rob Williams

Excellent	Good/Fair	Poor	Destroyed
Established orchard, mostly stocked / New trees planted where gaps	<b>X</b>	x	x
Newly planted or young orchard	<b>X</b>	x	
Established / mature orchard mostly gaps/no new trees planted		<b>X</b>	
Grazed	<b>X</b>	x	x
Mown or cut	x	<b>X</b>	x
Scrubbed over		<b>X</b>	
Livestock damage to trees		<b>X</b>	
Orchard no longer present		<b>X</b>	
Standing deadwood trees and limbs	<b>X</b>	x	x
Fallen deadwood trees and limbs	<b>X</b>	x	x

X = determiner x = present or absent

### Category Descriptions/combinations

#### Excellent Orchard

An orchard with **established trees** and **mostly stocked** i.e. there is no opportunity, or it is undesirable (due to environmental factors) to plant new trees at present or where there are **new trees planted in gaps**. There will be **both** standing and fallen large diameter deadwood present. The orchard floor will predominantly be **grazed** but may be mown or cut at certain times of the year.

#### Good/Fair

An orchard with **established trees** and **mostly stocked**. If there are gaps present there maybe **little or no evidence of replanting**. There maybe be **both** standing and fallen large diameter deadwood present or just **one** of these elements evident. The orchard floor will be **grazed, mown or cut**.

This category will also include **newly planted or young orchards** as long as no livestock damage is evident.

#### Poor

An orchard that has either been neglected or abandoned or which comprises **more than 30% scrub cover**. Deadwood in either form may be **present** or totally **absent** but there will be **no evidence of new planting** and the orchard will comprise **mostly gaps**. The orchard floor may be **grazed, mown or cut** but **livestock damage to trees** will be evident.

Destroyed

An orchard that is indicated as being present on maps and aerial photographs but no longer exists when ground-truthed – no fruit trees evident on land parcel.

Note: If a survey sheet is returned indicating that only 4 or less trees remain – this is given an non-traditional orchard code (Non-TO) and will be removed from the final inventory into a “relict” database

\* Photographs giving examples of orchards in different condition have been removed.