

A National Orchard Inventory for Scotland

Area Report for: South Ayrshire

Collaborating Organisations:
Scottish Smallholders Association



Report version 1.0 dated March 2018

prepared by
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Project national partners:
Scottish Natural Heritage
Orchard Research & Enterprise CIC

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Lorna Gibson, former GIS Officer at Crispin Hayes Associates who made a first deskstudy assessment of nearly two thousand sites across Scotland.

Thanks for all your contributions

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Summary

Keywords

orchard; fruit tree; top fruit; apple; pear; plum; undercrop; EUNIS G1.D4; South Ayrshire

Background

There has been growing interest in traditional orchards in Scotland for a little over a decade. This interest has a great breadth; from cultural heritage and horticultural practice, to historic varieties and the gradual disappearance of this unusual Scottish habitat.

The National Orchard Inventory for Scotland Project aims to create a comprehensive orchard inventory for the nation. This has probably not been attempted for over a century, perhaps since the 1885 Congress. The rationale that underpins this aim is that an Orchard Inventory will form the basis for addressing a number of issues linked to the decline of orchards over the last four decades and create a strong foundation for their revival. Simply put, we need to know what's where in order to change the downward trajectory.

The project began in 2013 with a pilot study which since then has received funding support from Scottish Natural Heritage. The programme has grown since that time to add further phases so that at the time of writing more than half of Scotland's orchards have been surveyed and recorded. The national project is reported separately, and is available at the project website www.scotlandthefruit.org.uk

Main findings

A total of 52 orchard sites were surveyed, of these 32 were found to be intact orchards.

The total acreage of orchards remaining in this area was found to be 8.4 ha and the average area of each orchard was 0.58 ha.

Most of the orchards contain less than 30 trees and are in a domestic setting. No larger orchards of commercial size are recorded.

Though apple dominates, most orchards contain a diverse mixture of fruit species, reflecting their domestic use. Crab apple is unusually popular in this area.

The tree stock contains trees of all age ranges.

Veteran tree features indicate that some orchards contain high levels of biodiversity.

The majority of orchards have some or active management, and this are at a higher rate than typically found elsewhere in Scotland.

Many orchards have new plantings and younger trees, and this shows orchards renewal is occurring.

Soft fruit and also vegetables are grown in a significant minority of orchards. This is at a higher level than most of Scotland.

Most fruit is used for family and friends, some is sold commercially and some is left to waste.

Livestock is grazed in minority of orchards, these mainly being fowl and cattle.

The qualitative data demonstrates the depth of history; cultural, economic and otherwise, that this area is custodian to.

To conclude, South Ayrshire contains a moderate number of small orchards, most of which are quite actively managed and from which the fruit is used within the domestic setting. There are no commercial sized orchards which sell their fruit. There are still some historic large mature orchards, mainly in the country estate setting.

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1 INTRODUCTION

There has been growing interest in traditional orchards in Scotland for a little over a decade. This interest has a great breadth; from cultural heritage and horticultural practice, to historic varieties and the gradual disappearance of this unusual Scottish habitat.

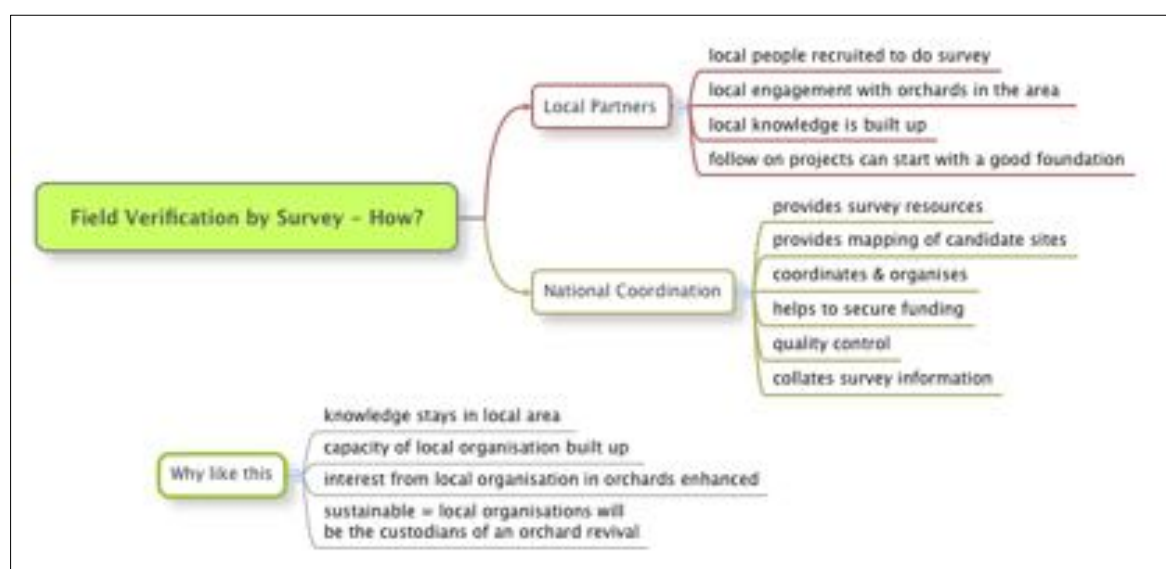
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The project began in 2013 with a pilot study which since then has received funding support from Scottish Natural Heritage. The programme has grown since that time to add further phases so that at the time of writing more than half of Scotland's orchards have been surveyed and recorded. The national project is reported separately, and is available at the project website www.scotlandthefruit.org.uk

This document is one of a series of reports that provide results for particular areas, which are usually coherent with the local authority domain. The purpose of producing these 'Area Reports' is to make results relevant to local organisations and local people. It is intended to raise awareness about their orchards and their cultural heritage, and to identify issues that may be contributing to their decline and, in some cases, revival.

2 COLLABORATION

The national project is structured to partner collaboratively with local groups. Resources, systems and coordination are provided nationally, fieldwork is organised and carried out by the local collaborating organisations.



The graphic shows what each partner brings to the field survey work. The reason why we have structured the project like this is also shown. We want knowledge to be retained locally so that capacity is built and a sense of ownership and interest in local orchards is strongly established. We think this will be the most sustainable way to create a foundation for an orchard revival.

As a project partner, the local collaborating group has a copy of the data collected in their area.

3 BACKGROUND TO THE AREA

South Ayrshire comprises Ayr and the coast south almost to Cairnryan, and stretching some way into the coastal hills.

The good land and favourable climate following the River Ayr inland meant horticulture was present though mining was the main business historically. Market gardens and nurseries including a few orchards existed here, and the local Auchincruive campus that has provided education in these skills for many decades.

One of the largest historic and most notable sites for horticulture in the late Victorian era was the Little Moss Nursery, then on the periphery of Ayr in the Ashgrove Street and St Andrews Street area. This large site was developed for housing in the early 20th Century.

Further south the coastal hills and inland valleys predominate, and this is reflected in the orchards tending to be for household rather than commercial purposes.

4 METHODOLOGY

The methodology for the project (of which this area is a subset) is described in Annex 2.

To summarise, a two stage approach is adopted.

1. A deskstudy is carried out, looking for orchard sites from mapping, historical data, existing surveys and other sources. This is collated on a Geographical Information System. Each site is given a unique number and a location map created. Nationally the deskstudy considered 1859 sites of which 1728 were considered candidates for field verification.

2. Field verification. Each candidate site was visited and surveyed by a volunteer surveyor. Photos were taken where possible. The survey results were submitted to the national project.

Finally the results are collated and reported.

The Local Facilitation for this area was provided by Lee Renouf-Miller of Scottish Smallholders Association.

Time input for field verification work is reported in Annex 2.

5 STRUCTURE OF RESULTS

The results are structured in this report in three distinct sections:

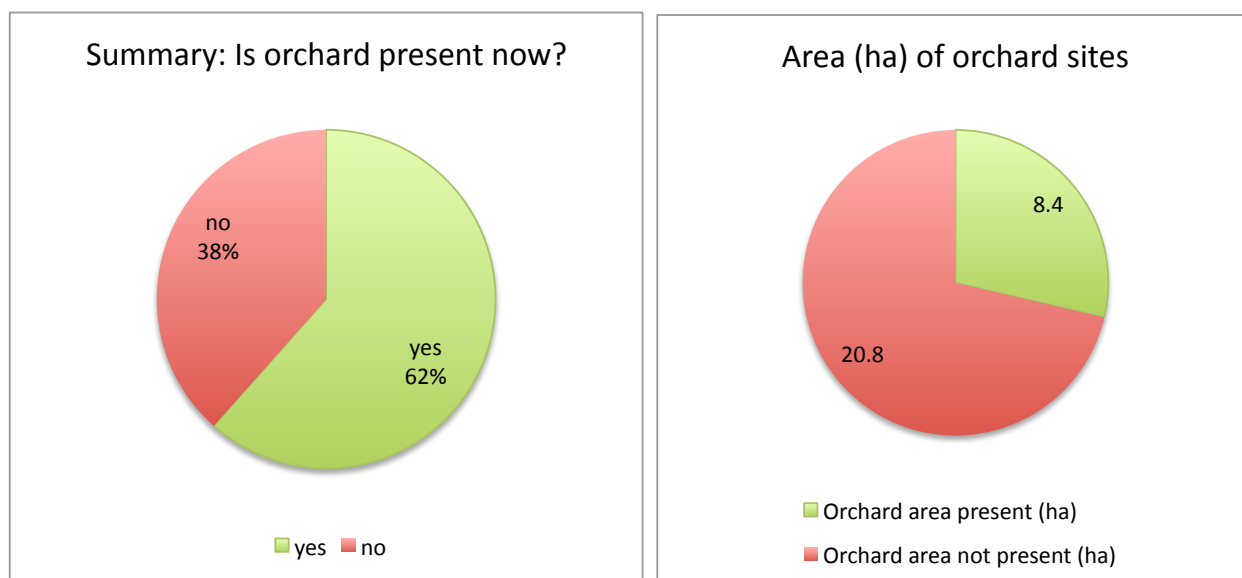
- Numeric and classification information (quantitative), together with overall conclusions.
- Anecdotal and comment information, qualitative aspects.
- Representative photo gallery. A collection of photos with descriptive captions that illustrate the orchards of the area.

Photos have been submitted for a total of 20 sites.

6 NUMERIC AND CLASSIFICATION INFORMATION

Quantitative Data Results

We have analysed the data collected and have turned it into a more presentable form by creating a graphical output. In the section below, those graphs are presented with a commentary.



The graphs above show the headline results of whether orchards were found to be present on candidate sites (left pie chart), and the total associated area (right pie chart).

Field surveywork was completed for this area for 52 candidate sites. Of that number, 32 sites were found to have an orchard present and of those 13 were new orchard sites, the balance resulting from our deskstudy. Our definition of an orchard is a collection of 5 or more fruit trees in proximity. By 'new sites' we mean sites not identified in our deskstudy - so new to us. Many, though not all, are recently planted orchards.

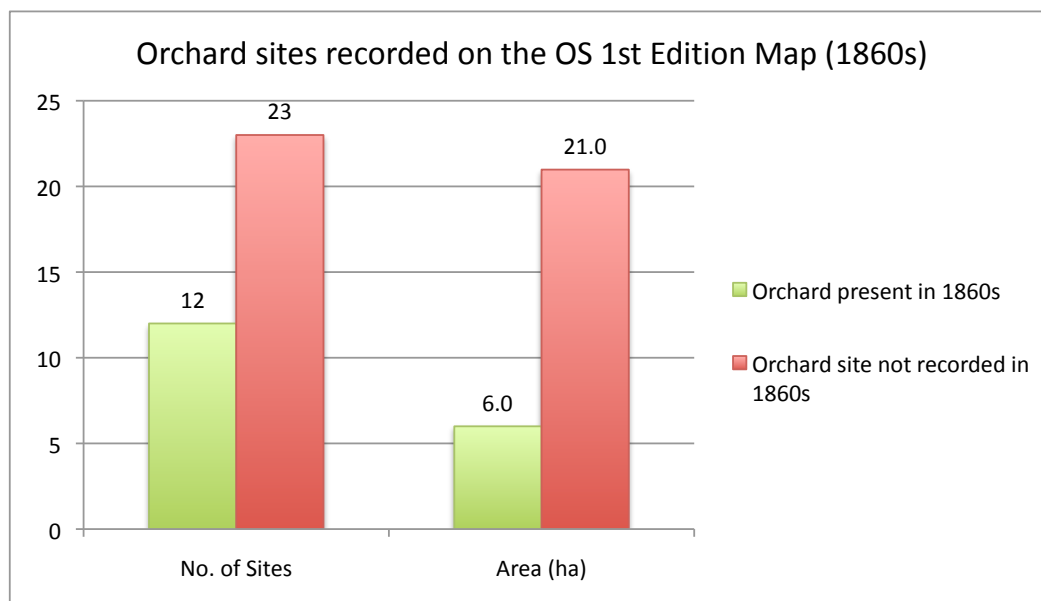
The fieldwork also found that a total of 20 sites were not orchards at the time of survey. Most of these latter sites were identified in the deskstudy as likely to be orchards from mapping, historical, or previous survey data. As such it is likely to represent some of the loss of orchards.

A further nil site(s) were visited where it was not possible to gain access or make a determination as the existence of an orchard.

In terms of the acreage of sites, the fieldwork found that 8.4 ha of the orchard sites were present in South Ayrshire. This represents 29% of the total area of deskstudy + new orchard sites. The average area of an orchard is 0.58 ha.

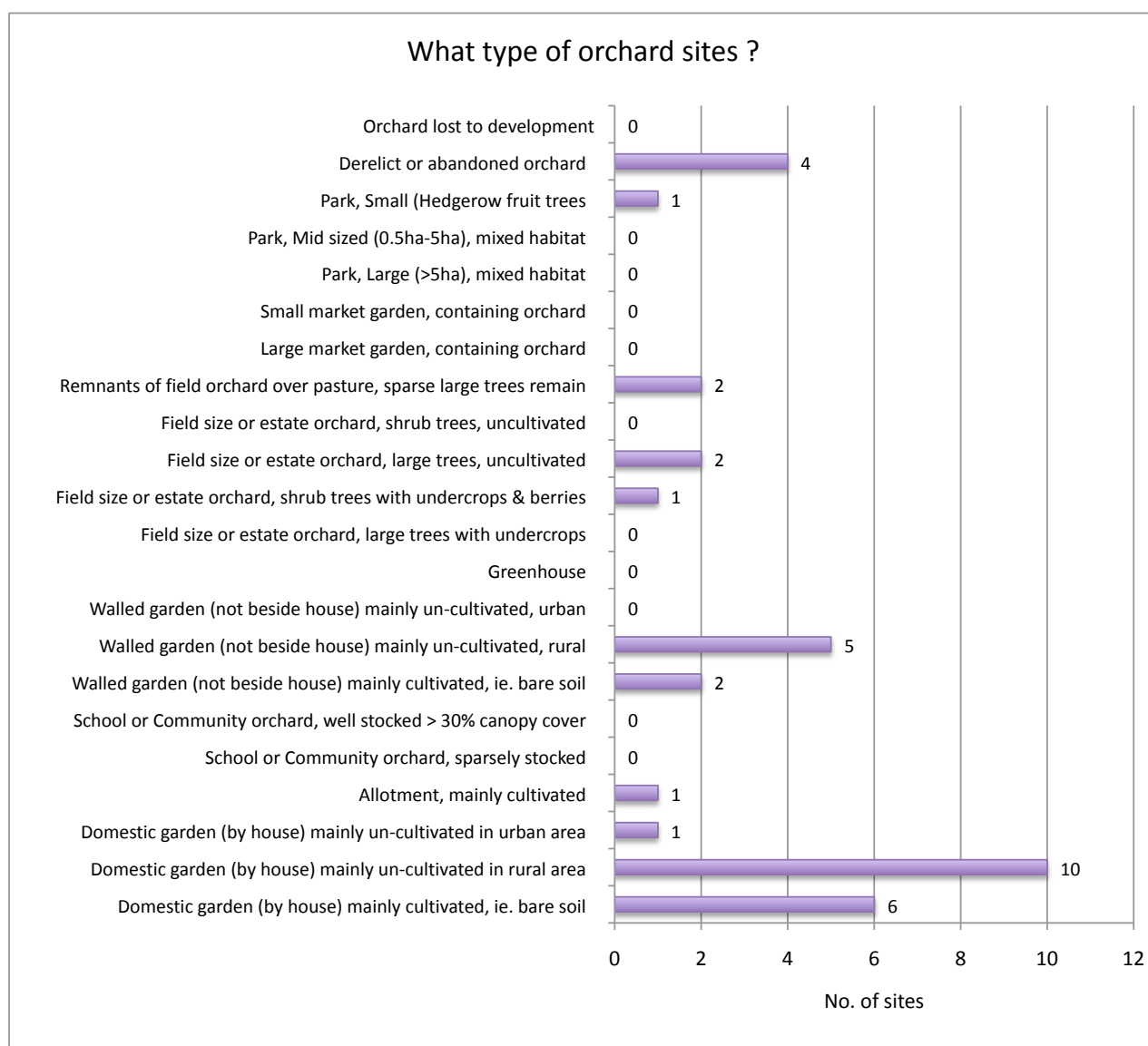
The graphs show that there has been a significant loss of orchards, both in terms of numbers and total area. The loss is significant because the area does not have a large number of mature orchards that have historical as well as high biodiversity value.

For a historical perspective on the significance of this trend we have also analysed the OS 1st edition data which was assessed for each site during the deskstudy. The OS 1st edition was surveyed in the late 1850s and early 1860s, and covered most of Scotland and was very detailed. It represents a good resource for historical analysis.



In South Ayrshire a determination for the presence of an orchard on the OS 1st Edition was made for a total of 35 candidate sites. The graph shows that of these, a total of 12 candidate sites were an orchard. The total area for these orchard sites was 6 ha in 1860s.

The graph shows that there was an increase in the number of orchard sites since the 1860s in South Ayrshire. It shows that the acreage increased substantially from that time. However this does not indicate that all these sites still exist today as the previous graph shows that only 8.4ha of orchards were recorded today, we are clearly passed the peak of orchards in this area for the timebeing.

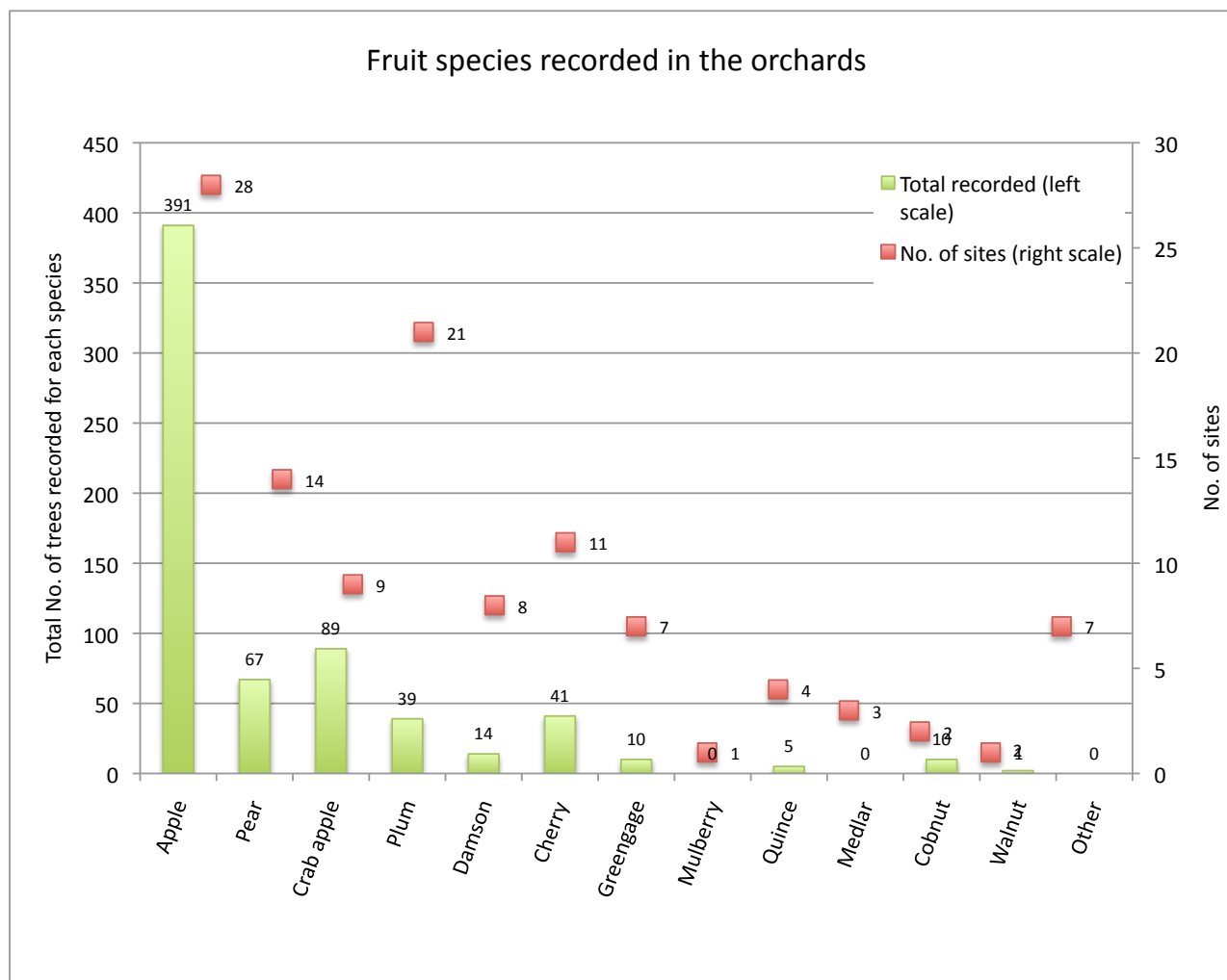


The type of site was recorded as a simple metric that can give a powerful insight into the type of orchard being considered, as well as assisting in the habitat classification using the European Nature Information System (EUNIS). Hence the apparent complexity of site types.

Domestic gardens are the main site type (17 in total) followed by walled gardens (7 in total). A few field sized orchards still exist. Four derelict or abandoned orchards were recorded.

Stewardship and Agricultural Payments

In the area being considered, it has been reported that no orchard(s) are part of a Stewardship scheme. In terms of orchard sites where an agricultural subsidy is being claimed, the survey found no orchard(s) were registered within the Integrated Administration and Control System (IACS) which relates to EU agricultural payments. This figure is probably an under-representation as there is some incentive to classify the land as other than an orchard.

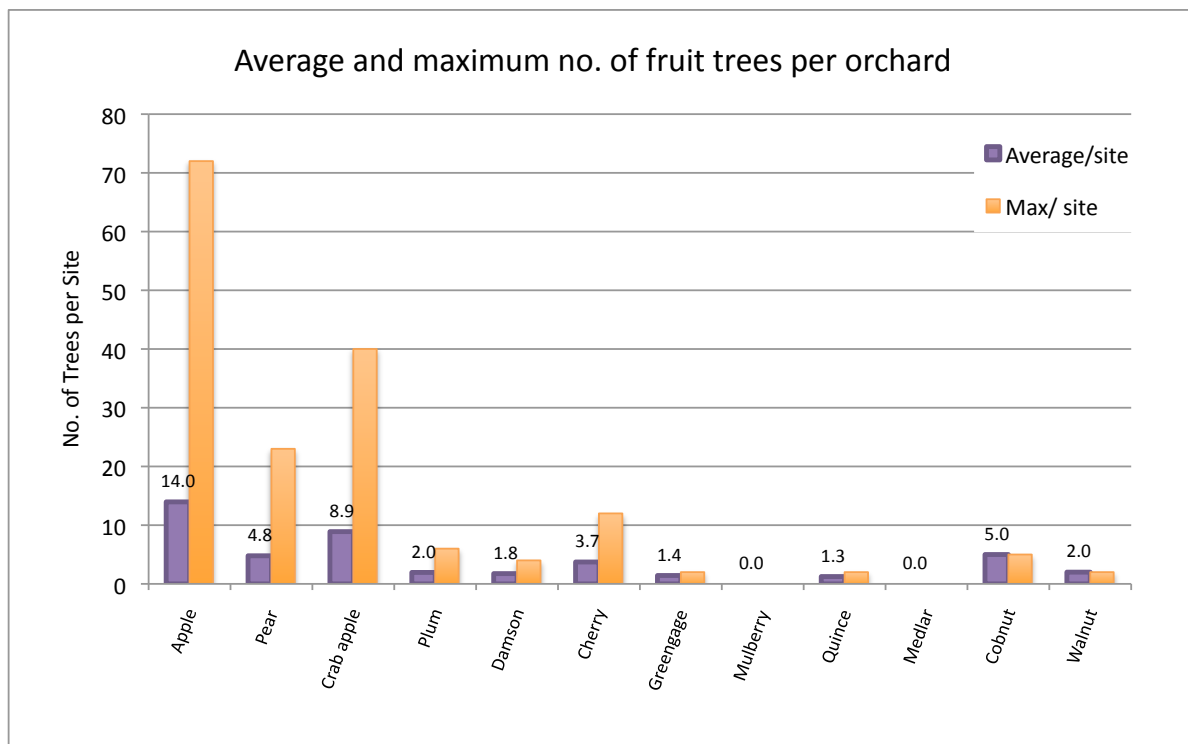


A broad range of top fruit species were recorded to gain a full picture of fruit produced. The green columns (left scale) represents the total number of trees recorded for each species in the area being considered. The red markers (right scale) represent the number of orchards in which that data was collected. In some cases it was not possible to determine numbers for individual species in an orchard, so the total number of sites surveyed is likely to be greater than the maximum number of sites recorded here.

The total number of individual trees recorded in the survey was 668. We also recorded a size range for each orchard. An estimate of the total number of trees from this size range data is 648. This demonstrates reasonable agreement, given that number of individual trees is not always recorded in every orchard.

The graph tells the story of this area. The apple dominates in the orchards recorded as part of this survey, being present in 25 of 32 orchards. Surprisingly crab apple are the second species which is not the case across much of Scotland. There a good number of pears, cherries and plums. There are a mixture of other species commonly found but only at a subsidiary level.

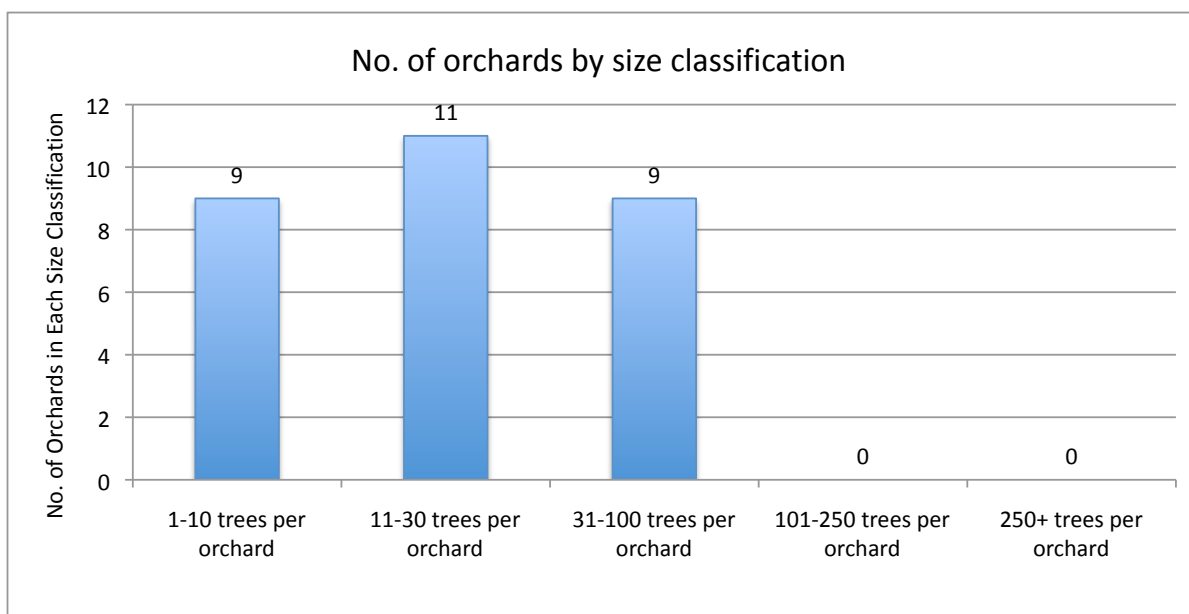
Of the more unusual species, it is interesting to see that greengage were found in 7 orchards, and 'other' in 7 orchards. This 'other' category noted peach, apricot, kiwi, nectarine, apricot, almond and even olive !



The graph above represents the average and maximum number of each species in the orchards of the area. It does not represent the typical stocking of an average orchard.

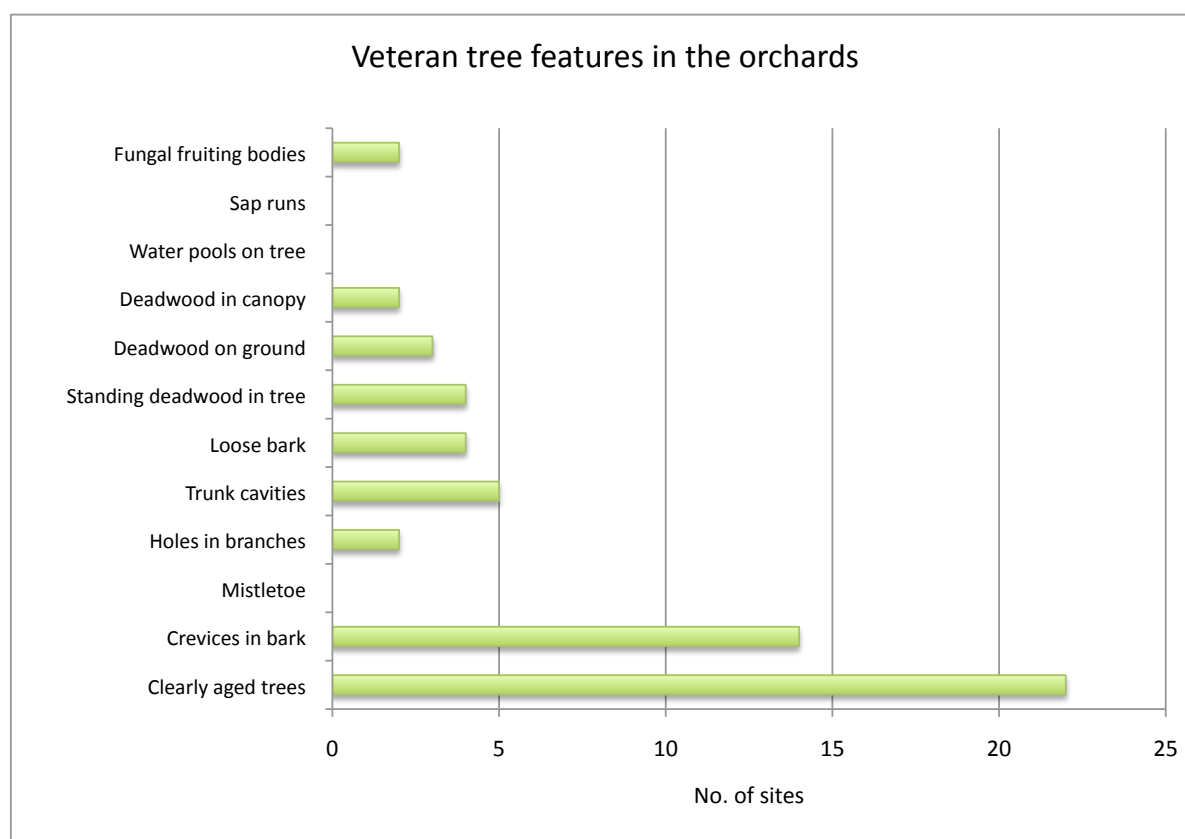
The short purple column on the graph show the average number of each species in the orchards. The taller orange columns show the maximum number of a species found in any orchard in the area.

The maximum number of trees of particular species in any site was found to be 72 for apples, 40 crabapples, and 24 pears. Average numbers of each species are typical for the rest of Scotland apart from crab apple which is better represented here.



As well as asking how many individuals of each species of tree were present, we also wanted a general sense of the size of an orchard, and therefore size range classification was recorded, as shown in the graph above.

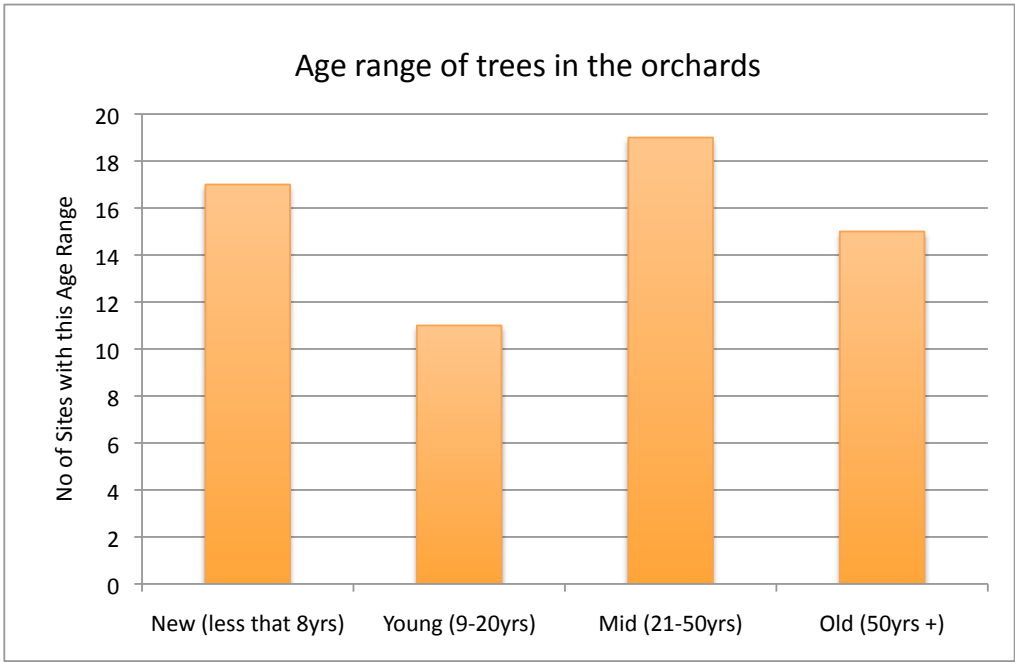
Most orchards are small having 30 trees or less, as the site type data would indicate. Nine orchards are larger, though not of a commercial size. No orchards were recorded with more than 100 trees.



Veteran tree features are used as biodiversity indicators. Therefore the more veteran tree features present, the higher the likely biodiversity in the orchards. There was a total of 58 veteran tree features recorded in the orchards in this area. This demonstrates significant biodiversity.

Its useful to assess how mature the trees in an orchard are. We consider trees over around 50 years old to be mature. Mature trees of older varieties generally are more established in terms of their steady yield. However, there is also potential for more disease. A further dimension is that orchards with mature trees have greater biodiversity potential.

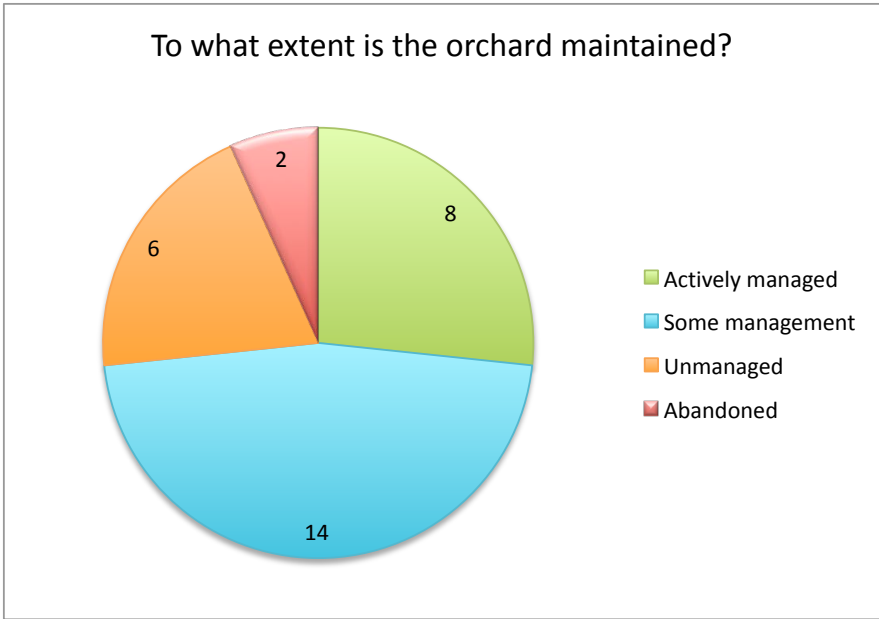
The average proportion of older trees for the orchards was 27%. This figure was calculated from the 23 sites where data was recorded. There will however be a great variability with some orchards being entirely mature, and some being entirely young.



The age of trees contained in each orchard was recorded. Ages were grouped into 4 categories to simplify the assessment in the field.

Each orchard may contain a number or all the age ranges reflecting the plantings over the years. Predominantly old trees indicates a mature collection of orchards. If no new or young plantings are recorded in an area, this indicates that the presence of orchards in the area is potentially threatened.

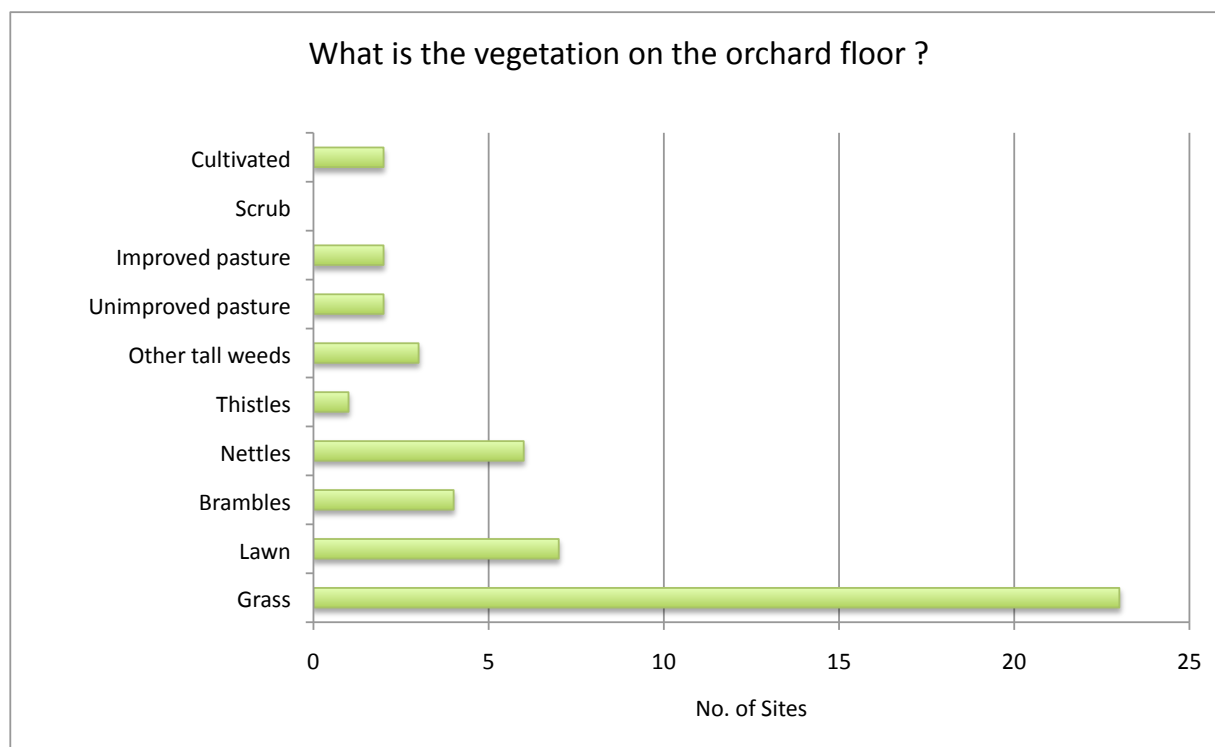
The graph shows that there is a fairly even age profile across orchards in this area, and this bodes well for the future security of orchards in the area.



The extent of orchard management is given above. A total of 30 sites have data recorded for them. The figures in the chart are the number of orchards determined to be in each particular category.

The graph shows that around three quarters of sites have some management while the remaining quarter have none or are abandoned. This level of management is a fairly good compared to some areas in Scotland.

High proportions of abandoned and unmanaged orchards are an indication that there needs to be a local focus on raising awareness on maintenance issues. Maintenance skills project are also a popular way of building capacity locally.

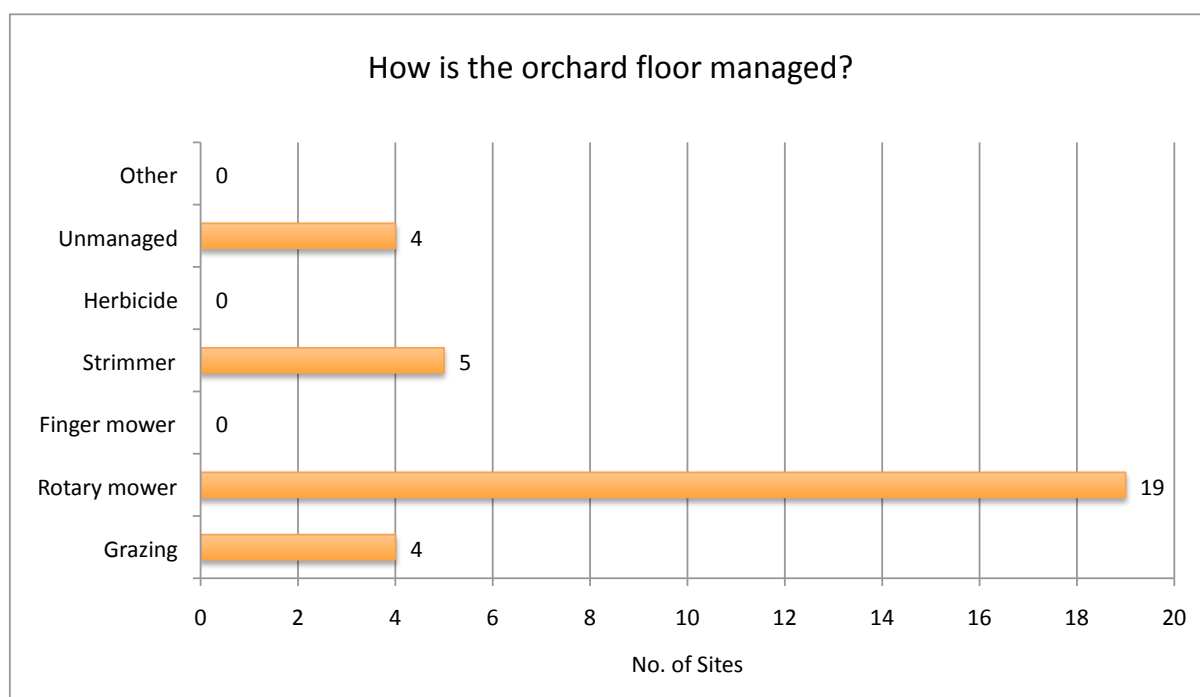


The orchard floor is an important part of the orchard habitat, both for biodiversity but also as a further element of the growing space. The generic term used across various habitats, is the 'field layer'.

Each site may have several field layer types, for example parts of it may be mown into a lawn while other parts are unimproved pasture with thistles. We are also interested in orchards that are cultivated as this was a practice that was once much more common.

The graphs shows that though many orchards have some sort of managed grass as a field layer, there are others that have various tall weeds, nettles and brambles. There are a small number that have pasture, and this is likely to be of higher biodiversity value than mown grass.

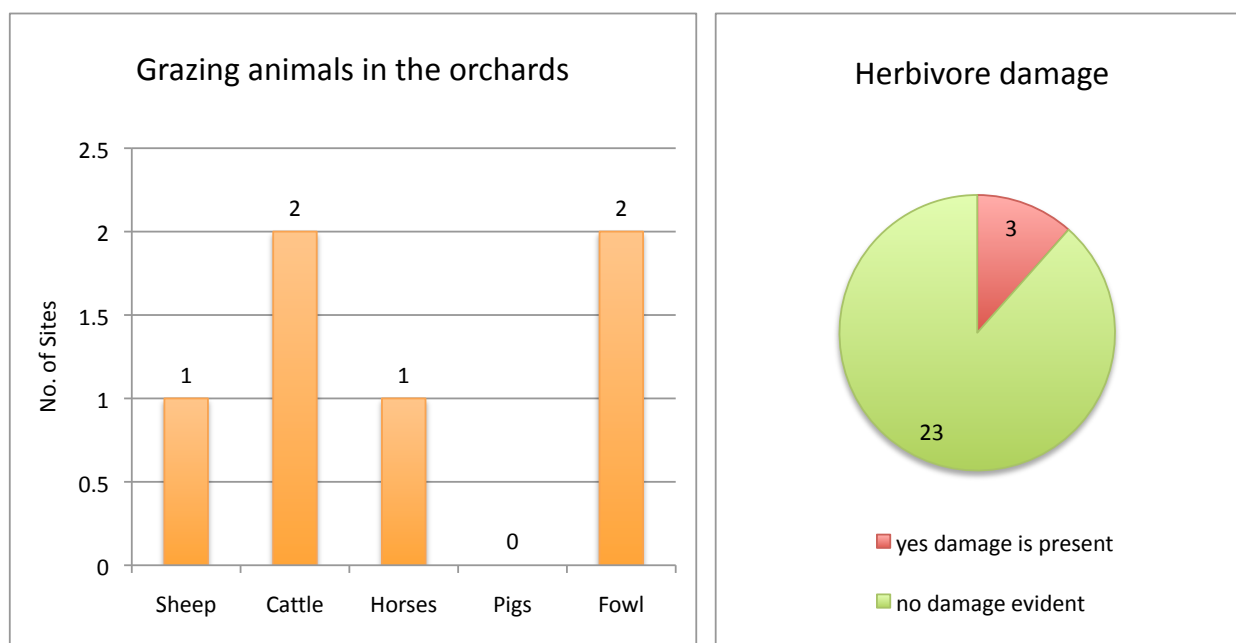
There were only two orchards that was also cultivated showing a more complex use of the land.



Each orchard can record more than one method for managing the orchard floor. The reference to the finger mower may be unfamiliar. This is a type mower that has a flat cutter bar like a hedge trimmer. The reason for recording this separately is that there is some evidence that this sort of mower does far less damage to invertebrate life in the sward than a rotary mower, which tends to suck up and eviscerate the sward contents.

In our experience herbicide use is under-reported by orchard keepers.

Unsurprisingly, the graph shows that the common method of management is by rotary mower. However, the number of strimmer managed sites comes second, with unmanaged field layer and grazing coming equal third.

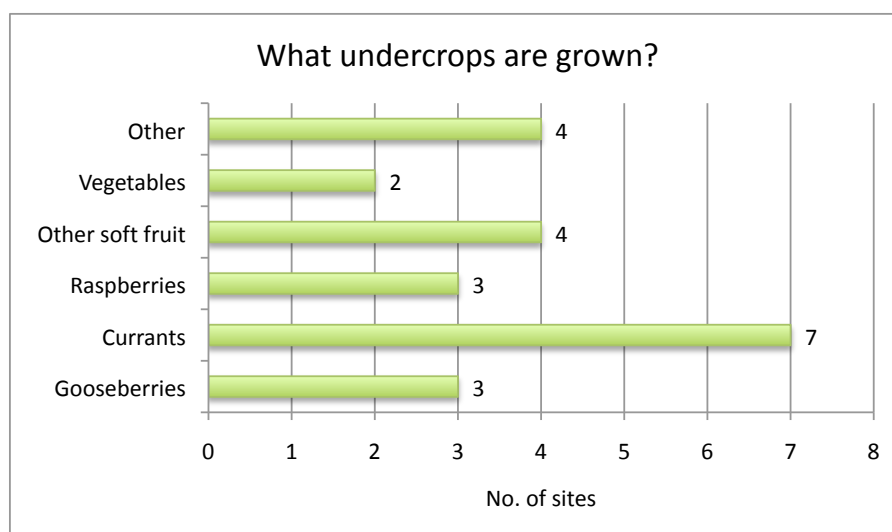


Each orchard can record more than one type of animal grazing the orchard floor.

The graph shows a wide variety of livestock grazing in the orchards, though the number of orchards involved is low.

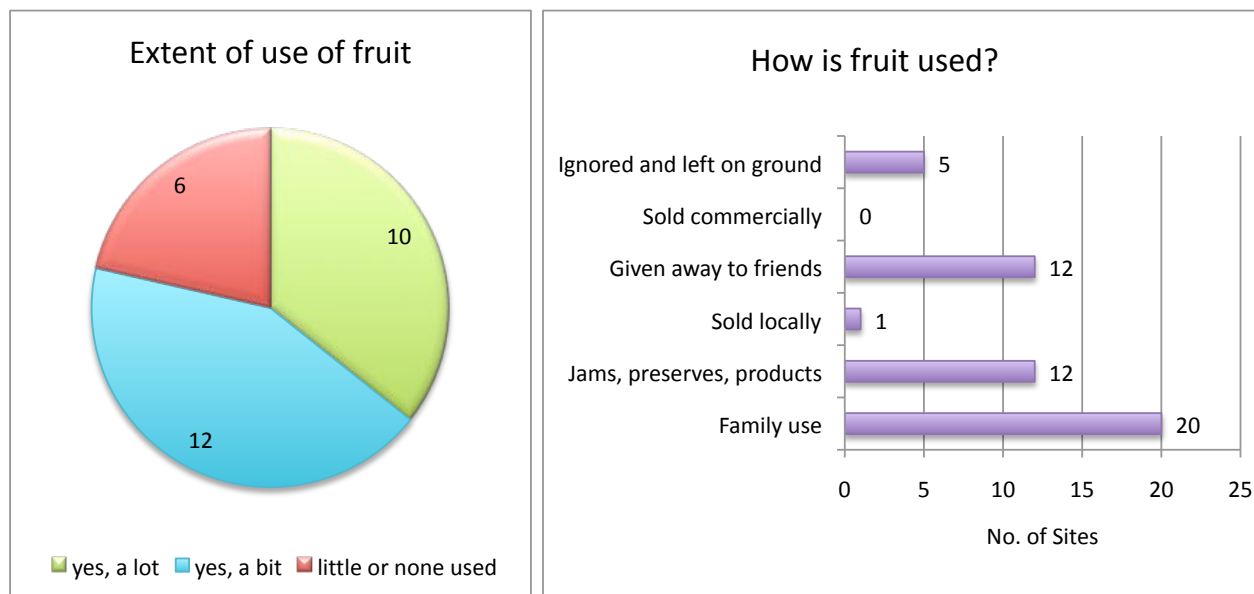
The pie chart shows that where recorded, herbivore damage is evident on couple of sites.

Not all recorded damage can be attributed to grazing livestock, as deer and rabbits also play a role.



The growing of other crops within an orchard – known as undercrops - was formerly a much more common practice than it is today. Each orchard can have more than one type of undercrop recorded.

The graph shows that a broad spread of undercrops were recorded, currants being the dominant species followed by various other soft fruits.



The use of fruit was determined for 28 sites. Though the categories in the pie chart are fairly broad, they do give a clear indication of the proportion of orchards that are well harvested. It also gives an indication of the scale of the unused local resource.

The chart shows that the overwhelming majority of orchards report that they use the fruit to some extent. A little over a third use their fruit a lot. This is a higher level of use than is found in much of the rest of Scotland.

The bar graph (above right) provides detail on how fruit is used. An individual orchard can record multiple uses. So while the family may use some, they may also leave unused fruit on the ground.

The graph shows that family use, followed by jam, preserves, products and then by giving the fruit away was most common. One orchard sells their fruit locally, and none sell commercially. In 5 orchards it is left on the ground.

7. ANECDOTAL AND COMMENT INFORMATION

A qualitative data summary

7.1 Introduction

Anecdotes and comments add a lot of colour to the survey of orchard sites. They are more valuable than they may first appear because they help interpret individual sites and whole areas in relation to their orchards. They also form an important record of local oral history that may not be recorded elsewhere; this may be about the family and its own orchard, or it may be about the characteristics, history and purpose of orchards in the area, and how this formed a part of its economic and cultural heritage.

7.2 Structure and Presentation

Guidance and training for the field surveywork encouraged the collection of anecdotal history, comments, pertinent information relating to the orchard being considered. This was written up on the survey form and submitted to us in that way.

The data presented below are a selected summary, representing what we consider to be the most interesting aspects of the qualitative data collected. We have identified emergent themes from these data and have categorised them accordingly.

The comments have been subject to some editing. Our intention is to maintain them as verbatim as reasonable. The editing has been restricted to typos, spelling and minor changes to assist understanding. We have carried out further editing to comply with data protection. We have therefore also redacted content that would enable an individual person to be identified.

7.3 Anecdotal and Comment Data Categorised by Theme

There was very little collected in terms of anecdotal or comment information in this area. The following three paragraphs are the only relevant material.

Walled garden is owned by a nursing home. Spoke to a local person who said the walled garden has been left to dereliction over many years. She remembers some apple trees but believes they have not survived. Walled garden not accessible due to gate & even if open, access would not be possible due to extreme overgrowth of brambles. I did find one large apple tree on a track outside the southern corner.
SAYR0024

Currently this orchards is being renovated, removing old unproductive or dangerous trees and replacing with younger specimens. We are grafting scions from our own stock on to MM106 rootstock to preserve our mainly Scottish varieties. Note from Head Gardener
SAYR0041

Orchard destroyed in woodland fire in 1930s or 1940s.
SAYR0029

8. CONCLUSIONS

The results presented above, and also in the following photographic record, lead to the following conclusions:

A total of 52 orchard sites were surveyed, of these 32 were found to be intact orchards.

The total acreage of orchards remaining in this area was found to be 8.4 ha and the average area of each orchard was 0.58 ha.

Most of the orchards contain less than 30 trees and are in a domestic setting. No larger orchards of commercial size are recorded.

Though apple dominates, most orchards contain a diverse mixture of fruit species, reflecting their domestic use. Crab apple is unusually popular in this area.

The tree stock contains trees of all age ranges.

Veteran tree features indicate that some orchards contain high levels of biodiversity.

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Many orchards have new plantings and younger trees, and this shows orchards renewal is occurring.

Soft fruit and also vegetables are grown in a significant minority of orchards. This is at a higher level than most of Scotland.

Most fruit is used for family and friends, some is sold commercially and some is left to waste.

Livestock is grazed in minority of orchards, these mainly being fowl and cattle. The qualitative data demonstrates the depth of history; cultural, economic and otherwise, that this area is custodian to.

To conclude, South Ayrshire contains a moderate number of small orchards, most of which are quite actively managed and from which the fruit is used within the domestic setting. There are no commercial sized orchards which sell their fruit. There are still some historic large mature orchards, mainly in the country estate setting.

SAYR0041-Leespics (4).jpg



Plate 01. Culzean Castle, managed by National Trust for Scotland, has a walled garden with over 80 fruit trees. Fruit trees are a mix of mature and newly planted specimens. The gardens are undergoing regeneration, including fruit tree replanting at the moment.

SAYR0041-Leespics (5).jpg



Plate 02. Culzean Castle's newly planted apple tree arch. Many of the young trees are grafted scions from their own stock on to MM106 rootstock to preserve the site's mainly Scottish varieties.

SAYR0041-Leespics (12).jpg



Plate 03. Some of Culzean Castle's mature apple trees.

SAYR0041-Leespics (27).jpg



Plate 04. More recent addition to the Culzean Castle's plantings.

SAYR0041-Leespics (28).jpg



Plate 05. Impressive pear tree cordons in a fruit cage at Culzean Castle.

IMGP2322.JPG



Plate 06. A small domestic mixed orchard - beautifully maintained.

SAYR0014-3.jpg



Plate 07. A mature apple tree in a small domestic garden orchard of mixed species and ages.

SAYR0040-1.JPG

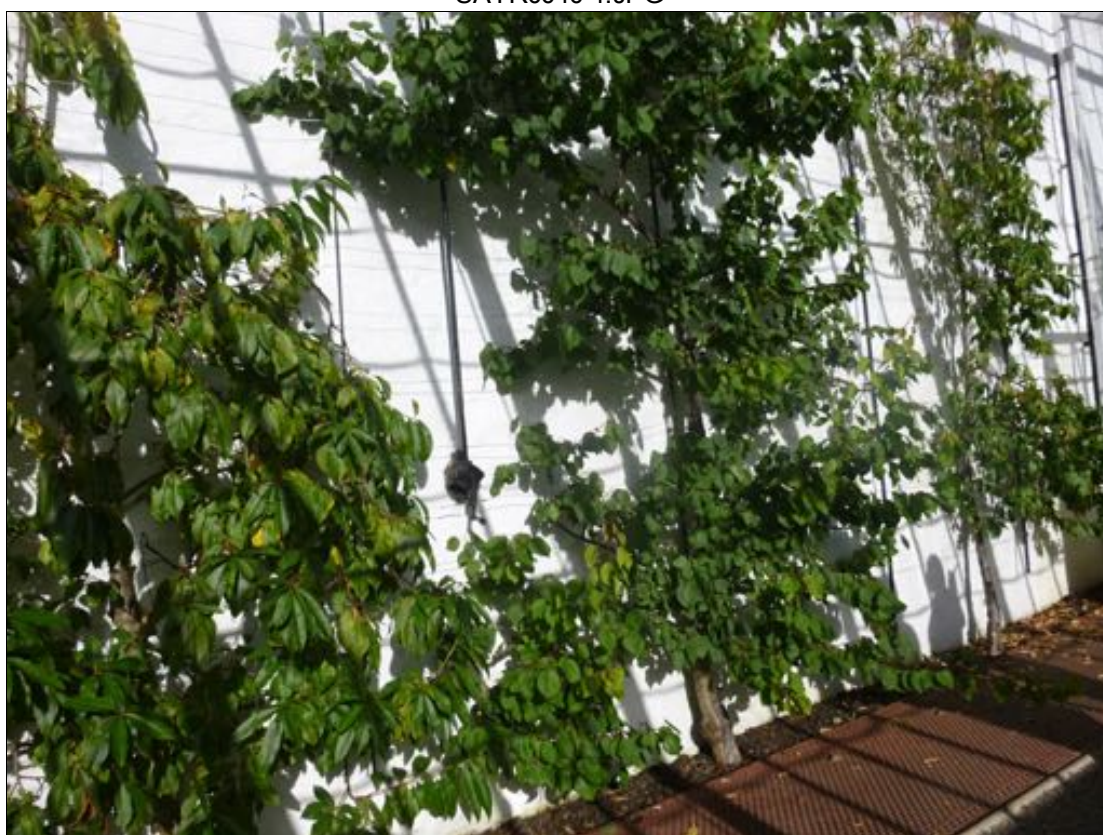


Plate 08. Peach, nectarine and apricot trees in a glasshouse of a walled garden of the Glenapp Castle Hotel.

SAYR0040-3.JPG



Plate 09. Fruit tree fans against the wall of a herb garden at the Glenapp Castle Hotel.

SAYR0040-5.JPG



Plate 10. An old apple tree variety at the Glenapp Castle Hotel walled garden.

SAYR0105-3.JPG



Plate 11. Fruit trees planted by the Walled Garden Caravan Park proprietor.

SAYR0108 (5).JPG



Plate 12. A therapeutic pottager garden at Failford House which replaced a christmas tree plantation around 1980s. This Victorian walled garden contains over 30 fruit trees of a variety of species, many beautifully trained.

SAYR0108 (8).JPG



Plate 13. One of the newly planted fruit trees at Failford house.

SAYR0108 (14).JPG



Plate 14. Some of the newly planted fruit trees at the therapeutic pottager garden at Failford House.

SAYR0108 (17).JPG



Plate 15. One of the newly planted fruit trees at the therapeutic pottager garden at Failford House.

SAYR0037 (02).JPG



Plate 16. Mature fruit tree fans in a small mixed species orchard within a walled garden.

SAYR0037 (10).JPG



Plate 17. Mature standards in a small mixed species orchard in a well maintained walled garden.

SAYR0107-2.JPG



Plate 18. A small domestic garden where John Butterworth taught a pruning course to the Scottish Smallholders Association.

SAYR0107-3.JPG



Plate 19. A well pruned young fan fruit tree at domestic garden orchard.

SAYR0002 (13) Veteran Dessert Apple.JPG



Plate 20. A veteran dessert apple tree, possibly >100 years old in a small domestic orchard with a mix of veteran and newly planted trees.

SAYR0112 Lee2.jpg



Plate 21. An extensive orchard in the walled garden at the site Scottish Agricultural College, previously Auchincruive Estate. Slightly neglected.

SAYR0112 Lee8.jpg



Plate 22. An extensive orchard in the walled garden at the site Scottish Agricultural College, previously Auchincruive Estate. Slightly neglected.

SAYR0104 5mb.JPG



Plate 23. A sizeable domestic orchard of mixed age and species.

SAYR0024 (5).jpg



Plate 24. An overgrown orchard site in a walled estate garden.

SAYR0007 (2).JPG



Plate 25. A small, unmanaged domestic orchard of apples and damsons, surrounded by farmland. Fruit is used by the family and by a local private cider-maker.

SAYR0008 (1).JPG



Plate 26. A very small domestic orchard of apple trees supplied by John Butterworth.

SAYR0103 (3).JPG



Plate 27.

SAYR0021 pear tree.JPG



Plate 28. An impressive young pear tree in a newly planted field estate orchard.

SAYR0112 Joseph (7).JPG



Plate 29. An extensive orchard in the walled garden at the site Scottish Agricultural College, previously Auchincruive Estate. Slightly neglected.

ANNEX 2: METHODOLOGY

A2.1 Methodology for GIS Deskstudy

The following methodology was implemented for the Deskstudy.

GIS system: MapInfo Professional v11.5 software with Data Capture Tool

Identifying locations; Various sources of data to determine orchard locations:

- Visual search of aerial and historic mapping.
- Existing survey data. Sites listed in existing surveys are reassessed.
- Additional existing datasets:
 - ♦ The OS MasterMap 'Orchard' attribute.
 - ♦ RCAHMS-Historic Land-use Assessment database
 - ♦ Regional orchard projects datasets
 - ♦ National Trust for Scotland Demeter Plants Database
 - ♦ Agricultural Census, historic data (not site specific)
 - ♦ Dunn 1885 Apple Congress report (time constraints meant that only a few sites from this marvellous tome were considered)
 - ♦ and other publically available datasets, such as community orchard listings.

A more detailed description of the deskstudy methodology and its results are published in reports for Scotland as a whole. These are available at www.scotlandthefruit.org.uk

A2.2 Methodology for Field Verification

The implementation of field verification is structured as follows:

- Fieldwork is devolved to a local collaborating organisation. Ideally this is a competent local not-for-profit organisation with a track record demonstrating ability to organise and deliver locally.
- Local Facilitator. The local collaborating organisation employs or contracts a person, the Local Facilitator, to be the local interface and organiser of volunteer surveyors. This has been a paid role.
- Recruitment of surveyors. The local organisation uses various channels to recruit volunteer surveyors. The channels include local press, presence at events, membership lists, other organisations, and formal & informal networks.
- Resources are provided by the National Coordinator (in this case Crispin Hayes Associates). Site specific resources such as site location maps and candidate site lists are shared via cloud services with the Local Facilitator. Other generic material is distributed via www.scotlandthefruit.org.uk which is used as the project website. This includes the webforms used to record survey data.
- Allocation. The Local Facilitator allocates sites to volunteers, and manages their progress, ensures instructions including the risk assessment are understood.
- Mentoring. Some volunteer surveyors are very competent at all aspects. Others require a little mentoring. The Local Facilitator carries out this role, if necessary taking the volunteer on a training site visit.
- Survey Data. The Local Facilitator ensures that survey data is submitted together with photos, and that all files are identified with the site unique identification. Quality checks are also carried out, and queries referred to volunteers.
- Data processing. Further quality checks are carried out on the data, and corrections made, if necessary with reference to the Local Facilitator and the volunteer surveyor.

- Merging. The field verification data is added to the Deskstudy data for each site via the Geographical Information System and other database tools.
- Amendments and snagging. Revision of site boundary and other Deskstudy details are carried out on a site by site basis. Snagging is carried out as required.
- Output. Further work may be required: for example redacting personal data fields, and extracting some site subsets, before the finalised dataset is output.

A2.3 Field Verification time input statistics for this area

Some statistics were recorded on the time input of various aspects of the Field Verification.

Time-on-site is reported on each surveyform by the surveyor. The average time on site in this area was 34 mins. The maximum time on site was reported as 180 mins, while the minimum was 5 mins.

In South Ayrshire, the total time-on-site was recorded as 24 hours.

This does not include preparation or travel time, just the time on site.

The time to fill in the survey webform is recorded automatically by the forms service. It shows that on average it took 28 mins to complete a submission in this area.