

THE CUMBRIA APPLE PROJECT

A survey of the current status and potential of orchards in
two Cumbrian parishes

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1. SUMMARY

A survey of the current status and future economic potential of apple orchards in two Cumbrian parishes was carried out during the summer and autumn of 1997.

The survey showed significant orchard losses for both parishes, with only one quarter of those orchards present at the turn of the century remaining today. Of the orchards remaining most consisted of trees in excess of 80 years old although many were reasonably well kept and maintained. There were some examples of newly planted apple trees and orchards.

A total of 147 individual apple trees were surveyed in detail revealing a high degree of variety, from ancient Bramley standards to newly planted Golden Delicious. In all a total of 36 apple varieties were identified from the fruit including several unusual types such as Catshead, Rhode Island Greening, Ladies Finger Of Lancaster and a possible Lemon Square (thought to be extinct earlier this century).

Although no active marketing of Cumbrian apples currently takes place, an annual demand for over five tonnes of produce was identified. There was considerable interest among orchard owners and retailers for the further development of a marketing initiative for locally grown apple varieties.

2. INTRODUCTION

The Cumbria Apple Project evolved from the Cumbria Apple Forum, which was formed in early 1996. The forum took the form of a series of open public meetings that provided an opportunity to discuss the promotion and problems of apple growing in Cumbria. It was clear from these meetings that little was known of the current condition of orchards in Cumbria and in October 1996 East Cumbria Countryside Project put together proposals for a pilot project to assess the status and potential of domestic orchards in two representative Cumbrian parishes.

A project officer was appointed in March 1997 once funding for the project was in place. The project officer was responsible for carrying out the orchard surveys, interviewing orchard owners, analysing the data, organising apple identification events in both parishes and writing up a final report.

The work of the project officer was guided by a steering group consisting of the following people:

Susannah England-Rural Community Officer with 'Voluntary Action Cumbria'

John Kerr/Phil Bradley-Countryside Officers with 'East Cumbria Countryside Project'

Chris Braithwaite-Head Gardener with 'National Trust' at Acorn Bank

Ken Mills-Apple enthusiast and retired forester

Although the Cumbria Apple Project was essentially a research project the promotion of local and native apple varieties was also an important part of the project. This included a market research assessment of the potential for marketing local apples through conventional retail outlets such as greengrocers, supermarkets and wholefood shops.

The project was financially supported by:

East Cumbria Countryside Project

Friends of the Lake District

Fells and Dales Leader II Project

Shell Better Britain Campaign

Stanley Smith Horticultural Trust

The aims and objectives of this pilot project are outlined below.

Aims:

- a) To increase public awareness of existing and local apple varieties with a view to creating a market for the fruit and young trees of these varieties.
- b) To maintain and enhance the diversity of apple varieties indigenous to the area with the help of the Countryside Stewardship Grant Scheme and other advice and information.

Objectives:

1. Create a database of all the existing and remnant orchards in the target area parishes with details of varieties in each orchard
2. Determine demand for local varieties by contacting potential retailers such as wholefood shops and greengrocers and investigate potential for manufacturing apple-based produce.
3. Assuming potential market is evident act as an agent by putting orchard owners in touch with retailers in order to satisfy demand.

4. Set up a propagation programme for grafts from old and local varieties of trees to supply local nurseries.
5. Raise public awareness by representation at events such as 'Apple Day' at Acorn Bank, and promote links with the Westmorland Damson Association and through the Apple Forum.
6. Promote the Countryside Stewardship Scheme as a means of conserving derelict orchards in the target area, including the promotion of raw planting.
7. Produce a report at the end of the survey which could be of use to similar projects in other parts of the country and which will also assess the viability of expanding the project countywide. This should also include guidelines on the establishment of domestic orchards in Cumbria which could be published separately as a leaflet.

Parishes Surveyed

The two parishes chosen for the pilot study were Crosby Ravensworth and Dacre. This was due to the fact that remnant orchards were known to be present in both parishes and in many ways the parishes could be seen as typical and representative of other parishes in the Eden Valley and the rest of the county.

Crosby Ravensworth parish lies 5 miles to the southwest of Appleby and contains the settlements of Crosby Ravensworth, Maulds Meaburn and Reagill (see fig. 1).

Dacre parish lies immediately to the west of Penrith and contains the villages of Dacre, Stainton, Newbiggin and Great Blencow (see fig. 2).

Soil Characteristics in Study Areas

The soils for Crosby Ravensworth, Maulds Meaburn and Reagill are known as 'Brickfield 3 Association' lying on sandstone and shale drift. They comprise seasonally waterlogged fine loams over clayey sub soils.

The Brickfield 3 Association soils are waterlogged for long periods in winter. At 70cm depth they are waterlogged for 90 to 180 days per year, although in drier areas underdrainage occurs. Characteristics of this soil include clayey subsurface horizons, which impede drainage.

Soils for the Newbiggin, Stainton and northern half of Dacre are the 'Newbiggin Association' on reddish drift. The southern half of Dacre and Soulby are 'Brickfield 2 Association' on sandstone and shale drift.

Newbiggin Association soils are deep, well drained fine loams with only slight seasonal waterlogging. They are permeable and well drained, the soil profile is not waterlogged for more than 30 days per year. These soils occur over Carboniferous limestone with a typical pH range of 5.8 at 0-19cm depth to 6.5 at 19-85cm depth.

Brickfield 2 Association soils are seasonally waterlogged fine loams.

Geology of Study Area

The solid geology underlying the glacial drift found in both parishes is predominantly Carboniferous limestone at Crosby Ravensworth and Penrith sandstone at Dacre. Retreating glaciers at the end of the last Ice Age ca. deposited the sandstone and shale drift lying on top of the parent rocks 13,000 years ago. These glaciers scoured the shale and sandstone from the land between Penrith and Brampton (Carlisle) and carried it south along the Eden Valley as they traversed Stainmore into Yorkshire. As they melted the fragments of rock and debris were deposited on top of the bedrock.

Altitude

The elevation of Crosby Ravensworth parish ranges from 157m (517ft) at Roans to 297m (975ft) at Harberwain. For Dacre parish the elevation ranges from 152m (500ft) at Dalemain to 232m (762ft) at Newbiggin.

3. METHODOLOGY FOR ORCHARD SURVEY

Two parishes were selected for the survey of orchards, namely Dacre and Crosby Ravensworth. In order to secure funding from the Leader II Project the parishes had to be in the appropriate Objective 5b area. Both parishes satisfied this requirement although this meant that lowland orchards below 150m elevation would not be included. As it is widely accepted that 150m is the maximum elevation for successful apple growing the orchards in this survey are on the edge of their ideal ecological niche, with higher rainfall, lower temperatures, windier conditions and a shorter growing season than their lowland counterparts.

A desktop survey of 1:2,500 Ordnance Survey maps for both parishes was conducted in order to determine the number and location of orchards to visit and/or field survey. The most recent editions of 1974 (Crosby Ravensworth) and 1985 (Dacre) were used for this. In order to elicit information about the trends in orchard proliferation and decline earlier editions were also consulted (1851 and 1898 [Crosby Ravensworth], and 1900 and 1925 [Dacre]). To compare these trends to fluctuations in population at the two parishes (see figs. 3 and 4), census records were also consulted. A total of 29 sites were visited in the parish of Crosby Ravensworth and 38 in Dacre.

It became apparent after several site visits that many orchards shown on the most recent OS maps had, in the ensuing 10-20 years been neglected leaving only a few scattered trees and in some cases grubbed up. Although two orchards are included with only two apple trees extant, they were compact and contained other fruit trees, making them worthy of inclusion. Any other orchards with less than three apple trees were not included. This rule meant that at Dacre 13 orchards were surveyed whilst at

Crosby Ravensworth only 4 suitable orchards remained intact. This gave 17 orchards containing a total of 147 apple trees to be included in the survey.

The survey was carried out between March and October 1997 with several orchard features being recorded (see copy of orchard survey form in Appendix 1). These variables included:

- Size of orchard
- Species and varieties of fruit trees present
- Number of trees per orchard
- Management regime of ground vegetation and trees
- History of orchard
- Wildlife associated with each orchard
- Tree girth and diameter at breast height (DBH)
- Approximate age of trees
- An estimate of rootstock type for each tree (based on height and age)
- A short description of the condition of each tree

A sketch map was drawn of each orchard showing the location of each tree. Each apple tree was numbered, allowing apple samples to be taken for identification of each apple variety later in the year.

During the fruiting season three samples of fruit were taken from each tree (wherever possible) and placed in a labelled polythene bag. Samples were stored and identified at a later date with assistance from the Northern Fruit Group.

The dimensions of each orchard were measured on-site using a 50m tape and areas calculated from the sketch plan. Most orchards were rectilinear in shape. A short questionnaire was filled in with the assistance of the orchard owner at the end of each survey. This determined the past and present management of the orchard, both of the trees and the underlying vegetation, also revealing relevant historic information. A brief description of the underlying vegetation in terms of species or genera was also carried out.

The boundary type was recorded after a visual inspection. The slope of each orchard was measured using a clinometer and the aspect measured using a compass. The elevation of each orchard was determined from the appropriate OS maps. The height of each tree was measured with a clinometer, the girth by using a tape measure and diameter at breast height calculated from the equation $C = \pi d$ (C = circumference in metres, d = diameter in metres).

An estimation was made of the approximate age of each tree, this was based upon the known history of the orchard, the size of the tree and the amount of epiphytic growth on stems and branches. It must be stressed that these estimates were not backed up by any more accurate methods (ie ring counts from a trunk core). Information from the orchard owners sometimes yielded planting dates for certain individual orchard trees.

Further estimates were made of the type of rootstock used for each tree by comparing the heights of each tree with a chart giving a list of rootstock types for certain heights of tree (see Hessayon 1990). A short description of the condition of each tree was compiled noting evidence of diseases, pests, nutrient starvation and any action deemed necessary to correct these problems.

In addition to the desktop and field surveys a marketing survey was carried out in order to assess the potential market for locally grown apples by retailers in Cumbria. This involved sending out questionnaires (see copy of questionnaire in Appendix II), to a range of local retail outlets including wholefood shops, greengrocers and supermarkets. A total of 24 questionnaires were distributed.

4. RESULTS OF ORCHARD SURVEY

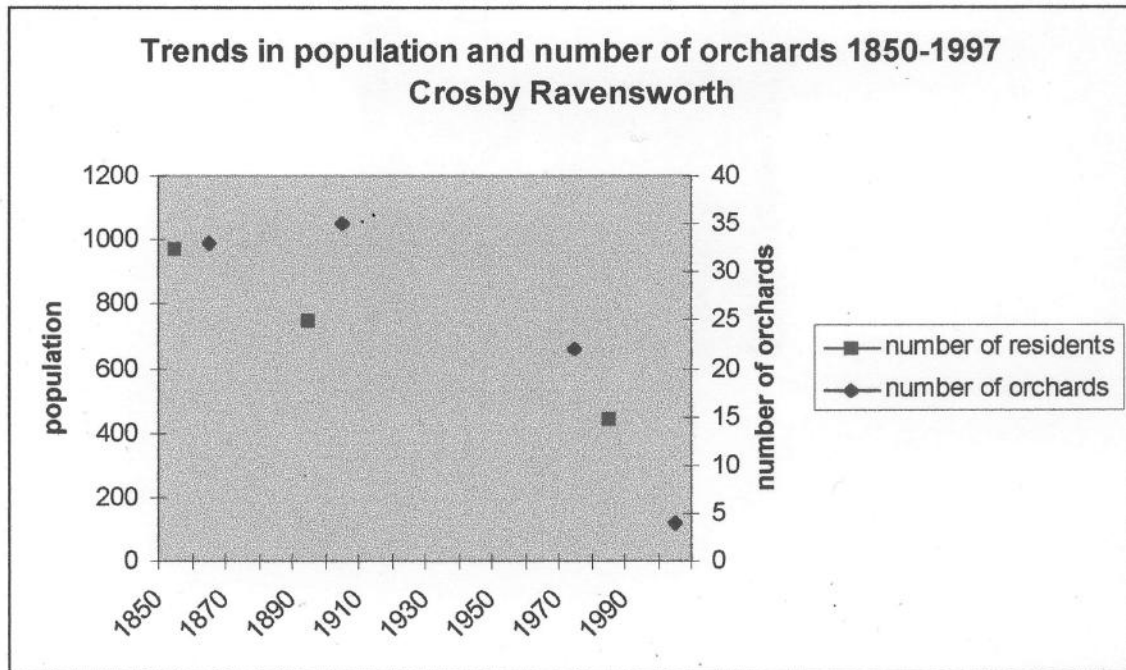


Fig.3

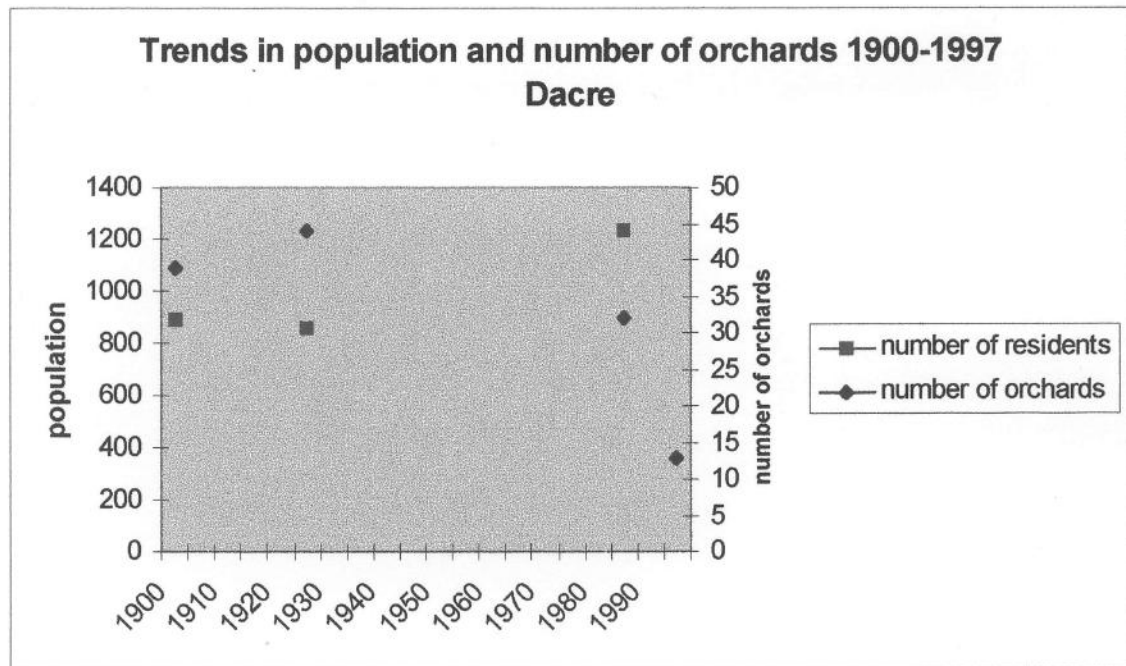


Fig. 4

Trends in the Number of Orchards

After a desktop survey of the 2nd Edition OS maps for both parishes two graphs were drawn charting the trends in orchard numbers coupled with the changes in population over time (figs. 3 & 4). The data show that in Dacre (where the 3rd Edition OS map 1925 was also consulted) that orchard numbers were 39 in 1900 rising to a peak of 44 in 1925 and then falling to 32 in 1985. Using data from the field survey the final number of 13 was inserted for 1997. Not included in these data are 2 newly planted orchards. One orchard and one archway of apple trees were also not included due to difficulty in obtaining permission from the owners.

The population of Dacre parish has increased from 886 in 1900 to 1234 in 1985, an increase of 40%. This means that the figure for the number of residents per orchard has increased from 23 to 38 over the same time interval an increase of 65%.

A different pattern emerges at for Crosby Ravensworth parish. Orchard numbers show a similar peak at the turn of the century and a subsequent decline from 35 in 1901 to 22 in 1974. The final figure of 4 was inserted using data from the field survey. The resident population of Crosby Ravensworth parish has fallen continuously from 971 in 1851 to 443 in 1981. This has resulted in the number of residents per orchard decreasing from 29.5 in 1851 to 20 in 1981, a decrease of 32% over 130 years.

Since 1974 only 4 of the 22 are now recognisable orchards, the missing 18 have been either neglected to dereliction or grubbed up. However not included in the data are four newly planted orchards throughout the parish.

Orchard characteristics

Analysis of the data collected during the field survey (table 1) shows that the area of the orchards surveyed varied from 224 sq.m (D12) to 1700 sq.m (C3) with a mean area of 776 sq.m. Six of the orchards were contained within a mixed boundary (fence, hedge and/or wall) whilst 10 were contained solely by a drystone wall (5 mixed stone types, 3 limestone only and 2 sandstone only). A summary of orchard details is given in table 4.

Of the orchards surveyed 10 were believed to be over 100 years in age, 6 were younger and one was of unknown age. Dating of the orchards was based on their presence or absence on early OS maps. The orchard of unknown age was not found on any of the maps examined in the desktop survey.

The total number of fruit trees per orchard varied from 5 (D13) to a maximum of 41 (C1) giving a mean of 15.2 trees per orchard. The total number of apple trees per orchard varied from 2 (D12 & D13) to 23 (C1), giving a mean of 8.6. This information is summarised in table 5.

The aspects of the orchards varied considerably but more were found to be of a north easterly aspect than any other direction. The orchards were mostly on flat or very gently sloping land, none were found on a slope greater than 7 deg. The mean slope was 2.3 deg. The elevation of the orchards varied from 160m above mean sea level (D5 & D7) to 255m (C4) with a mean of 200m. Three of the orchards were actively grazed, 3 unmanaged and 11 regularly mown or part mown.

The ages of the trees in the field survey varied from 3 years to over 100 years with a mean of 69.5 (table 6). There were 36 trees of 'standard' shape with a mean age of 94.6 years. There were 48 trees of 'half standard' shape with a mean age of 69.6 years and 22 'bush' shaped trees with a mean age of 59.5. There were 38 'dwarf bush' shaped trees with a mean age of 53.5 years. There were two 'pyramid' shaped trees with a mean age of 23 years and one 'fan' shaped tree of 80 years.

Vigorous rootstocks were the most commonly used type, of the 59 surveyed 23 were on standard trees and 22 on half standards. Extremely dwarfing rootstocks were the least used, being noted on 10 trees only. The mean age of the trees found on vigorous rootstocks was 86.8 years and the mean age of the trees found on semi-dwarfing rootstocks was 83.1 years. The mean age of those trees found on dwarfing rootstocks was 33.4 years and those on very dwarfing rootstocks had a mean age of 40.6 years. The 10 trees on extremely dwarfing rootstocks had a mean age of 16.4 years.

Various other species of fruit tree were found in the surveyed orchards, the commonest by far being pear plum and damson, with a few elder and crab and one walnut (table 7).

Market Research

Of the 25 questionnaires mailed to fruit retailers 9 were returned completed. Of these 9 replies 6 expressed a strong desire to market locally grown apples and 3 did not. This represents 24% of the identified retail outlets that were willing to sell locally grown apples, although important factors such as price, condition, organic status and specific varieties, were mentioned in the replies. Five of the 6 positive replies indicated their required quantity of produce totalling more than 100kg per week. Two showed a strong preference for organically grown apples and one was only interested in apples over 60mm diameter.

TABLE 1 - ORCHARD CHARACTERISTICS

Orchard No.	Area (sq.m)	Boundary	Age (yrs)	Total No. Fruit Trees	No. Apple Trees	Aspect	Slope (deg)	Elevation (m)
D01	456	mixed	>100	8	4	E	4	230
D02	783	drystone	>100	16	8	N	4	170
D03	216	none	ca. 30	8	4	E	5	230
D04	1166	drystone	>100	21	7	W	2	215
D05	640	mixed hedge	>100	15	12	S	1	160
D06	1452	fence/drystone	<100	13	7	NE	5	235
D07	900	fence	>100	14	12	SE	2	160
D08	528	drystone	<100	15	9	n/a	0	200
D09	224	drystone	<100	11	3	W	0.5	230
D10	1046	drystone	<100	20	12	NE	2.5	185
D11	236	drystone	?	9	6	SE	1	200
D12	224	drystone	>100	9	2	NE	4	180
D13	408	drystone	>100	6	2	S	7	225
C01	1350	drystone	>100	41	23	n/a	0	180
C02	1366	drystone	>100	17	15	n/a	0	170
C03	1700	drystone	<100	31	18	n/a	0	183
C04	503	drystone	>100	6	3	NE	2	255

TABLE 2 - INDIVIDUAL APPLE TREE CHARACTERISTICS

ORCHARD NO./TREE NO.	APPROX. AGE (yrs)	HEIGHT (m)	GIRTH (m)	DBH (m)	ROOTSTOCK	SHAPE	VARIETY
D01/001	50	7.7	1.0	0.32	vigorous	standard	Bramley
002	30	4.0	0.35	0.11	dwarfing	half standard	Laxton's Superb
003	30	4.5	0.4	0.13	dwarfing	half standard	Ribston Pippin
004	30	4.5	0.4	n/a	dwarfing	standard	James Grieve
D02/005	40	4.4	0.8	n/a	dwarfing	bush	Beauty of Bath
006	40	4.4	0.8	n/a	dwarfing	bush	Golden Spire
007	40	4.4	0.8	n/a	vigorous	half standard	Golden Spire
008	100	8.5	0.8	n/a	vigorous	dwarf bush	Green Balsam
009	100	9.0	1.2	n/a	vigorous	dwarf bush	Lord Suffield
010	40	4.4	1.1	n/a	dwarfing	bush	Ecklinville Seedling
011	40	5.0	0.8	n/a	dwarfing	bush	Bramley
012	100	6.0	0.8	n/a	vigorous	half standard	Bramley
D03/013	30	7.0	0.7	0.22	vigorous	dwarf bush	Bramley
014	30	7.3	0.7	n/a	vigorous	half standard	Cox's Orange Pippin
015	30	0.5	0.5	0.17	vigorous	half standard	Lanes Prince Albert

ORCHARD NO/TREE NO.	APPROX. AGE (yrs)	HEIGHT (m)	GIRTH (m)	DBH (m)	ROOTSTOCK	SHAPE	VARIETY
016	30	4.5	0.5	n/a	semi dwarfing	dwarf bush	Howgate Wonder
D04/017	100	8.0	0.9	0.29	vigorous	standard	Grenadier
018	100	8.2	1.0	0.33	vigorous	standard	Unidentified
019	100	5.2	0.7	0.23	semi dwarfing	standard	Golden Spire
020	100	5.2	0.5	0.17	semi dwarfing	standard	Unidentified
021	100	6.0	0.3	0.11	vigorous	standard	Unidentified
022	100	6.4	0.6	n/a	vigorous	half standard	Allington Pippin
023	100	5.8	0.7	0.23	vigorous	standard	Lemon Square
D05/024	70	6.6	0.9	0.29	vigorous	half standard	Bramley
025	70	7.0	0.9	0.29	vigorous	half standard	Bramley
026	80	7.0	0.9	0.29	vigorous	half standard	Scotch Bridget
027	30	3.5	0.35	0.11	dwarfing	half standard	Worcester Pearmain
028	60	6.0	0.28	0.09	vigorous	standard	Worcester Pearmain
029	100	4.9	0.7	n/a	semi dwarfing	bush	Bramley
030	100	9.0	2.0	n/a	vigorous	dwarf bush	Bramley
031	100	5.8	1.05	0.33	vigorous	standard	Bramley

ORCHARD NO/TREE NO.	APPROX. AGE (yrs)	HEIGHT (m)	GIRTH (m)	DBH (m)	ROOTSTOCK	SHAPE	VARIETY
032	100	5.9	1.2	n/a	vigorous	half standard	Golden Noble
033	100	9.0	1.2	n/a	vigorous	standard	Bramley
034	100	5.5	1.8	n/a	vigorous	dwarf bush	Bramley
035	100	5.5	2.0	n/a	vigorous	dwarf bush	Bramley
D06/036	80	9.0	1.35	0.43	vigorous	standard	Scotch Bridget
037	80	5.5	1.2	n/a	semi dwarfing	dwarf bush	Beauty of Kent
038	80	6.2	0.8	0.26	vigorous	standard	Keswick Codlin
039	80	5.5	0.8	n/a	semi dwarfing	half standard	Lord Derby
040	80	4.5	0.8	0.27	semi dwarfing	standard	Annie Elizabeth
041	80	7.0	1.2	n/a	vigorous	dwarf bush	Allington Pippin
042	80	5.5	0.75	0.24	semi dwarfing	half standard	Unidentified
D07/043	40	3.0	0.27	n/a	very dwarfing	bush	Keswick Codlin
044	100	8.8	1.5	0.48	dwarfing	standard	No Fruit
045	40	3.7	0.35	0.11	vigorous	pyramid	Lord Derby
046	50	6.6	1.5	0.48	vigorous	half standard	Bramley
047	50	5.9	1.15	0.37	vigorous	standard	Crimson Bramley
048	50	6.0	1.0	n/a	vigorous	bush	Crimson Bramley

ORCHARD NO/TREE NO.	APPROX. AGE (yrs)	HEIGHT (m)	GIRTH (m)	DBH (m)	ROOTSTOCK	SHAPE	VARIETY
049	30	3.5	0.35	0.11	dwarfing	half standard	Grenadier
050	40	2.5	0.4	0.13	very dwarfing	bush	Keswick Codlin
051	40	2.7	0.4	0.13	very dwarfing	bush	Keswick Codlin
052	40	4.6	0.35	n/a	semi dwarfing	dwarf bush	Lanes.Prince Albert
053	50	5.0	0.6	n/a	semi dwarfing	half standard (wb)	Allington Pippin
054	20	2.0	0.35	n/a	extremely dwarfing	dwarf bush	No Fruit
D08/055	3	3.0	0.1	0.03	very dwarfing	pyramid	No Fruit
056	100	8.5	1.9	n/a	vigorous	half standard	Bramley
057	100	4.6	1.3	0.4	semi dwarfing	half standard	Ecklinville Seedling
058	100	6.5	0.8	n/a	vigorous	half standard	Keswick Codlin
059	100	4.6	1.15	n/a	semi dwarfing	half standard	Galloway Pippin
060	100	5.2	0.75	0.24	semi dwarfing	standard	Worcester Pearmain
061	100	7.5	1.7	n/a	vigorous	half standard	Unknown local variety (see 125)
062	30	5.5	0.6	n/a	semi dwarfing	bush	Fruit is of rootstock MM106
063	100	4.6	0.9	0.29	semi dwarfing	half standard	Rhode Island Greening
D09/064	70	5.8	1.15	0.37	vigorous	half standard	Bramley

ORCHARD NO/TREE NO.	APPROX. AGE (yrs)	HEIGHT (m)	GIRTH (m)	DBH (m)	ROOTSTOCK	SHAPE	VARIETY
065	70	6.1	0.55	0.17	vigorous	half standard	Family Tree (Ecklinville Seedling /Scotch Bridget
066	70	4.0	0.9	0.29	semi dwarfing	half standard	Ladies Finger Of Lancaster
D10/067	25	1.5	0.15	n/a	extremely dwarfing	dwarf bush	James Grieve
068	25	1.5	0.2	n/a	extremely dwarfing	dwarf bush	No Fruit
069	25	3.0	0.15	0.05	very dwarfing	half standard	Worcester Pearmain
070	25	2.2	0.2	n/a	extremely dwarfing	dwarf bush	Worcester Pearmain
071	25	1.5	0.22	n/a	extremely dwarfing	dwarf bush	Unidentified
072	25	3.0	0.25	n/a	very dwarfing	dwarf bush	No Fruit
073	25	3.0	0.25	n/a	very dwarfing	dwarf bush	Unidentified
074	25	3.8	0.2	n/a	dwarfing	dwarf bush	No Fruit
075	25	2.0	0.3	n/a	extremely dwarfing	dwarf bush	Unidentified
076	25	3.3	0.25	n/a	dwarfing	dwarf bush	No Fruit
077	25	4.0	0.25	n/a	semi dwarfing	dwarf bush	Unidentified
078	25	2.6	0.2	n/a	very dwarfing	dwarf bush	No Fruit
D11/079	4	3.5	0.15	0.05	very dwarfing	half standard	Unidentified

ORCHARD NO/TREE NO.	APPROX. AGE (yrs)	HEIGHT (m)	GIRTH (m)	DBH (m)	ROOTSTOCK	SHAPE	VARIETY
080	4	1.5	0.15	n/a	extremely dwarfing	dwarf bush	Unidentified
081	60	4.6	0.85	n/a	semi dwarfing	bush	Unidentified
082	60	3.7	0.67	0.21	semi dwarfing	half standard	Unidentified
083	60	3.1	0.40	n/a	semi dwarfing	half standard	Unidentified
084	60	3.7	1.0	n/a	semi dwarfing	half standard	Unidentified
D12/085	12	3.5	0.2	n/a	dwarfing	bush	Newton Wonder
086	12	4.0	0.25	n/a	dwarfing	bush	Bramley
D13/087	100	6.5	1.0	0.32	vigorous	standard	Cockpit
088	100	6.5	1.55	n/a	vigorous	half standard	Blenheim Orange
C01/089	100	6.25	1.15	n/a	vigorous	half standard	Bramley
090	100	6.25	0.65	0.21	vigorous	standard	Grenadier
091	100	5.4	0.45	0.14	vigorous	standard	No Fruit
092	100	4.8	0.7	n/a	semi dwarfing	half standard	Ribston Pippin
093	100	6.9	1.2	n/a	vigorous	bush	Newton Wonder
094	100	4.8	0.65	n/a	semi dwarfing	half standard	Newton Wonder
095	100	5.0	0.85	n/a	semi dwarfing	half standard	Gascoyne's Scarlet
096	100	5.0	0.45	0.14	semi dwarfing	half standard	Lane's Prince Albert

ORCHARD NO/TREE NO.	APPROX. AGE (yrs)	HEIGHT (m)	GIRTH (m)	DBH (m)	ROOTSTOCK	SHAPE	VARIETY
097	100	5.5	0.8	n/a	vigorous	dwarf bush	Grenadier
098	100	4.9	0.5	0.16	semi dwarfing	standard	Newton Wonder
099	100	6.4	1.1	0.35	vigorous	standard	Lord Derby
100	100	3.0	0.65	n/a	dwarfing	bush	Arthur. Turner
101	100	4.6	0.65	n/a	semi dwarfing	dwarf bush	Worcester Pearmain
102	5	1.5	0.1	n/a	extremely dwarfing	bush	Golden Delicious
103	100	7.0	1.35	n/a	vigorous	dwarf bush	Newton Wonder
104	100	5.8	0.75	0.24	vigorous	standard	Alexander
105	100	9.0	1.15	n/a	vigorous	dwarf bush	Epicure
106	100	2.0	0.3	n/a	very dwarfing	bush	Unidentified
107	100	6.8	1.0	0.32	vigorous	half standard	Newton Wonder
108	100	4.0	0.5	n/a	semi dwarfing	bush	Lord Derby
109	5	2.0	0.15	n/a	extremely dwarfing	dwarf bush	No Fruit
110	5	4.0	0.15	n/a	dwarfing	dwarf bush	Bramley
111	5	1.7	0.12	n/a	extremely dwarfing	dwarf bush	Cox's Orange Pippin

ORCHARD NO/TREE NO.	APPROX. AGE (yrs)	HEIGHT (m)	GIRTH (m)	DBH (m)	ROOTSTOCK	SHAPE	VARIETY
C02/112	100	4.15	1.0	n/a	semi dwarfing	standard (wb)	Family Tree: Newton Wonder/Keswick Codlin
113	100	7.4	0.75	0.24	vigorous	standard	Hanwell's Souring
114	100	4.6	0.45	0.14	semi dwarfing	standard	Hanwell's Souring
115	100	9.8	1.35	0.43	vigorous	standard	Hanwell's Souring
116	100	5.8	0.70	0.22	vigorous	standard	Grenadier
117	10	3.0	0.25	n/a	very dwarfing	half standard	No Fruit
118	100	8.2	0.9	0.29	vigorous	standard	Grenadier
119	10	3.0	0.25	0.08	very dwarfing	half standard	No Fruit
120	100	10.6	1.1	0.35	vigorous	standard	Galloway Pippin
121	100	4.2	0.65	0.21	semi dwarfing	standard	Grenadier
122	100	7.4	1.3	0.41	vigorous	standard	No Fruit
123	100	5.4	0.65	0.21	semi dwarfing	standard	King of the Pippins
124	100	5.4	0.65	0.21	semi dwarfing	standard	Bramley
125	100	10.6	1.1	0.35	vigorous	standard	Unknown local variety
126	100	5.4	1.0	0.32	semi dwarfing	standard	Catshead
C03127	80	7.0	0.9	0.29	vigorous	half standard	Newton Wonder

ORCHARD NO/TREE NO.	APPROX. AGE (yrs)	HEIGHT (m)	GIRTH (m)	DBH (m)	ROOTSTOCK	SHAPE	VARIETY
128	80	5.0	0.65	0.21	semi dwarfing	standard	Bramley
129	80	6.6	0.9	n/a	vigorous	dwarf bush	Bramley
130	80	5.0	0.6	n/a	semi dwarfing	dwarf bush	Keswick Codlin
131	80	3.0	0.5	n/a	very dwarfing	dwarf bush	Unidentified
132	80	4.6	0.6	0.19	semi dwarfing	half standard	Bramley
133	80	5.4	1.2	0.38	vigorous	half standard (wb)	Unidentified
134	80	4.2	0.25	n/a	semi dwarfing	bush	Bramley
135	80	3.8	0.5	n/a	semi dwarfing	bush	Annie Elizabeth
136	80	4.2	0.5	n/a	semi dwarfing	half standard	Keswick Codlin
137	80	3.0	0.25	n/a	very dwarfing	half standard	Unidentified
138	80	3.0	0.55	n/a	very dwarfing	bush	Newton Wonder
139	80	5.0	0.7	n/a	semi dwarfing	bush (wb)	Catshead
140	80	5.8	0.65	0.21	vigorous	half standard	Bramley
141	80	5.4	1.1	0.35	vigorous	half standard	Newton Wonder
142	80	4.2	0.6	n/a	semi dwarfing	fan	Laxton's Superb
143	80	4.2	0.85	n/a	semi dwarfing	bush	Allington Pippin
144	80	3.8	0.4	0.13	semi dwarfing	standard	Allington Pippin

ORCHARD NO/TREE NO.	APPROX. AGE (yrs)	HEIGHT (m)	GIRTH (m)	DBH (m)	ROOTSTOCK	SHAPE	VARIETY
C04/145	80	4.9	0.85	n/a	semi dwarfing	dwarf bush	Keswick Codlin
146	80	5.9	1.2	n/a	semi dwarfing	dwarf bush	Annie Elizabeth
147	80	6.5	1.4	n/a	vigorous	dwarf bush	Newton Wonder

NB (wb) = windblown

TABLE 3 THE COMBINATION OF ROOTSTOCKS AND TREE SHAPES FOUND IN THE SURVEY

Shape	Rootstock	Vigorous					Semi Dwarfing			Very Dwarfing		Extremely Dwarfing		Total
Standard							23	13	0	0	0	0	36	
Half Standard							22	16	5	5	0	0	48	
Bush							2	8	6	5	1	1	22	
Dwarf Bush							12	7	5	5	5	9	38	
Pyramid							0	0	1	1	0	0	2	
Fan							0	1	0	0	0	0	1	
Total							59	45	17	16	10	147		

TABLE 4 ORCHARD DETAILS

Locations of Orchards:		Management of Ground Cover:	
Farm/Smallholding	8	Grazed	3
Private Dwelling	9	Mown	10.5
		Unmanaged	3.5
Aspect of Orchards:		Boundary Type:	
North	1	Mixed	6
South	2	Drystone Wall	10
East	2	None	1
West	2		
North East	4		
South East	2		
Level Sites	4		
		Composition of Drystone Walls:	
		Mixed	5
		Limestone	3
		Sandstone	2

TABLE 5 COMPOSITION AND AGE OF ORCHARDS

Mean Number of Fruit Trees per Orchard:		Age of Orchards:	
Crosby Ravensworth	23.7	>100 Years	10
Dacre	12.6	<100 Years	6
Dacre & Crosby Ravensworth	15.2	Unknown	1
n=95			
n=164			
n=259			

Mean Number of Apple Trees per Orchard:	
Crosby Ravensworth	14.7
Dacre	6.8
Dacre & Crosby Ravensworth	8.6
n=59	
n=88	
n=147	

TABLE 6 MEAN AGES OF TREE SHAPES AND ROOTSTOCKS

Mean Ages of Different Tree Shapes:		Mean Ages of Different Rootstocks:	
Standard	94.6 yrs n=36	Vigorous	86.8 yrs n=59
Half Standard	69.6 yrs n=48	Semi Dwarfing	83.1 yrs n=45
Bush	59.5 yrs n=22	Dwarfing	33.4 yrs n=17
Dwarf Bush	53.5 yrs n=38	Very Dwarfing	40.6 yrs n=16
Fan	80.0 yrs n=1	Extremely Dwarfing	16.4 yrs n=10
Pyramid	23.0 yrs n=2		

TABLE 7

**TOTAL NUMBERS OF FRUIT TREES
OTHER THAN APPLE TREES FOUND
IN THE ORCHARDS SURVEYED:**

Pear	20
Plum	29
Damson	32
Cherry	4
Elder	6
Bullace	2
Crab	5
Walnut	1
Greengage	2
Unidentified	
Prunus species	11
Total	112

5. DISCUSSION OF RESULTS

Although at the turn of the century both parishes had substantial numbers of orchards (figs 3 & 4) by the end of the century Crosby Ravensworth had far fewer viable orchards than Dacre, with the possible reason for this being related to soil type. The soils of Crosby Ravensworth are far more prone to water logging than those of Dacre, by a factor of three or more (see p.5). The susceptibility of apple tree roots to rotting in wet soil, coupled with high winds in the winter months would result in the poorly anchored trees at Crosby Ravensworth being more prone to windthrow. This was a factor that was often mentioned by landowners as a reason for removing orchard trees. Indeed of the three substantial orchards in Crosby Ravensworth parish (C01,02 & 03) the highest of the three (C03) at 183m elevation had two windblown trees extant (see p.22).

The fact that the commonest orientation for these remaining old orchards is on a north to east facing slope, tends to suggest that although exposed to cold winds for approximately 25% of the time the prevailing wind is south to west for 55% of the time, the direction from which strong gale force winds would uproot poorly anchored trees on a south to west facing slope (Pearsall and Pennington 1989). So although orchards on a north to east facing slope will tend to suffer a cooler, drier microclimate with less direct sunlight, they will also be sheltered from strong oceanic winds and heavy rainfall, the combination of which is very deleterious to apple trees growing on heavy soils.

The desktop survey of archive maps revealed a similar pattern of orchard numbers in each parish as a function of time (figs 3 & 4). Each graph shows a peak at the beginning of this century and a subsequent decline towards the present day.

If this information is combined with contemporary census data it can be seen that in Dacre there are now more residents per orchard than there have been at any time since 1900. Conversely in Crosby Ravensworth parish there are now fewer residents per orchard than at any time since 1851. These contrasting trends are the result of a fall in population from 971 at Crosby Ravensworth in 1851 to 443 in 1981, a drop of 54%. This can be attributed to the increased mechanisation of farming since the industrial

revolution causing people to leave rural areas and migrate to urban areas where more work was available. Although the parish of Crosby Ravensworth would be attractive to second home owners as a country retreat there is little evidence of any new dwellings having been built with those vacated by previously rural based workers being now occupied by urban based professionals as second homes or let as holiday cottages.

Dacre parish however shows a reversal of this trend. Being on the periphery of the busy market town of Penrith and adjacent to the A66 and M6, it is ideally situated for commuting to industrial West Cumbria, Carlisle, Lancaster or Penrith. This network of improved transport facilities has resulted in many new houses having been built in Stainton, the largest village in the parish of Dacre. In Dacre parish the population showed a slight fall between 1900 and 1925 but as the motor vehicle became more widely used after the war years the population rose to 1234 in 1985 from 863 in 1925, a rise of 43%.

As there are more residents per orchard in Dacre parish and there is a rising population trend it would be an ideal location for a community orchard to be planted, allowing access to the public for recreation. The model of a typical Eden Valley orchard as described in the appendices could be used as the basis for the establishment of a community orchard.

The reason for the peaks in orchard numbers at the beginning of this century can be attributed to a nation-wide emphasis on self-sufficiency as imports of food and fruit were severely restricted during the war years. As imported fruit became cheaper and more widely available after the second world war the importance of locally grown fruit declined, resulting in the neglect or removal of many domestic orchards, as shown by the survey results.

A typical example of this decline is D04 (Orchard House, Newbiggin). In the first half of this century Orchard House boasted a large orchard (by local standards) of 0.5ha. (1.2 acres) in area. Like many of the orchards covered by this survey it was attached to a working farm. The farmer was a keen fruit grower and grew cherries, strawberries, gooseberries, blackcurrants, raspberries and rhubarb in addition to

apples, damsons, plums and pears. Some of the produce was used on the farm and the farmer's wife sold the surplus at Penrith market whilst the family carried out the fruit picking. More recently most of the trees were removed after they had become diseased and windblown, leaving 21 fruit trees still standing in an area of 0.12ha. The remaining trees still bear fruit but are in need of pruning and large conifers planted nearby shade many of them.

Although most of the orchards surveyed were well maintained a substantial number were obviously neglected and had not been tended for many years. If trends continue then these orchards could be lost to future generations before long. It is hoped that the work of Common Ground in celebrating Apple Day and the work of other organisations in this area (the National Trust at Acorn Bank and East Cumbria Countryside Project) will help prevent this decline and if the owners are willing they will be encouraged to take advantage of the Countryside Stewardship Scheme in order to renovate these derelict orchards.

Not included in the data set are several new plantings at both parishes, one particularly large one at Dacre and several smaller ones at Crosby Ravensworth. This is a trend that should be encouraged and is possibly a result of recent endeavours by the organisations mentioned above.

As all the orchards in this survey were for domestic use only it is not surprising that the maximum size of any orchard surveyed did not exceed 1700 sq.m. This would be too small an area to give any commercial return to the owner but large enough to give a substantial crop of fruit for a minimal management outlay.

The ratio of extant orchards attached to farms or smallholdings compared with those attached to private dwellings was roughly 1:1. The survey showed that it was orchards attached to farms (rather than private dwellings) that had been removed as a result of agricultural intensification or allowed to become derelict as their economic importance dwindled.

Typically both private and farm orchards were surrounded by a drystone wall composed of stone found locally, thus near Penrith the orchards were enclosed by sandstone walls whilst at Crosby Ravensworth limestone was used.

Economic Potential

Yields for individual apple trees range from 10kg per year (extremely dwarfing rootstocks) to over 100kg per year (vigorous rootstocks) although yields vary widely between years depending on the weather amongst other factors.

The orchards surveyed could theoretically produce approximately 10 tonnes of apples per year. The estimated local demand (postal survey) is 5.2 tonnes per year. At a possible wholesale price of 40 – 50 pence per kilo, as suggested by one retailer, a return of £2,080 - £2,600 should be possible on the 5.2 tonnes sold locally, (£4,000 - £5,000 if all the apples were sold). This figure represents an income of around £45 per tree if on a vigorous rootstock.

Although these figures are only estimates they do illustrate the potential income for orchard owners if a local collection and distribution network were set up. There is currently no active marketing of locally grown apples and once the problems of sorting, grading and storage have been overcome there is no reason why this venture should not become economically viable. As consumers become more concerned about sustainable food production, the reduction of 'food miles' and the benefits of locally sourced products a venture such as this is more likely to be successful if emphasis is placed on these positive aspects of the produce when they are marketed.

Rootstocks

As most orchards in this survey were over 100 years in age it is likely that many of the trees surviving were planted at the beginning of this century or earlier. At this time the development of dwarfing rootstock was limited, with the 'Paradise' rootstock being the most widely used. As a result most apple trees planted here at this time were grafted to seedling or crab rootstocks, grown from seed to give a vigorous sized tree

7-8m high. As a result, the oldest trees in the survey tended to also be the largest trees not because they have had longer to grow, but because their size has not been restricted by dwarfing rootstocks as the size of some of the younger trees has been.

The use of rootstocks allows the propagation of true varieties to continue. If the seeds of a known variety are planted the resulting trees will grow to be a cross between the known variety and the pollinating parent. Dwarfing rootstocks are now commonly used as they restrict the growth of the tree, allowing easy picking of fruit and maintenance.

Countryside Stewardship Scheme

During the survey visits details of the Countryside Stewardship Scheme were discussed with the individual orchard owners. One element of this grant scheme is directly targeted at the restoration of traditional orchards with widely spaced standard trees. This particular scheme makes payment on a 'per hectare' basis and is more relevant to larger orchards rather than smaller ones with only a few trees.

Consequently a follow up letter was sent to the owners of orchards over 0.13ha in size (D06, C01, C02 & C03) with specific details of the grants for orchard restoration and the offer of further assistance with management plan production.

Many owners were in need of more individual advice and assistance with matters such as pest control, pruning, suitable varieties for planting and general orchard management. Where possible such advice was given and follow up information posted on.

Publicity surrounding the Cumbria Apple Project generated a considerable inflow of requests for advice and information on many aspects of apple cultivation and orchard management from all over Cumbria and the rest of the country. Many of these requests were regarding which varieties of apple to incorporate into new orchard plantings. The results of the survey proved very useful in providing the basis for suggesting which varieties could be expected to produce regular and reliable fruit.

The interest in planting new orchards led to many requests for details of suppliers of specialist apple tree varieties and nursery stock. Currently we are able to recommend:
R.V. Roger, the Nurseries, Pickering, N. Yorks.

Deacons Nursery, Godshill, Isle of Wight

Keepers Nurseries, East Malling, Kent

Due to the increased demand for unusual apple varieties there is considerable potential for more nurseries to stock a wider range of apple tree varieties.

6. CONCLUSION

After comprehensive analysis of the data collected in the survey it can be concluded that there has been a dramatic fall in the number of orchards in the survey area since the beginning of the 20th century. This was more marked in Crosby Ravensworth where windblown trees have been removed and not replaced as intensification and specialisation of farming practices has occurred. Notably some farms have established new fruit trees over the last few years especially at Crosby Ravensworth. This is a trend that should be encouraged especially if local varieties are used.

Of the surviving orchards many are in excess of 100 years old and the majority of trees nearing the end of their natural life. Although the owners of those orchards attached to private dwellings tend to keep them well maintained, those attached to farms tend to be more neglected. It is essential that a grant package aimed at small farm orchards be introduced in order to halt the losses of these valuable genetic resources, which also play an often-understated role in countryside heritage. This, alongside the continued promotion of local varieties through the work of Common Ground and others should enable both farm orchards and those attached to private dwellings to survive and proliferate, rather than disappear, as the trend has been for the last 50 years.

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9. APPENDICES

- I. Blank Field Survey Form (overleaf)
- II. Blank Market Survey Form
- III. Model of a Typical Eden Valley Orchard

ORCHARD SURVEY AND REGISTER FORM**OWNERSHIP DETAILS**Name & location address of orchard:

Grid Reference:

Site owner, contact address & tel. no:

ORCHARD DETAILSSize of orchard (in square metres):

Types & varieties of fruit tree present:

No. of trees present:

Approx. age of trees present:

Current condition of tree present
(including any present management):

Ground vegetation in orchard -
(grass, bare soil, grazed, meadow etc.):

Other uses of orchard
(e.g. for bees or poultry):

History of orchard
(local uses, recipes, stories):

Wildlife observations:

Other comments:

Filled in by:

Date:

**CUMBRIA APPLE PROJECT
MARKET SURVEY QUESTIONNAIRE**

NAME & ADDRESS OF RETAIL OUTLET:

CONTACT NAME & PHONE NUMBER:

WOULD YOU BE INTERESTED IN STOCKING LOCALLY GROWN APPLE VARIETIES?

YES/NO

IF SO, WHAT QUANTITIES WOULD YOU PROVISIONALLY BE INTERESTED IN STOCKING?

----- kg (approx.)

WOULD YOU BE INTERESTED IN ANY PARTICULAR VARIETIES?

OTHER COMMENTS

PLEASE RETURN THIS QUESTIONNAIRE IN THE ENVELOPE PROVIDED

Appendix III

Model of a Typical Eden Valley Orchard:

15 Fruit trees, comprising	8 apple trees
	2 damson trees
	2 plum trees
	1 pear tree
	1 cherry
	1 crab

Area: approx. 800 sq.m.

Main apple varieties:	3 Bramley (2 half standard, 1 bush)
	1 Keswick Codlin (dwarf bush)
	1 Newton Wonder (half standard)
	1 Grenadier (standard)
	1 Allington Pippin (standard)
	1 Worcester Pearmain (dwarf bush)

Other Possibilities:	Lord Derby
	Scotch Bridget
	Lane's Prince Albert
	Golden Spire