

Status of Vegetation Development at Butcherland Fields SWT Reserve to 2005



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The West Weald Landscape Project Manager is employed by the Sussex Wildlife Trust with funding from English Nature, Environment Agency and the Heritage Lottery Fund.

The aim of the project is to encourage good management of this well wooded landscape in the West Weald; particularly concentrating on linking up isolated habitats and species and promoting conservation management with grants that are available through Environmental Stewardship and the England Woodland Grant Scheme.

A partnership of organisations helps oversee the project which includes the Sussex Wildlife Trust, English Nature, Forestry Commission, Environment Agency, Butterfly Conservation, Surrey Wildlife Trust, South Downs Joint Committee, Farming and Wildlife Advisory Group, Woodland Trust, National Trust, West Sussex and Surrey County Councils, Chichester District Council, Waverley Borough Council

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Introduction

The nine fields bought by SWT in 2001 at Butcherland Farm with HLF funding cover an area of about 80 ha in total, equivalent to the size of Ebernoe Common, and have been developing from ex-arable fields (with margins) over a period of about 4 years. SWT's vision for the six main fields is that they develop naturally into a pasture woodland complex with a patchwork of more open areas in the longer term, with the main driver for this process being grazing animals.

During the first five years (until 2008/09), it was envisioned that the Trust would “kick-start” the establishment and growth of desired vegetation. This has been done by initially disc-harrowing the land, followed by relatively low intensity grazing by a domestic breed of cattle from April to November encouraged to focus on annually topped patches in the field centres (discontinued in 2004 due to the abundance of ragwort). ‘Undesirable’ vegetation - ragwort and thistle – has been subject to both manual and chemical weed control (spot-spraying in some areas). No other significant management intervention was contemplated, although limited wetland and hedgerow works and black poplar planting have taken place subsequently.

From the outset, the importance of research and monitoring of the development of Butcherland fields was considered – in particular studies of the development of woody vegetation and effect of grazing pressure – although unfortunately no full baseline survey was undertaken prior to reversion being initiated. It is important now to analyse the early results of the various surveillance/ monitoring studies that have been carried out since 2002 (in some cases) to assess the colonisation of vegetation and effectiveness of our supporting management, and consider whether any changes should be made so that grazing and browsing levels are maintained within acceptable limits.

Methods

PROJECT	FOCUS	PERSON	TIME PERIOD
1. Regular Quadrat Transects	All Vegetation	Frances Abraham	2004-05
2. Continuous Quadrat Transects	Woody & other selected Vegetation	Sarah McKenzie et al	2005
3. Scrub mapping	Woody scrub (all)	Rich Howorth	2005
4. Willow Scrub Structure & Browsing Plots	Willow scrub (selected)	Rich Howorth	2005
5. Oak seedlings study	Oak seedlings	Sarah McKenzie et al	2003
Other Methods applied: (i) Experimental acorn planting (ii) Soils (iii) Faunal surveys	Acorns Soils a) Birds b) Butterflies c) Small mammals	SWT S. McKenzie et al Clive Hope & Leonard Manns Margaret Hibbard S. McKenzie et al.	2002 2004 2004-05 2005 (casual) 2004

1. Regular Quadrat Transects

Eight transect belts were laid out in mid-2004, consisting of a total of 64 1 m² sq quadrats with each transect having 6-12 quadrats generally 4 m apart. The transect lines cover mown, grazed and unmanaged areas and some include the former conservation headlands of the ex-arable fields. The cover/abundance of vascular plant species in each quadrat has been recorded according to the Domin scale in June/July of 2004 and 2005, with woody species also individually counted and measured and the cover of bare soil and bryophytes and vegetation height also noted.

2. Continuous Quadrat Transects

Two belt-transects 4 m wide (consisting of two 2m² quadrats adjacent to one another repeated contiguously) were laid out in Sparks field in May 2005 and a further two in Hilland field in October 2005. The aim was to record the presence of seedlings of woody species that have established since SWT took over management, as well as recording the percentage cover of shrubby/"weedy" species that may act as a "nurse" cover to some woody seedlings. The number of individuals of key woody species were recorded, as well as any evidence of browsing of oak seedlings in Spark's field and all seedlings in Hilland. Individual seedling heights were also measured in one side of just one transect at Hilland as an experiment.

3. Scrub mapping

A ground survey was carried out on 10-11 October 2005 to approximately map the distribution of scrub areas in all of the fields at Butcherland. Areas of scattered and dense scrub were differentiated, with (Phase 1) species codes assigned to represent the dominant woody species present. For dense scrub blocks, a note was made on the approximate average height and width of each furthermore.

4. Willow Scrub Structure & Browsing Plots

Eight plots were established in late 2005 across the six main fields of Butcherland Farm to characterise the developmental stage of the willow scrub development and assess the influence of domestic and wild browsing animals across the site. The plot(s) in each field were located in a 'representative' stand of scrub, with the quadrat similarly sited in a typical area within the stand. A 4 x 4 m quadrat was established with marked wooden stakes at each corner, connected by a temporary string line with 4 m sides.

The general environmental characteristics of each plot were noted, including location, stand and quadrat descriptions, slope, drainage, land management and scrub characteristics. The latter category included noting evidence of any bark stripping and/or snapped stems by grazing animals. The maximum height of each evident live woody individual (< 9 cm girth at breast height (gbh), or <3 cm diameter (dbh)) was measured, as opposed to every woody stem. Obvious dead stems were ignored, as well as live young suckers lacking woody bark. Height was recorded to the nearest 10 cm (20 cm in Plot 1), and a record made of whether the top leading shoot(s) had been obviously browsed by grazing animals. Subsequent analysis generated a height-frequency chart illustrating the scrub structure/population profile and the relative amount of browsed versus unbrowsed individuals in each height class.

5. Oak seedlings study

Two 50 metre baselines were originally set out in November 2002 at the northern end of Spark's Field in the former unharrowed arable margin, each approximately 3 metres from the field edge. A search was made for oak seedlings in 10 metre length sections in each baseline, moving 20 metres out into the field up to the edge of the harrowed area. The position of each seedling was noted and measured from the baseline, also recording the distance from each baseline to the nearest parent oak tree. The survey was then repeated in October 2003 as a follow-up.

Other Methods applied:

(i) Experimental acorn planting (SWT)

Three experimental areas were planted with acorns in 2002 in areas with/without deer browsing access, prior to introduction of cattle on the site. No difference was found in oak seedling establishment between these different areas, with a lowly 2% of acorns only emerging as oak seedlings in the study period.

(ii) Soils (S. McKenzie et al)

Two pits were dug in Hilland Field in 2004 to assess soil profiles, with each horizon identified and described and soil texture determined. In addition soils were sampled from different parts of this same field for simple chemical analysis. Results held comprise a scanned image of the field notebook detailing the 2 profiles only.

(iii) Faunal surveys (Various surveyors)

Casual recording and limited surveys only have been undertaken to date of a few selected groups of animals. A transect walk to record birds has been carried out by Clive Hope in April and May 2004 and 2005 (4 visits in total) by walking a line through the centres of all six ex-arable fields, with individual numbers of each bird species provided. Occasional visits to record butterflies were undertaken by Margaret Hibbard during 2005, with a suite of transect walks to carry out regularly from 2006 now established (see end of report). A survey of small mammals in Spark's Field was done on 13-14 November 2003 and repeated on 6-7 May 2004 by Sarah McKenzie's group furthermore, with the results for this now being obtained.

Results

(N.B. Raw data is available on request)

1. Regular Quadrat Transects

Considerable differences exist between the different field transects in species richness, ranging from a maximum of 38 species in Church Field (12 quadrats) down to less than half this figure, 16 species in the 7 quadrats of Lime Kiln Field.

Vegetation height trends were variable, but generally showed the same pattern along the transect line between years, although the two older grassland fields (Common Barn and Hooks Croft) both had noticeably shorter swards in 2005 than 2004, presumably due to the more intensive winter-grazing by Herdwick sheep, as was the case generally in High Buildings Field too. In contrast, sward height increased slightly on average in Lime Kiln Field, which was not grazed in 2005 because of the ragwort abundance there.

There was a marked difference between the two longer-established grassland field swards and the six ex-arable (post-2000) fields, with the latter vegetation being quite dynamic as it develops from arable and disturbed ground towards a grassland flora. A net average of two species were lost from each ex-arable field in the one-year period of initial monitoring and there was considerable turnover of species. Species of arable and other disturbed ground, many of which are annuals, have continued to decline as the sward has closed in, and the flora is in general becoming less diverse and more uniform. Common 'immigrant' species included hogweed *Heracleum sphondylium*, and less so dandelion *Taraxacum officinale* and marsh thistle *Cirsium palustre*.

Common Barn Field and Hooks Croft have been uncultivated for a longer period (since about 1990) and their flora already contains more species of established grassland. Fewer changes in species composition are evident here, and both fields increased species richness overall in the one-year monitoring period. There has been more change in the grassland species in Hooks Croft than Common Barn Field, apparently resulting from mowing and grazing. In Hooks Croft there has

been a marked decline in both Creeping Thistle *Cirsium arvense* and Fleabane *Pulicaria dysenterica*.

Trends in dominant species abundance were variable across different fields, with cover of the main grass species present *Poa trivialis* generally declining a little in all fields, whereas another abundant grass *Agrostis stolonifera* showed variable trends in different fields and the palatable damp meadow grass Yorkshire Fog (*Holcus lanatus*) generally increased its cover in all fields. The clover *Trifolium repens* experienced a big decline in cover in both Sparks and Lime Kiln fields, and variable trends elsewhere in common with the abundant forb Creeping Buttercup *Ranunculus repens* which changed variably in different fields.

Woody seedlings experienced considerable turnover of individuals and species, with oak *Quercus robur* disappearing from a number of quadrats and other species, such as ash, coming in. The number of seedling and sapling trees has increased in most fields, however, especially in the quadrats in ungrazed areas. Grey Willow *Salix cinerea* is the most common species in Butcherland fields, whereas Ash *Fraxinus excelsior* and Oak *Quercus robur* are occasional. Blackthorn *Prunus spinosa* has arrived in Common Barn Field in the quadrat closest to the hedge. In general it appears that while Grey Willow races into the more recently cultivated ground, Blackthorn is more likely to colonize longer-established grassland. Indeed SWT's Herdwick sheep are used in both Hooks Croft and Common Barn Field to control the invasion of blackthorn and bramble there.

2. Continuous Quadrat Transects

Transect 1 in Spark's Field had 8 oak seedlings, 6 of which had been browsed (75%). No seedlings were present beyond the first 6m from the field margin. Three other woody species were recorded, willow (*Salix spp.*), ash (*Fraxinus excelsior*) and blackthorn (*Prunus spinosa*), principally in the first 16m from the hedgerow. Dock was the most frequently recorded "weedy" species present, with rush and thistle also prevalent over the length of the transect, but occurring in discrete clumps. For Transect 2, 14 oak seedlings occurred, 10 of which had been browsed (71%). Seedlings were present up to 16m distance from the boundary, thus establishing successfully in two of the three management treatments: ungrazed and grazed but not mown. Willow (*Salix spp.*) and birch (*Betula spp.*) also occurred, again in the first 16m. The distribution of "weedy" species was more evenly spread (than Transect 1), and were dominated by the 3 aforementioned species although thistle and rush were concentrated nearer the start of the transect. More bramble and bracken occurred furthermore.

In Hilland Field, browse pressure varied along the length of both transects for the dominant woody species, oak in the north (Transect 2) and willow in the south (Transect 1), but tended to increase with distance from the field edge. Oak browsing averaged 74% for T2 but just 29% for T1, with willow browsing slightly greater here at 39% of stems. Browsing by stem height on one side of the T1 transect revealed that most oak seedlings were browsed at c. 15 cm height, with most escaping attention at a lesser height. Willow heights varied from 5-50 cm, with the majority just 15 cm tall. A few other woody species occurred at low numbers, and thistle and ragwort predominated amongst the "weedy" species.

Further analysis is required in both fields to determine what vegetation differences are evident between grazed and ungrazed areas by cattle. Furthermore, none of the oak seedlings recorded in Spark's Field (at least) seemed to be clearly associated with any scrub or "weedy" species of these species. It will be interesting to see if such an association develops over time as hypothesized by Frans Vera.

3. Scrub mapping

Significant dense bands of willow scrub (*Salix cinerea*) occur in Spark's, Limekiln, Highbuildings, Nine Acre and Hilland Fields – in the former two areas these are located behind the fenceline protected from cattle grazing. In all of these fields, the scrub bands were restricted to the former arable margins, with scattered scrub also largely occurring at these fringes. Only in Highbuildings Field does the scattered willow scrub expand outwards significantly away from the margins. Scattered bramble and occasional oak seedlings were found in all of the ex-arable fields, with very limited birch in Spark's and alder in Hilland. In contrast, bramble and blackthorn predominate in the older grassland fields, generally hugging the margins, with bands of gorse also significant in Brick Kiln field and Furnace Meadow furthermore. See attached paper map - note that discrete patches of scattered scrub are indicated by a dotted line, and oak seedlings by a point. (N.B. Scope exists to add average heights and width data for willow scrub patches too).

4. Willow Scrub Structure & Browsing Plots

The results (Table 1 & Figure 1 below) illustrate highly contrasting population structures – heights and densities – of (grey) willow scrub (*Salix cinerea*) in different fields, as well as greatly differing browsing impacts on scrub development which may well relate to the degree of growth evident in each field. Occasional pedunculate oak seedlings (*Quercus robur*) were also encountered beneath the willow scrub patches in some fields, with very limited occurrence of any other woody species.

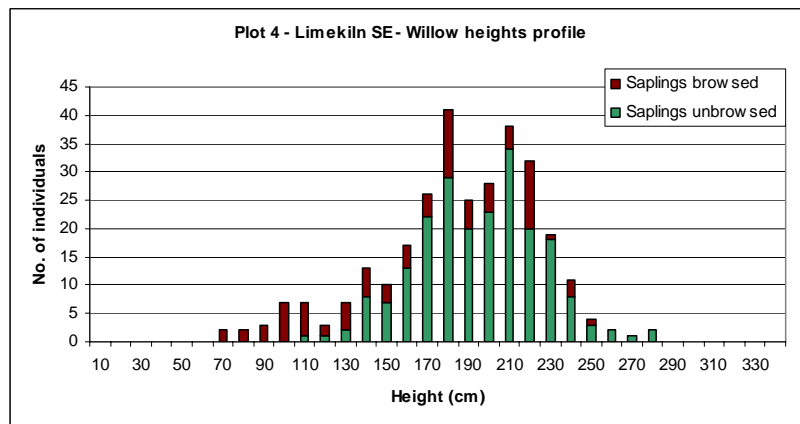
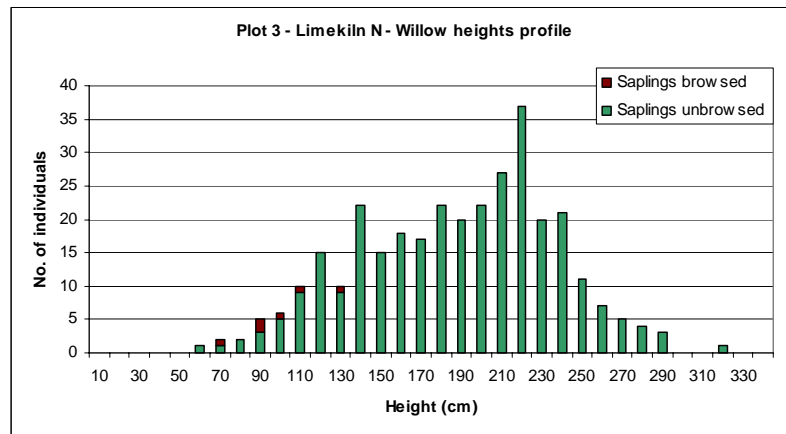
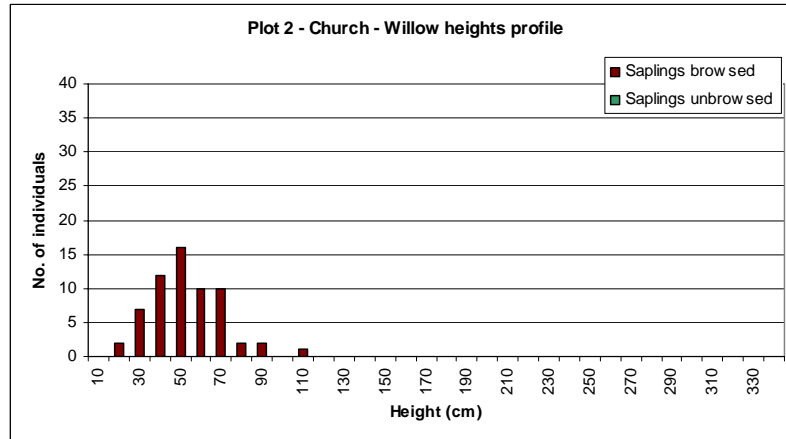
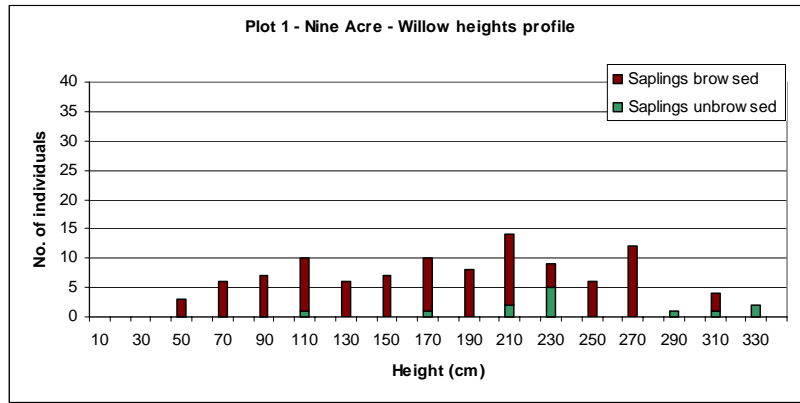
Browsing was heavy in all fields, except for the fenced areas of Lime Kiln field. The two fields with the least dense and smallest scrub – Church and Spark's fields – also had all of their individuals browsed. Plots on other fields that were open to cattle grazing generally also had a relatively sparse density of willow scrub and generally heavy browsing of individuals also. Highbuildings NE plot was a partial exception to this trend, with medium density scrub and moderately heavy browsing only. In contrast, the fenced plots – both located in Lime Kiln field, in different stands of scrub – contained very dense and tall willow and showed reduced evidence of browsing, almost non-existent in the case of the Northern stand. The South-eastern stand, in contrast, had almost one-third of individuals browsed – apparently by roe deer. The high prevalence of scrub individuals with damaged/stripped bark around 40-60 cm height in this area could also be attributable to rabbits potentially.

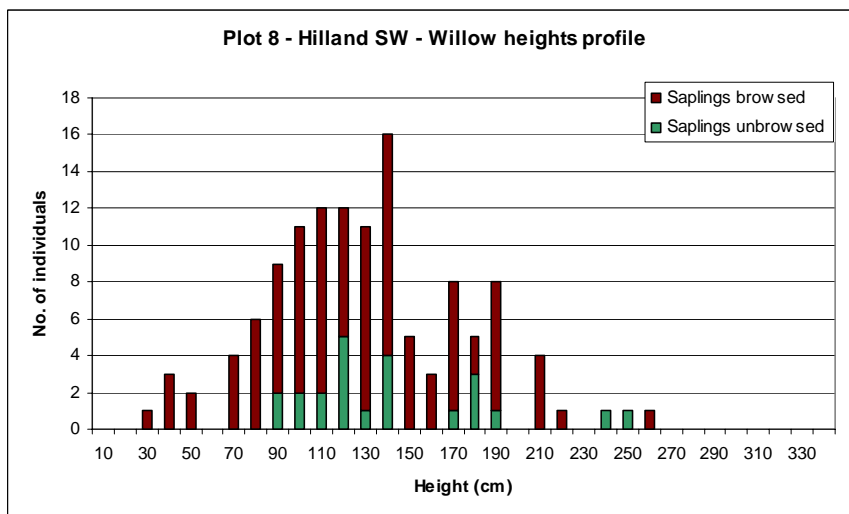
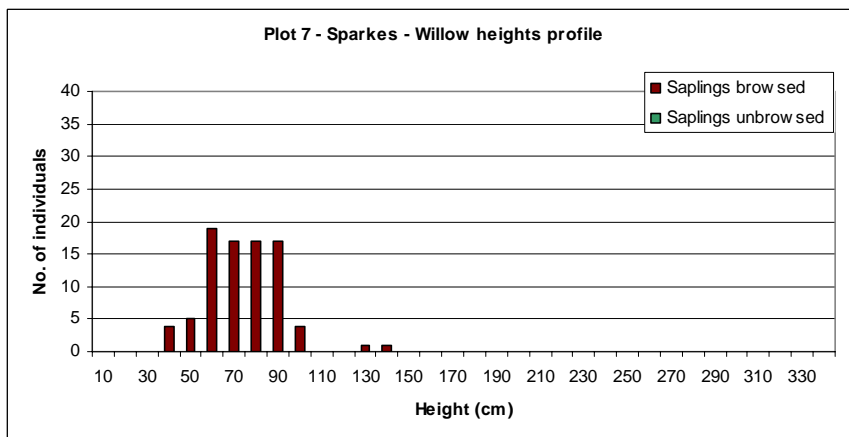
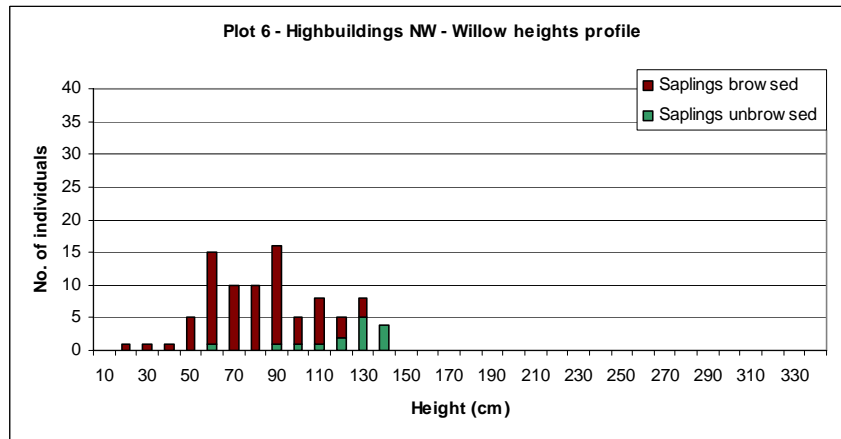
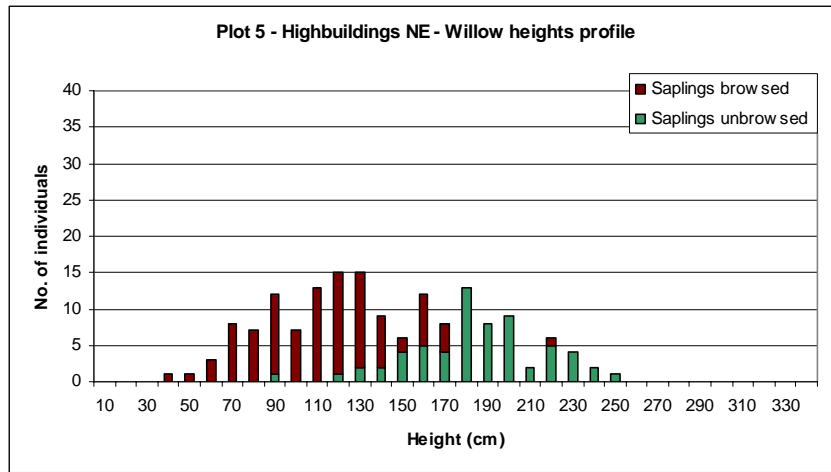
Of note was the tall height at which browsing occurred, up to about 140 cm height principally in the case of the two fenced plots but reaching up to 180 cm in Highbuilding and 240 cm in Hilland fields respectively and an incredible 310 cm in Nine Acre field! Apparently the cattle present, in some fields at least, are leaning on tall willow scrub and thus reaching the topmost growing shoots. Even where browsing does reach such extreme heights, and where it is heavy, some new leading/lateral stems may get away and at least temporarily escape browsing animals – the growth of the scrub is undoubtedly considerably altered and inhibited however in this scenario. The few mostly small individuals of other woody species present – principally oak (nine seedlings) – had all been browsed too with just one exception.

Table 1 – Willow scrub characteristics in Butcherland scrub plots

Plot No.	Field name (loc.)	Scrub species	Population structure	Browsing impact
1	Nine Acre (N) Open	Grey willow	Fairly sparse density (6.6 indivs/m ²), tall – average height 184 cm, broad size range (50-330 cm tall), peak heights (/age?) at <u>210</u> and 270 cm.	Heavy: 88% average browse density – browsing to 310 cm (!) height, totally browsed to c. 210 cm vs. partly unbrowsed from 290 cm.
2	Church (W) Open	Grey willow & Ash (1)	Very sparse density (3.9 indivs/m ²), v. small – average height 53 cm, limited size range (20-110 cm tall), peak height (/age?) at just 50 cm.	V. heavy: 100% average browse density – all stems browsed, none unbrowsed.
3	Limekiln (N) <u>Fenced</u> i.e. not grazed by cattle	Grey willow	Very high density (20.2 indivs/m ²), tall - average height 187 cm, broad size range (60-330 cm tall), peak heights (/age?) at 150 and <u>220</u> cm.	V. light: 2% average browse density – browsing to 130 cm height only, limited browsing from 80-130 cm height vs. totally unbrowsed from 140 cm.
4	Limekiln (SE) <u>Fenced</u> i.e. not grazed by cattle	Grey willow	Very high density (18.8 indivs/m ²), tall - average height 186 cm, quite broad size range (70-280 cm tall), peak heights (/age?) at <u>180</u> and 210 cm.	Moderately light: 29% average browse density – browsing to 250 cm height (!), totally browsed to c. 100 cm vs. mostly unbrowsed from 140 cm.
5	Highbuildings (NE) Open	Grey willow & Oak (2)	Medium density (10.1 indivs/m ²), quite tall - average height 141 cm, broad size range (40-260 cm tall), peak heights (/age?) at <u>130/140</u> and 190 cm.	Moderately heavy: 61% average browse density – browsing to 180 cm height mainly, totally browsed to c. 120 cm vs. largely unbrowsed from 180 cm.
6	Highbuildings (NW) Open	Grey willow & Oak (3)	Sparse density (5.6 indivs/m ²), relatively small – average height 87 cm, fairly limited size range (20-150 cm tall), peak heights (/age?) at 60 and 90 cm.	Heavy: 83% average browse density – browsing to 140 cm height, largely browsed to c. 120 cm vs. largely unbrowsed from 130 cm.
7	Sparkes (SW) Open	Grey willow & Oak (1)	Sparse density 5.3 indivs/m ²), small - average height 74 cm, limited size range (40-150 cm tall), peak height (/age?) at just 60(-100) cm.	V. heavy: 100% average browse density – all stems browsed, none unbrowsed.
8	Hilland (SW) Open	Grey willow & Oak (3) & Alder (1)	Fairly sparse density (7.8 indivs/m ²), quite tall – average height 130 cm, broad size range (30-260 cm tall), peak heights (/age?) at 110/120 and <u>140</u> cm.	Heavy: 81% average browse density – browsing up to 260 cm height (!), totally browsed to 80 cm, partly unbrowsed from 90-140 and 170-190 cm, totally unbrowsed from 240-250 cm.

Figure 1 – Willow scrub plots population/growth profiles, showing browse proportion (darker brown)





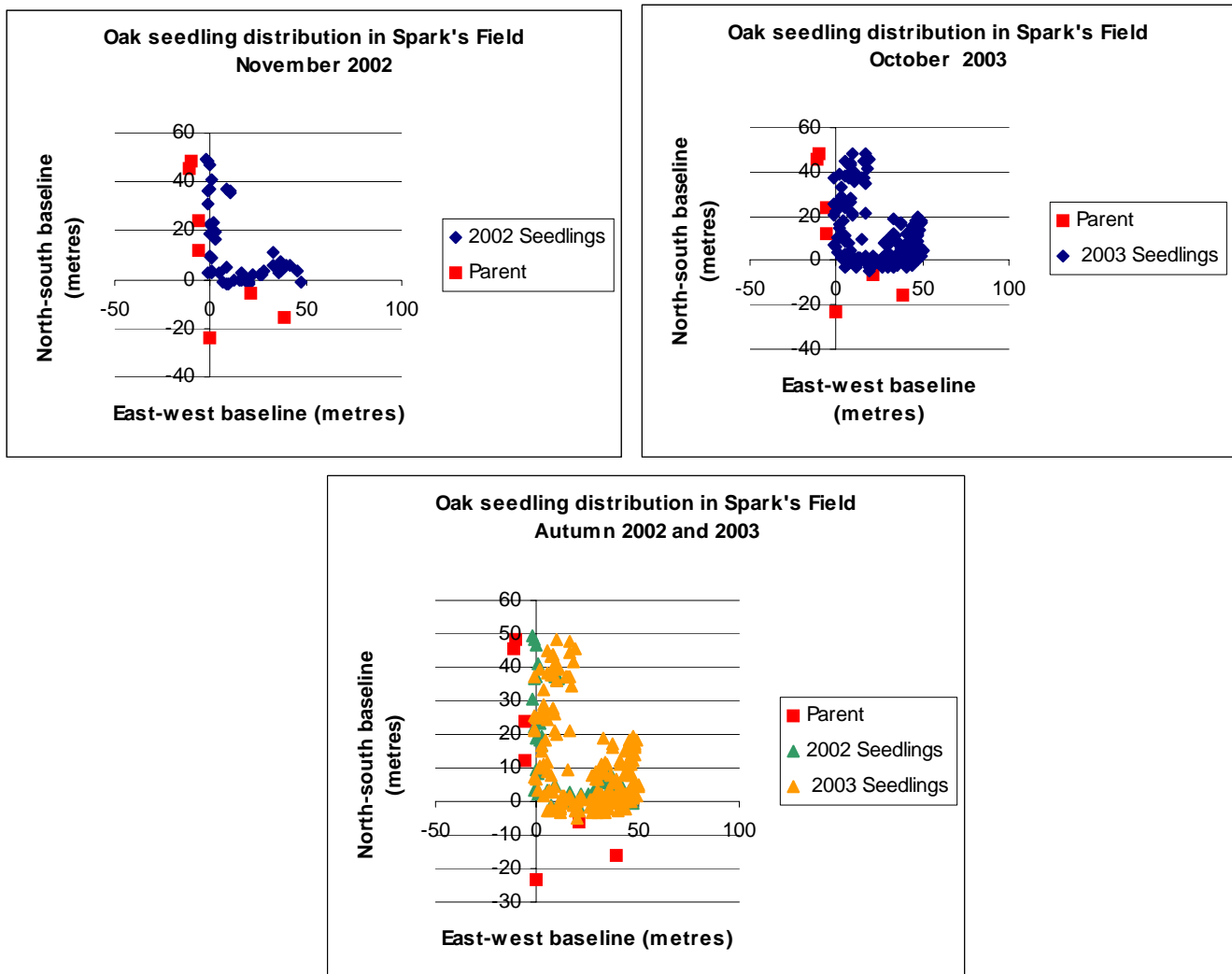
5. Oak seedlings study

A total of 49 seedlings were recorded and measured in 2002, along with 7 parent oak trees. Figure 2 shows a plot of the distribution of oak seedlings (blue diamonds) and the parent trees (red squares). The greatest distance from the baseline that a seedling was recorded was 10.8m, the nearest to the field edge was -2.2m from the baseline. The majority of seedlings occurred near the edge of the field (mean = 3.97m), with only 10 seedlings occurring more than 4m from either baseline. There appears to be some relationship between the location of the parent trees and seedling distribution, although this was not tested.

In 2003, in contrast, a total of 191 seedlings were recorded (Figure 3) - an increase of 241%! The mean distance of seedlings from the field edge was 16.04m with a maximum of 19.7m. The reason for this remarkable increase in oak seedlings and their distribution further into the field is not easy to explain. Sparks Field had been freshly harrowed to within 20m of the field edge in the autumn of 2002. It could be due to a number of oak seedlings having survived the disc harrowing, which would have given them a competitive advantage through the removal of the more competitive grasses. Additionally, it is possible that acorns could have been buried by jays at the junction of the harrowed and un-harrowed zones in the field (making use of vertical structure to aid subsequent relocation).

Figure 4 shows data from 2002 (darker green triangles) and 2003 (lighter yellow triangles) for comparison – of note is the cluster of seedlings at 40-50m along the east-west boundary 20m into the field.

Figures 2, 3 & 4 – Oak seedling distributions in 2002, 2003 and 2003/2003 respectively



Management information

Management in 2003 / 2004

Several areas were topped for thistle in July. There was only occasional ragwort seen at this time. Tenders were put together to contract the 9km of stock fencing required for the site. Fencing and all infrastructure were finished in early 2004. The central area of Brick Kiln field was topped and raked by volunteers.

Grazing in 2004

50 cattle, all cross breeds, were introduced to the Butcherland fields from April 2004. Many of the fields were rich in clover and movements between the fields were often undertaken in the afternoon to avoid bloat. It soon became apparent that there was a large ragwort problem and several fields could not be grazed once the ragwort was in flower. Several cattle were observed eating ragwort and one steer was found dead in Church field. High Buildings Field remained ungrazed due to the quantity of ragwort.

Once Hilland and then Lime Kiln Field became unavailable for grazing, cattle were moved around the site to fields with less ragwort. As the dry summer progressed, we began to move the animals off-site in September / early October. Other problems included poor access in to Furnace Meadow, Brick Kiln Field and difficulties catching cattle in the crush in Ebernoe.

Herdwick sheep were used to browse off Common Barn Field and Hook Croft in the winter.

Approximately 23 volunteer days utilised to pull ragwort. Several fields were topped for thistle and ragwort in July.

Grazing in 2005

Approximately 80 cattle were brought in for the 2005 season with the intention of removing 30 – 50 % once any spring flush had been controlled. A new Fittleworth trackway was created in to Furnace Meadow and a new bridge installed between Furnace and Brick Kiln to allow the cattle to graze both meadows. A new gate was installed from Ebernoe in to Furnace Meadow to allow the cattle to be moved from the Common without using a crush.

Hilland was grazed early in the season and then the cattle grazed c 13 ha. behind electric fencing. By the end of June it became necessary to move the animals from Hilland to Church Field, on to Nine Acre and then back to Church. With another incredibly dry summer it became necessary to move the animals off-site early – this took some time as the grazier struggled to find other grazing land.

Ragwort was an issue in several fields and Lime Kiln was hardly grazed. Enhancement of the wetland area took place in Nine Acre. Herdwick sheep were used to browse off Common Barn Field, Hook Croft, Denis's Croft and Furnace Meadow in the winter. Several fields were topped for thistle and ragwort in July. Ragwort was spot-sprayed in May in several fields by contractors. Approximately 38 volunteer days were utilised to pull ragwort.

Analysis of the cattle grazing data from 2004 and 2005 is shown in **Table 2**, showing the equivalent livestock units in each field and their density per hectare.

Grazing in 2006

Approximately 50 cattle were brought on in May (a late start to the season). A section of hedgerow between Nine Acre and Church was fenced to prevent access by cattle. Cattle will now be able to wander more naturally around the site as the gates between Sparks, Lime Kiln and High buildings are being kept open. A new gate between Church and Nine Acre will also be kept open, although Hilland will not be grazed this year. A management strategy needs to be determined for addressing the ragwort abundance in Hilland field (e.g. spraying, weed-wiping, topping etc.).

Cattle numbers planned in 2006:

20 cattle - Highbuildings /Lime Kiln / Sparks

8 cattle – Common Barn / Hook Croft

8 cattle – Church / Nine Acre

14 cattle – Brick Kiln Field / Furnace Meadow

Table 2 – Livestock units & grazing days in 2004 and 2005, compared with field size and woody scrub plots' browse % impact

Field name	livestock units 04	grazing days 04	livestock days	l.d.per hectare		livestock units 05	grazing days 05	livestock days	l.d. per hectare	field size	browse impact
	0.5 cattle 0.1 sh					0.5 cattle 0.1 sh				ha	
common barn field	5	57	285	174.85		4	56	224	137.4	1.63	
hook croft	2.5	77	192.5	77.62		4	72	288	116.12	2.48	
Lime kiln	4.5	71	319.5	34.02		8.5	10	85	9.05	9.39	N/A (behind fence: 2-29%)
high buildings	0	0	0	0		8.5	27	229.5	36.37	6.31	Median 72% (range 61-83%)
sparks	6	127	762	93.95		8.5	104	884	109	8.11	100%
church	8.16	118	962.88	171.63		8.875	171	1517.6	270.51	5.61	100%
hilland	14	34	476	25.68		18	42	756	40.79	18.5 3	81%
Nine acre	14	15	210	46.35		17.5	21	367.5	81.12	4.53	88%
furnace meadow	8	18	144	38.92		10	27	270	72.97	3.7	
brick kiln field	5.3	136	720.8	110.21		5 sussex	3	15	4.05	3.7	
ebernoe common	4.2 sussex	51	214.2	6.12		3 sussex (may)	23	69	1.97	35	
	4.5 X breeds	29	130.5	3.73		5 sussex (aug)	37	185	5.28	35	
denis's croft	0	0	0	0		3.8 herdwick	18	68.4			
common barn field	3.2 herdwick	19	60.8	37.3		3.8 herdwick	24	91.2	55.95	1.63	
hook croft	3.2 herdwick	54	172.8	69.67		3.6 herdwick	19	68.4	27.58	2.48	
furnace meadow						3.6 herdwick	44	158.4	42.81	3.7	

A Correlation Analysis (CORREL) performed on the livestock days per hectare figures for 2004 and 2005 against the browse percentage impact on the unfenced woody scrub plots (measured 2005 only) showed a strong positive correlation for both years 0.892 and 0.766 respectively. This indicates that the cattle were most likely responsible for the majority of the observed browsing impacts in the unfenced areas of the fields sampled. The weaker correlation evident in 2005 based on the actual data introduces a slight note of caution however.

Conclusions

- Woody vegetation is developing in Butcherland fields, principally willow scrub and especially in fenced ungrazed areas. Longer-established grassland fields tend to exhibit invading bramble, blackthorn and gorse rather than willow in contrast.
- Browsing pressure of willow scrub in most areas is high, between 80-100% of stems surveyed in grazed areas (although just 60% in Highbuildings NE plot and 30-40% in southern Hilland Transect 1) as opposed to 2-30% of stems in fenced areas.
- Scrub development is being held back to low heights and densities mainly as a result of browsing pressure by our domestic breeds of cattle in most of Butcherland fields. This is likely to be related to both stock numbers and the dry climate experienced in 2005 limiting available grass growth.
- Oak seedlings are sporadic in occurrence, including amongst willow scrub, and show some clustering and link to parent trees as well as varying considerably in numbers between years.
- Browsing of oak seedlings is generally high, 70-75% of individuals, and is concentrated at heights of 15 cm and above.
- There is no obvious evidence as yet of a “nurse” role of oak tree seedlings by ‘weedy’ species and scrub, as postulated by Vera.
- Some limited evidence of increasing browse pressure with distance from the field margins at Hilland Field is apparent for willow in particular.
- Herbaceous vegetation height was apparently reduced in Common Barn and Hooks Croft fields by grazing in 2005 relative to 2004 by Herdwick sheep in winter, with the latter field also showing more change in species composition (increased) potentially due to mowing and grazing.
- Other changes in species composition included a decline in white clover in Spark’s and Limekiln Fields, thus diminishing the risk of cattle stomach bloating. A decline of the ‘weeds’ creeping thistle and fleabane was evident in Hooks Croft, whereas the abundance of ragwort, subject to much intensive manual removal and a particular problem in Hilland Field, was not picked up by the quadrats monitoring.

Recommendations

1. It is recommended to reduce stock numbers and/or grazing duration in 2006, subject to the viability of this option with our outside grazer, to enable more scrub to “get away”. The plan to leave Hilland field ungrazed during 2006 (due to the abundance of ‘noxious’ weeds) might also enable an evaluation of any enhanced scrub development in areas normally open to cattle (but easily accessible to deer too) to confirm their relative impact.
2. We should move towards a more extensive grazing system in which cattle can roam freely between individual fields so that they determine where grazing pressure is concentrated and thus drive the dynamic development of vegetation. Attachment of a GPS collar to cattle will provide information on their preferences.
3. We need to gain a better understanding of the numbers and impacts of wild herbivores - deer and rabbits – at Butcherland fields.
4. A judgement is required on how best to address the abundance of ragwort in some parts of Butcherland fields, including the use of chemical spraying or weed-wipes.
5. Management might focus on creating an uneven sward height and allowing/encouraging the colonisation of thorn scrub, and assess whether this encourages jays to bury acorns at vertical structural boundaries.
6. Further investigation of past land use, from the previous farmer right back, would be of interest in better assessing the effects observed in the present reversion process.
7. There is a need to better define acceptable thresholds of grazing/browsing pressure, beyond which management intervention is triggered in this semi-naturalistic grazing initiative.
8. We should consider developing an enhanced definition of the nature and relative proportions of desired vegetation at Butcherland in the longer term to be able to assess the site’s development and any need for further intervention. This could take the form of a visual representation of the future vegetation state as a plan (GIS) or profile views (artist).

Future survey & monitoring work

PLANNED

1. Regular Quadrat Transects

Frances Abraham will resurvey these in July 2006, and annually until the end of HLF support in 2008 – frequency thereafter to be determined.

2. Continuous Quadrat Transects

These will be resurveyed in October 2006, thereafter annually if possible, by Sarah McKenzie's group.

3. Scrub mapping

This 'baseline' map is suitable for digitisation, followed by survey to update it in c. 2-5 years time. Other mapping work which might be useful sooner is of wet rushy areas to be able to determine if they have any impact (+/-) on woody scrub establishment and growth.

4. Willow Scrub Structure & Browsing Plots

These should be re-surveyed following the end of grazing in late 2006, thereafter at 1-2 year intervals it is suggested. Note that there will be a need to switch from height to girth measurements once the stem threshold size of 9 cm gbh. A further plot could be added in Nine Acre Field where a new fenceline has been installed to assess cattle grazing impact.

Other groups:

Butterflies – Margaret Hibbard to carry out 3 transect walks as possible from April to October, but not on a weekly basis as for Butterfly Conservation standard. All fields to be covered over time, plus one fenced ungrazed area (Spark's Field).

Birds – Clive Hope is apparently unable to continue the established transect walks, in April and May of each year at least, and thus this group is not being regularly monitored presently.

Deer – The Deer Initiative and/or Forest Research have expressed an interest in assessing deer population numbers using their still experimental infrared survey equipment, hopefully in Winter 2005/06 in the wider Ebernoe area. Other possible methods could include a timed transect walk count of individuals and pellet plots monitoring.

POTENTIAL

Other groups:

Rabbits – This is another wild herbivore requiring information on their abundance, potentially through a timed transect walk count of individuals, pellet plots monitoring and/or a count of active warrens. Survey of voles numbers too is another possible focal herbivore species.

Badgers? – It may be worth documenting their setts and territories, including any relationship to cattle grazing and TB.

Ants / Fungi? – Both might be used as indicators of the arable reversion status, with methods and taxonomic expertise support to be determined.

Soils – This is a priority area for full chemical analysis (including NPK), as well as soil moisture levels (?), across all the fields in combination with re-surveys of Spark's, Highbuildings and Limekiln Fields. Ideally this would have been carried out prior to arable reversion commencing, since nutrient levels are likely to play an important role in the determination of the nature and rate of successional processes.

Grass sward density – This is one remaining factor of the vegetation sampling work that has not been addressed to date, potentially through the use of a point quadrat, to assess the relative openness of the developing sward (field centres and margins) in relation to opportunities for woody seedling establishment and the driver effect of different grazing pressures.

Wetland development (Nine Acre Field) – Simple surveys of the colonisation of the new open water ponds suite by vegetation (based on the PSYM method?), invertebrates, amphibians and water voles would be of interest to assess the rate of habitat 'naturalisation'.