Small Fleabane in the New Forest

FC Contract No.304/NF/13/721

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2014

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Martin Rand is the BSBI vice-county recorder for South Hampshire. Martin provided detailed historic records of Small Fleabane, has participated in previous Small Fleabane surveys and has contributed to the 2013 survey.

Neil Sanderson of Botanical Survey and Assessment has a detailed understanding of the flora and phytosociology of the New Forest and has participated in previous Small Fleabane surveys. Neil undertook the 2013 field survey of populations and plant communities. Neil's detailed field report *'Survey of Pulicaria vulgaris on the New Forest 2013'* is available separately.

Recommended citation

Chatters. C., McGuire, C., Rand, M., and Sanderson, N. (2014), *Small Fleabane in the New Forest.* Hampshire and Isle of Wight Wildlife Trust, Curdridge

Cover image by Clive Chatters:

Small Fleabane at Cadnam Green, September 2009

Mapping

Contents

Table of Figures

Summary

Small Fleabane is a critically endangered and legally protected plant associated with the grazed greens and waysides of the New Forest. The plant and these habitats reflect the persistence of New Forest commoners turning their livestock out onto the commons to graze. As such the status of Small Fleabane is indicative of the state of the Forest's landscape and management.

The traditional management of waysides and commons has declined across the lowlands of north-west Europe. The New Forest has become a stronghold for Small Fleabane together with other species and features associated with this historic landscape. With notable exceptions conservation measures and designations outside the New Forest have not halted the decline and local extinctions of Small Fleabane in Britain.

There is a relative abundance of data relating to Small Fleabane in and around the New Forest. Similarly there are data which enable Small Fleabane populations to be considered within the context of changes in the management of the New Forest.

Small Fleabane populations are strongly associated with concentrations of cattle grazed settlement-edge lawns within Ancient Forest Farmlands together with the yards and fields of New Forest commoners' holdings. These habitats are highly localised and represent less than 1% of the common-grazed land of the New Forest. In the absence of high livestock concentrations the grazing of free-ranging livestock does not appear adequate to maintain the seasonally-open eutrophic habitats required by Small Fleabane to germinate.

Small Fleabane populations have benefited from events which may otherwise be regarded as unfortunate or even damaging. These include seasonal poaching of grasslands, stock feeding on a common together with the use of a common by heavy goods vehicles.

Whilst the overall population of Small Fleabane in the New Forest shows changes consistent with stochastic meta-populations there have been local declines in recent decades to a point of local extinctions. These declines and extinctions are particularly pronounced around the historic settlements which adjoin the Crown Lands.

Significant changes have occurred in the size and character of Commoners' holdings. Current changes are occurring in the enclosed Forest landscape with a transfer of agricultural land into fragmented amenity landholdings. These changes militate against the establishment of new cattle enterprises.

Recommendations are made that Higher Level Stewardship partners take actions to support enterprises turning out significant numbers of cattle and pigs on the Open Forest particularly from holdings associated with Ancient Forest Farmland.

Figure 1: Small Fleabane, Cadnam, 2007

Chapter 1: Introduction.

This study has been commissioned by the Forestry Commission on behalf of the partners delivering the New Forest Higher Level Stewardship scheme.

The study relates to a single plant, the Small Fleabane *Pulicaria vulgaris* Gaertn. The Small Fleabane has been selected for detailed consideration as it is a critically endangered plant associated with the grazed greens and waysides of the New Forest. The plant and these habitats in turn reflect the persistence of New Forest commoners turning their livestock out onto the commons to graze. As such the status of Small Fleabane is indicative of the state of the Forest's landscape and management.

In their account of the species in 1999 Tony Hare and Francis Rose state;

"In the New Forest it (the Small Fleabane) grows with an interesting assemblage of species, which give a tantalising glimpse of what the greens and waysides of England must have been like a century or more ago" [1].

The traditional management of waysides and commons has declined across the lowlands of north-west Europe. The New Forest has become a stronghold for Small Fleabane and the assemblage of species associated with this historic landscape.

Through its own funds and the support of the Chapman Charitable Trust the Wildlife Trust has complemented the resources made available through this contract to present a national assessment of the species. The New Forest populations in general, and the populations within the Crown Lands in particular, can therefore be considered in a national context.

Chapter 2: An introduction to Small Fleabane, its ecology, distribution and history to 2009

Small Fleabane (Figure 1), is an aesthetically unremarkable member of the daisy family described as *'not the most ostentatious of British rarities*[2]*'*. It is an annual plant, usually germinating from April onwards to produce flowering plants from mid-July. Germination can occur whenever seed is exposed to warm, moist, bare ground. In exceptional circumstances some autumn germinated seedlings will overwinter to flower the following year. A late germinating plant flowering in the same year may be as small as 1cm high whilst plants growing over an extended season may exceed 30cm. Most plants are usually between 15 and 20cm tall.

Germination occurs on well-illuminated ground with abundant bare soil. This may occur in bare ground exposed by the drying of seasonal ponds, in heavily trampled and poached swards and in ruts created by vehicle movements. The larger populations tend to occur where water stands in winter but which is parched by high summer.

Seed production has been calculated from the New Forest population at Cadnam Green[3]. The mean average number of flower heads[a] per plant was 12.27 with a range of a single flower to 50 flowers per plant. The mean average of seeds per flower was 207.4 with a range of 187-231. An average Cadnam Green plant with an average seed production could therefore theoretically produce 2,500 seeds in a single season. A single large plant with 50 flowers could theoretically produce over 10,000 seeds.

In 1967 Lord Salisbury[4] sampled plants from a number of locations with an average height of 15-20cm with individual robust specimens of 55cm and 70cm. He identified the maximum flower heads per plant at 134 with an average for the entire population of 16. The number of seeds per flower ranged from 23 to 342 with an average of 168. From Salisbury's data the average seed production per plant would be in the order of 2,700 with the larger plants producing more than 16,000 seeds.

The viability of seed within the seedbank has not been subject to systematic study. A seedbank created artificially in 2005 in a 10 litre bucket of soil-based compost has produced seedlings annually to the present day[b] (2013). The seedlings, once confirmed as Small Fleabane, are destroyed before flowering to prevent additions to the seedbank. The reappearance of Small Fleabane on Backside Common (Surrey) after an absence of seven years following the reintroduction of grazing indicates the persistence of the seedbank in the wild[5].

Seed mobility was considered by both Lord Salisbury and Tony Hare. Whilst the seed has a 'dandelion-clock' pappus the seed is disproportionately large for the pappus and aerial dispersal has not been witnessed either in cultivation or in the field. Dispersal appears to occur by the seed simply falling from the plant. Once within the soil there are theoretical opportunities by dispersal with material floating within winter water-bodies or adhering within mud to livestock or vehicles.

[a] In the strict sense these 'flowers' are the densely packed florets of a capitula.
[b] In the garden of the author's (Clive Chatters).

Another potential means of dispersal is the uprooting of the whole plant to be discharged elsewhere. The Small Fleabane is reputedly bitter and is certainly avoided by livestock which graze the sward around the plant. There are occasional observations from the field including Geoffrey Field's observation "*The ponies were actually pulling the plants out and discarding them"*[6]. From personal observations (CC) this appears to occur during drought periods when the ponies pull up any green matter from the parched sward including unpalatable species such as Knotweeds *Persicaria* species and Small Fleabane.

Whatever the actual mechanisms, of persistence in the seedbank or means of dispersal, there is abundant field evidence of the dynamic nature of populations of Small Fleabane.

Small Fleabane in Europe

In his doctoral thesis of 1986 Tony Hare[7] cites Ferakova (1977)[8] and Hulten (1950)[9] in describing the British populations of Small Fleabane as at the north-western limits of their European distribution.

The status of Small Fleabane through its European range has not been the subject of systematic studies. Hare (1986) cited personal communications to describe declines in Yugoslavia and Poland, to the plant being *'very rare indeed'* in mainland France together with its extinction from Denmark. Recent regional work on distribution mapping in France indicates Small Fleabane may be extinct or in near-terminal decline in most regions of mainland France, outside a few valleys of major wild rivers such as the Loire and Allier. The scale of the remaining French populations has yet to be quantified but may be locally substantial. The Eunis database[10] of 2006 reports Small Fleabane as listed in the respective Red Data Books of the Czech Republic and Lithuania. The UNEP-WCMC species database[11] , also of 2006, reports the species having become extinct in Denmark, Sweden and Switzerland and as endangered in the Netherlands.

Tony Hare concluded his 1986 review of the European status by quoting a personal communication from Dr Francis Rose, the Reader of Biogeography at Kings College, London:

"The sites in the New Forest, Hampshire, may represent the most important population in western Europe as well as Britain."[12]

An additional comment was subsequently published in 1999 in the third edition of the Red Data Book:

"*It is declining rapidly across much of its (European) range, and the New Forest populations are probably the most important in Western Europe*[13]*.*

Subject to further work on the French populations the statement of 1999 appears to remain the case.

Small Fleabane in Britain

Records for Small Fleabane in Britain date from the late sixteenth century when in 1570 the physician and botanist Matthias de L'Obel recorded it from *"Benardgreyn ara et fossis*[14]*"* (Barnard Green mound and ditch), an ambiguous locality possibly in Paddington, Middlesex[15].

From the mid-nineteenth century onwards with increased mobility, affluence and the education of amateur botanists there are a great many botanical records for Small Fleabane. By the late nineteenth century there were records for the species from commons and waysides throughout southern England and the Welsh borders south of a line between Herefordshire and Lincolnshire.

The decline of the species throughout the twentieth century may be deduced through the last records for the Small Fleabane published in county floras. The decline was dramatic over the first half of the century with most populations being lost before the 1940s. Local extinctions continued through the 1940s and 1950s with the plant being lost in that era from Dorset, West Sussex, Worcestershire and Buckinghamshire.

The rapid decline of the species drew comments from the biologist Lord Salisbury (1886-1978). In 1967 he commented on Small Fleabane in roadside ponds:

"…..*ponds no longer provide, as in the past, an essential service to agriculture and their neglect has been a striking sequel to the diminished importance of ponds in the pattern of the rural economy. In consequence a large proportion of the smaller ponds have disappeared, or through unchecked natural succession, have failed to furnish the exposed mud requisite for these annuals to recur*[16]*."*

In commenting on the loss of Small Fleabane from Hertfordshire Trevor James reported:

"It was last seen at Colney Heath in 1923 about the time when grazing of commoners' livestock ceased in such places[17]*"*

Ted Lousley in Surrey associated the loss of Small Fleabane with the decline of commoning:

"*The reason is partly drainage, but even more the falling off in keeping geese and ducks which kept down the grass and enriched village greens with their droppings*[18]*"*

In their detailed consideration of local extinctions of Dorset's heathland flora Byfield and Pearman (1986)[19] considered Small Fleabane together with its habitats and associated species. Of the five heathland habitats they studied it was amongst the species of historically tightly-grazed lawns and greens where botanical losses where greatest. Not only was the loss of the habitats of lawns and greens the highest but also the loss of characteristic species of those habitats was the highest. The survival of characteristic species of lawns and greens in Dorset is substantially dependant on one site, Corfe Common. Corfe Common is still grazed by the commoners of the village. Small Fleabane is not known from Corfe Common and is considered extinct in the vice-county of Dorset.

Byfield and Pearman contrast the situation in Dorset with that in the New Forest:

"*Undoubtedly, the best example of an intact grazed system is the New Forest (Hampshire) which supports virtually all of the 41 indicator species that formed the basis of this study, and most with considerably greater frequency"*

More recent local extinctions include from that part of South Wiltshire outside the New Forest in the early 1980s, from Ashford Hill in North Hampshire in the late 1980s, from the last Surrey population at Backside Common in c.2000 and from Bramshill, also in North Hampshire, in c.2003[20].

There is detailed history of Small Fleabane in its last Surrey site at Backside Common. This history is set out in full in an appendix to this report as it contributes to the understanding of the processes leading to local extinctions

The national population and distribution of Small Fleabane has been assessed on seven occasions between 1980 and 2009 which provide the context for the 2013 survey.

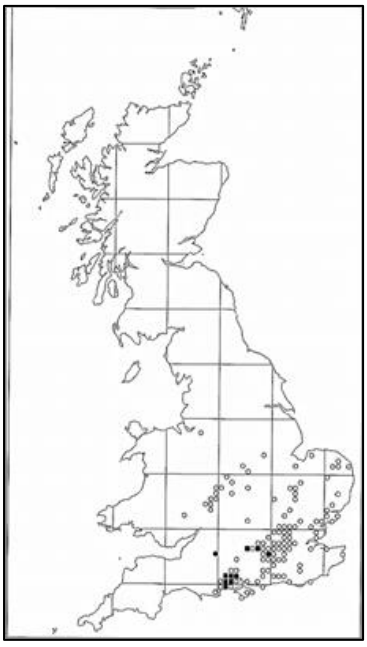

Figure 2: The national distribution of Small Fleabane[21]

The map in Figure 2 was produced in 1999. The hollow circles reflect all historic records and the dark circles populations extant in 1999.

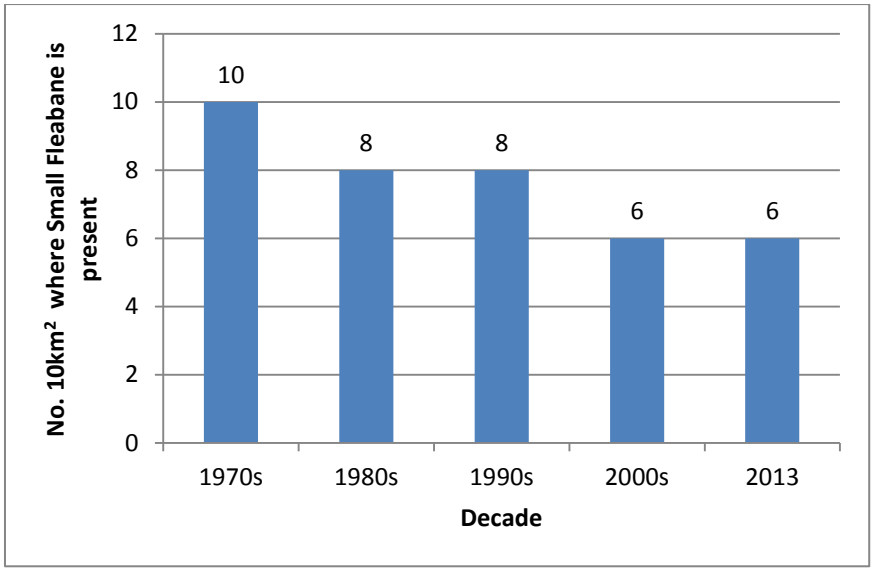

Figure 3: Trends in British distribution

Figure 3 illustrates the number of 10 km^2 (hectads) of the national grid where Small Fleabane is present.

The British population of Small Fleabane was once widespread being found in 116 hectads. Populations were known from commons and waysides through the Welsh borders and across much of eastern and southern England. In the 1970s the population was found in ten hectads reducing to eight hectads in the 1980s and 1990s. By 2009, the time of the most recent census, the distribution of Small Fleabane had declined to six hectads, all of which are in or around the New Forest.

Figure 4 illustrates trends in population. Whilst the distribution has been reduced the population has grown.

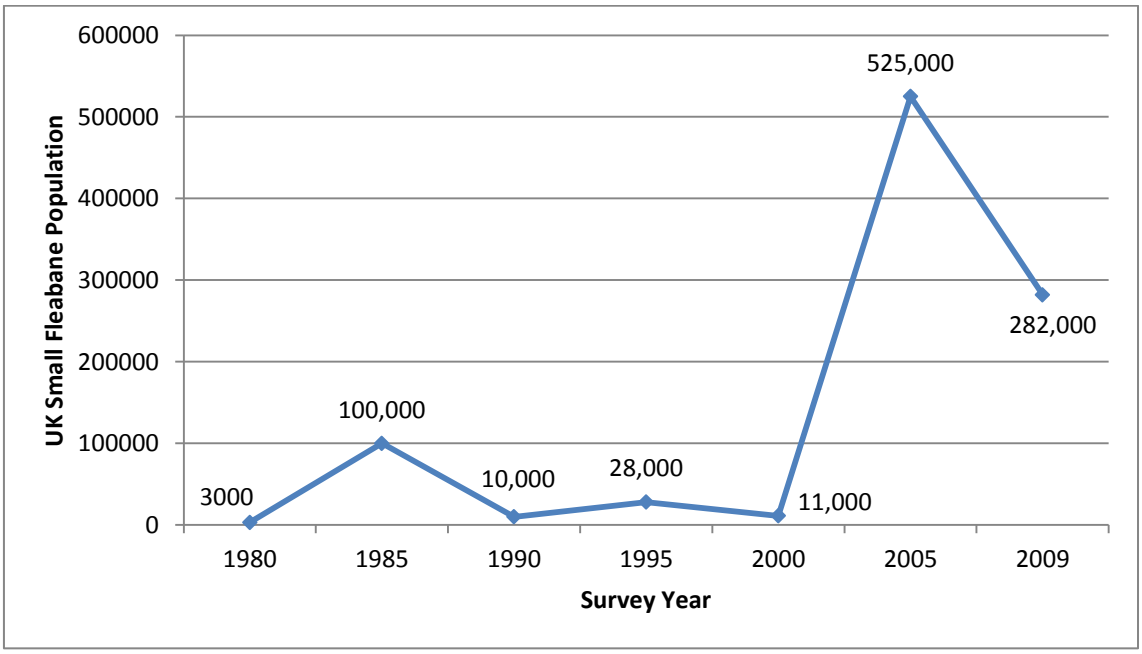

Figure 4: Trends in the British population between 1980 and 2009

References: 1980[22] 1985[23] 1990[24] 1995[25] 2000-2009 HIWWT unpublished surveys.

Small Fleabane in the New Forest

There are records for Small Fleabane in the New Forest dating back to the mid-nineteenth century. Early records were collated and published by Frederick Townsend in 1883[26] and 1904[27] and more recently in Lady Anne Brewis et. al.(1996)[28] together with Martin Rand and Tony Mundell (2011)[29].

The nineteenth century records reflect the character of the New Forest at that time. The physical bounds of the Forest had not yet been defined by fences and cattle grids and adjacent commons were subject to grazing by their own commoners. Until the fencing of the perambulation and gridding of the roads in the 1960s Forest livestock were free to roam. 'Hedge creeping' stock took advantage of the opportunities to graze waysides and adjacent commons. The tales of wandering stock, of impoundments and releases from pounds, legitimately or otherwise, are the stuff of administrative records and folk memory[30].

Early records of Small Fleabane therefore include sites along droves and wayside greens on the periphery of the modern Forest. To the south of the Forest there are records from around Milton, Hinton Admiral and along the road to Christchurch. There are records for Ringwood itself as well as from Bisterne and Kingston to the south and Blashford to the north. On the Forest's Waterside there are records from Marchwood and from Pooks Green. All of these populations are no longer extant. The likely historic sites of the records persist but the vegetation is ungrazed and entirely unsuitable for Small Fleabane.

Other early records relate to general locations within the perambulation including Ashurst (Lyndhurst Road Station), Brockenhurst and Lyndhurst with other records localised to Emery Down, near Lyndhurst Church and around Bolton's Bench.

By the second half of the twentieth century detailed records were being made by Paul Bowman, Francis Rose and others. Some populations known in the nineteenth century were now absent. Notable amongst these is the site at Lyndhurst Church. The roads and verges had been paved since the nineteenth century and in the mid twentieth century livestock were excluded from Lyndhurst's streets. The disappearance of other populations where livestock are still abundant, such as those at Bolton's Bench and Emery Down, needs a different explanation.

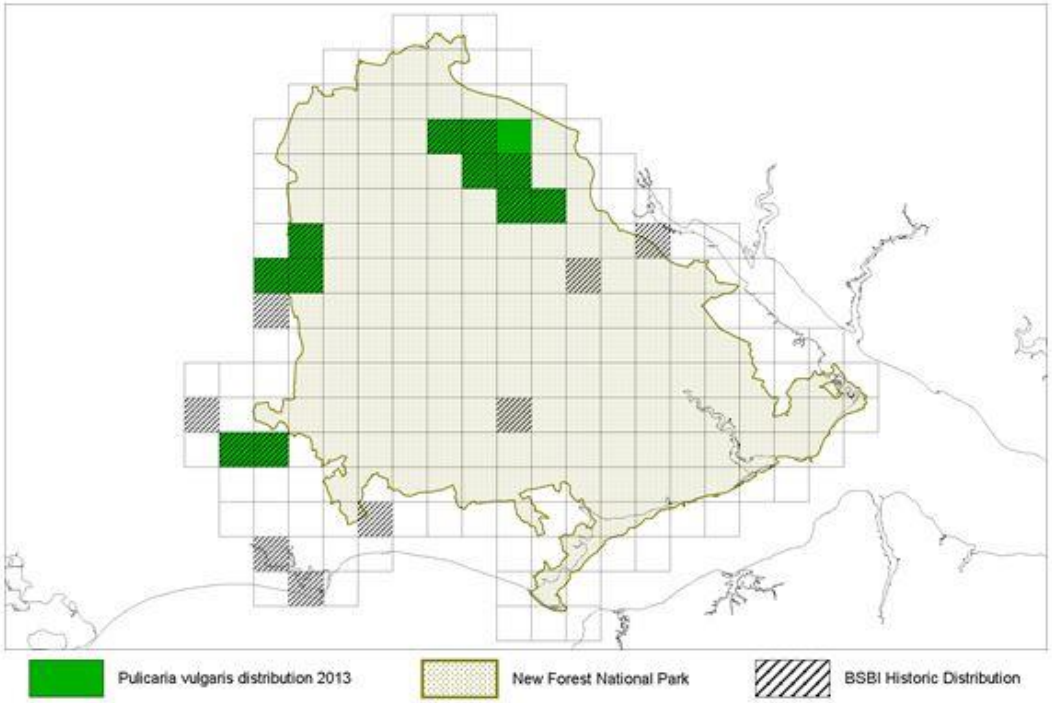

Figure 5: The combined historic distribution of Small Fleabane in The New Forest by tetrad

Through the late twentieth century to the present day Small Fleabane has been the subject of many individual records as well as systematic surveys. The 1980 Red Data Book infers that a national census had been undertaken but no data are available to compliment the published estimate of the national population. The first of the systematic surveys for which original data survive[31]were undertaken by Sue Everett and Phil Wilson for the Nature Conservancy Council in 1985-6. Subsequently in 1990, 1995, 2000, 2005 and 2009 the Hampshire and Isle of Wight Wildlife Trust coordinated systematic surveys with a range of partners. Data sets are therefore available to consider both the population trends across the whole of the Forest as well as trends in individual populations. The 2013 survey results may therefore be considered in its own right and as a part of longer term trends. Figure 5 shows both the historic and current distribution by tetrad and so illustrates the change in distribution of Small Fleabane.

Historic photographs of former Small Fleabane localities in the New Forest

Figure 6 to Figure 9 illustrate the character of former Small Fleabane sites at the time populations were known to be present.

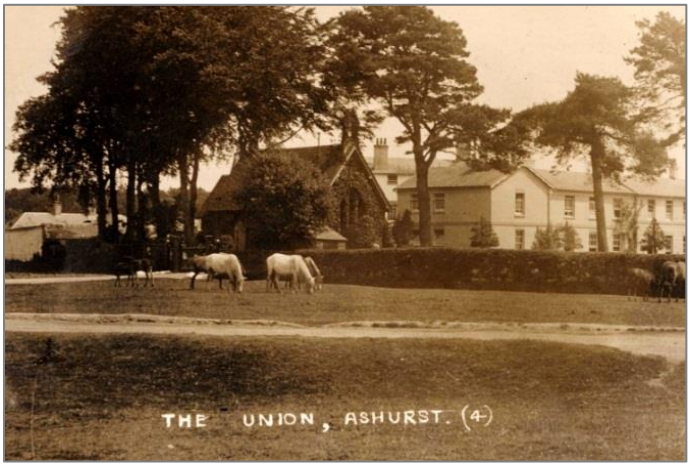

Figure 6: The Union, early twentieth century

The Union, now Ashurst Hospital, was adjacent to Lyndhurst Road Station and is shown here in the early twentieth century with tightly grazed lawns characteristic of Small Fleabane habitats. The Small Fleabane record of pre-1904 is however ambiguous as to locality.

Figure 7: The Cat and Fiddle, Hinton, late nineteenth century

The road to Christchurch outside the Cat and Fiddle at Hinton at the end of the nineteenth century shows the Small Fleabane habitats of ruts and muddy waysides. The late nineteenth century records by Bolton King describe Small Fleabane as in ‘Roadsides at Hinton in several places’.

Figure 8: Emery Down with seasonal pond, late nineteenth century

The lawns on the edge of Emery Down in the late nineteenth century supported tightly grazed grasslands and a seasonal muddy pond, ideal for Small Fleabane.

Figure 9: Two scenes from around Lyndhurst by John Golden Short, late nineteenth century

John Golden Short's photographs of Lyndhurst in the 1870's and 1880's are contemporary with early records for Small Fleabane in this locality.

Figure 10: Milton waysides, early twentieth century

The record for Milton pre-dates 1929. The precise location is unrecorded but contemporary photographs illustrate waysides eminently suited to Small Fleabane.

Chapter 3: The 2009 survey

As an element of the contract is to repeat the 2009 survey the opportunity has been taken to present a summary of the previously unpublished results of that survey.

The 2009 survey considered all of the known Small Fleabane populations in Britain. These comprise the New Forest populations together with a single population at Pithouse Farm in the Avon Valley. The Pithouse Farm site is c.4 km to the west of the New Forest National Park boundary and c.5 km from the perambulation. Historically the Pithouse Farm site was a drove road linking the commons of the New Forest with those of the Dorset heaths[32].

In 2009 the total population of Small Fleabane in Britain was estimated to be in the order of 282,000 plants. Of these 259,500 plants were recorded within the common grazing lands of the New Forest, 22,000 plants within commoners' holdings adjacent to the commons and c.500 plants within the farm tracks and fields of Pithouse Farm.

The west of the Forest

In the west of the Forest scattered individual plants were found on North Gorley Green and adjacent road verges. A previously unrecorded population of c.100 plants was located on a lane, still open to Forest stock, near Venard's House.

As in previous years South Gorley Green held a strong population of some 160 plants with the lane following the Hucklesbrook supporting a population of some 250.

The verges of Cottage Plantation and Mockbeggar Cross supported over 200 plants.

Of particular interest was the roadside pond between Moyles Court and Newlands Plantation where Mike Faherty had discovered a wholly new population. This roadside pond has been visited many times in the past with no records of Small Fleabane. There is strong circumstantial evidence that Small Fleabane has recently colonised this pond. The population here was between 800 and 1000 plants.

The east of the Forest

As predicted the Penn Common population was found to be declining following the recovery of vegetation after a period of supplementary feeding on the common. The population was still substantive in the order of 250,000 plants over 2 ha with outlying individual plants on neighbouring verges including at Stocks Cross and Bloodoaks.

The populations centred on Cadnam Green were in excess of 4000 plants. This total includes the Storms Farm track population which persist in the hollows created by the gross disturbance of Cadnam Common in the 1980s.

The strongest populations were within the Commoners' holdings adjacent to Cadnam Green. The combined populations were in the order of 22,000 plants

Crown Land populations

The main population on the Crown Land was recorded from Bartley Cross with a population of c.100 plants.

The formerly reliable population at South Weirs produced no plants. Given no plants have been recorded since 2003 it was proposed that the South Weirs now be considered a 'former site'.

A new population, of just a single plant, plant was recorded from the Crown Land on Longcross Plain near Pipers Wait.

The distribution of Small Fleabane in 2009 is illustrated in Figure 11. This shows distribution by 2 km squares of the national grid.

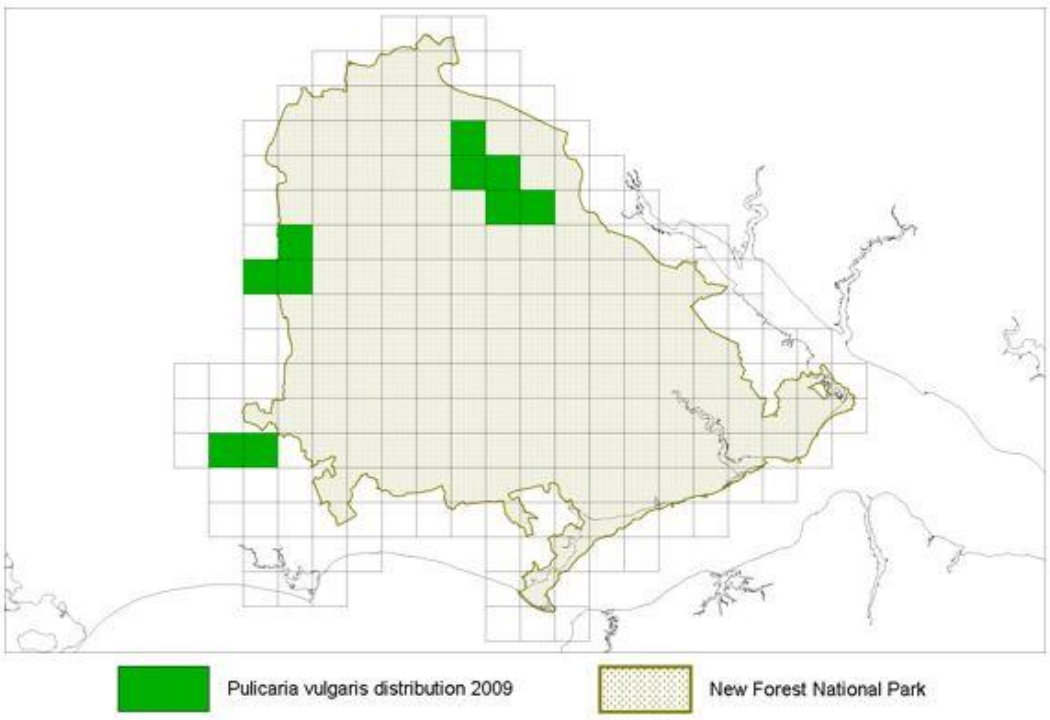

Figure 11: Distribution of Small Fleabane in 2009 by tetrad

Chapter 4: The 2013 survey

The 2013 survey repeated the 2009 survey and considered all of the known Small Fleabane populations in Britain. These comprise the New Forest populations together with a single population at Pithouse Farm in the Avon Valley. The 2013 survey also revisited historic sites and visited potential sites.

The survey of known New Forest sites was undertaken by Neil Sanderson, Pithouse Farm was surveyed by Martin Rand and the historic and prospective sites were surveyed by Clive Chatters. The Nomansland site was discovered by local naturalist, Ginnie Copsey. Additional records made in 2013 were provided by Jenny Thomas and Graham Steven of Natural England.

This summary of the 2013 survey follows the same format as the report of the 2009 survey. Further information is available in the site accounts in Chapter 6. The raw data and report from the field surveys together with the distribution maps and photographs are available electronically on the accompanying compact discs.

In 2013 the total population of Small Fleabane in Britain was estimated to be in the order of 243,000 plants. Of these the majority were recorded within the common grazing lands of the Open Forest, and c.31,500 plants within adjacent commoners' holdings. An additional substantial population within a commoner's holding has been identified but not quantified. The Avon Valley population comprised c.1400 plants within the farm tracks and fields of Pithouse Farm. As in 2005 and 2009 the largest single population was at Penn Common which represents over 80% of the population in Britain.

Since 2009 one site has been lost (Pipers Wait-Longcross) two sites have been discovered (Nomansland and Moorbridge). An extension to the Penn Common population was identified within enclosed farmland. This population awaits quantification subject to consent to survey the site. There have been, as expected, fluctuations in individual populations.

The west of the Forest

In the west of the Forest no plants were found on North Gorley Green with c.50 plants on adjacent road verges.

South Gorley Green held a strong population of some 330 plants with the lane following the Hucklesbrook supporting a population of c.180 plants.

The verges of Cottage Plantation and Mockbeggar Cross supported over 280 plants.

The population of 800-1000 plants reported from the roadside of Rockford Common between Moyles Court and Newlands Plantation in 2009 persisted in 2013 with c.250 plants.

The east of the Forest

The Penn Common population continues to be the largest population in the country at over 200,000 plants. This population is greater than the sum of all other populations. There are outlying individual plants on neighbouring verges including at Stocks Cross and Bloodoaks.

The populations centred on Cadnam Green were in excess of 3000 plants. This total excludes the Storms Farm track population of 510 plants which persist in the hollows created by vehicle movements in the 1980s. The lanes and wayside greens around Kewlake, Cadnam Green and Wittensford support a strong population of some 870 plants.

The strong populations were recorded within the Commoners' holdings adjacent to Cadnam Green. The combined populations in the Cadnam area were in the order of 38,000 plants.

A wholly new population was located on the greens adjoining Moorbridge Farm on the Bramshaw commons with a population of a handful of individual plants.

Crown Land populations

The main population on the Crown Land was recorded from Bartley Cross with a population of c.145 plants. As in 2009 the formerly reliable population at South Weirs produced no plants. The individual plant recorded from the Crown Land on Pipers Wait / Longcross Plain in 2009 was not re-found in 2010 nor in the 2013 survey. A single plant was discovered in a wholly new location in a mud-filled gutter by the side of Forest Road in Nomansland.

Figure 12 shows the distribution of Small Fleabane in 2013 by tetrad.

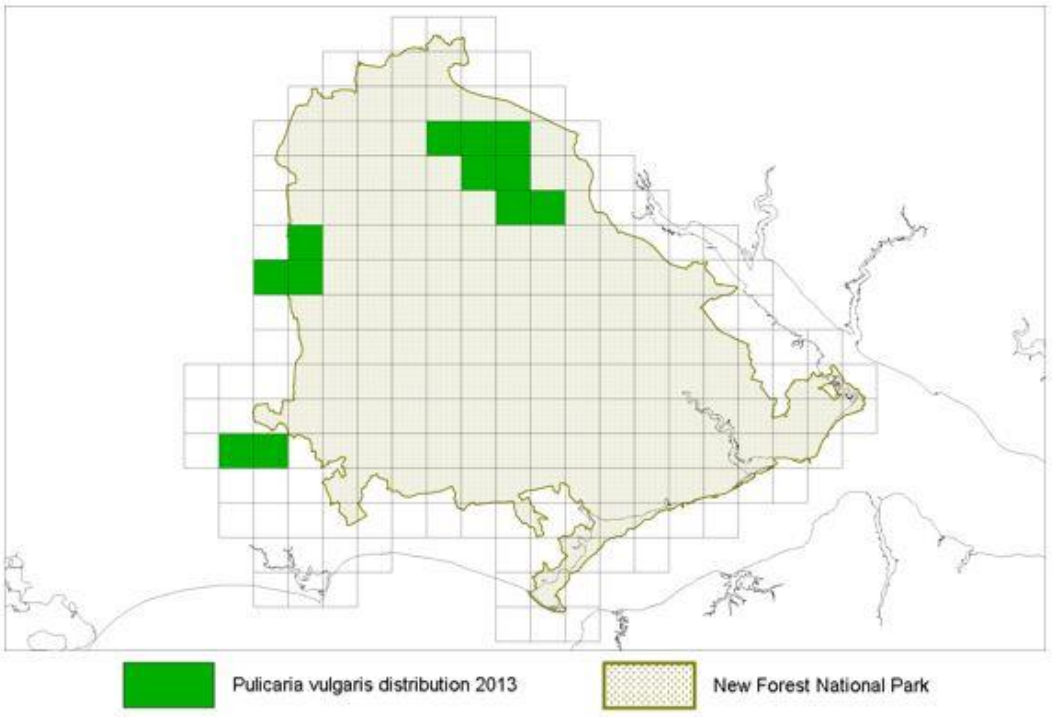

Figure 12: Distribution of Small Fleabane in 2013 by tetrad

Historic sites and surveys of potential sites

The 2013 survey included visits to historic sites together with visits to sites where circumstances may favour the plant but from where it has not been recorded in the past. Historic sites were visited where some semblance of traditional management persists in the general area. The historic sites outside the perambulation were not visited.

Historic sites

Ashurst (Lyndhurst Road Station) and Ashurst Lodge

This record is, at best, ambiguous. The record is undated but was made by F I Warner and passed to Frederick Townsend for publishing in the 1904 Flora of Hampshire. The record is *'Between Lyndhurst Station and Town'*. This may be interpreted as anywhere between Lyndhurst Road Station (now called Ashurst; New Forest, Figure 13) and Lyndhurst itself. The station is four km to the north east of Lyndhurst. It is possible the record refers to Bolton's Bench as that is on the road from the station to Lyndhurst.

Much of the lawn adjoining the station has been developed as formal car parks or was lost when the bridge for the main road over the railway was built in the 1930s. The lawns within the Open Forest adjacent to the station platform and around the campsite were searched. There was little suitable habitat. The most promising habitat was the Open Forest adjacent to the platform on the west-bound side of the station. There are hollows and seasonal pannage pig wallows here which deserved close inspection. No plants of Small Fleabane were found.

Figure 13: Lyndhurst Road Station, now called Ashurst, New Forest, 2010

Ashurst Lodge is close to the railway and could conceivably be associated with the historic record. A significant herd of cattle are turned out directly onto the Open Forest from the lodge fields. There is considerable localised poaching as well as close grazing. Whilst no Small Fleabane was found there were extensive areas of apparently suitable habitat which merited close inspection. Of particular interest was a population of Pennyroyal Mint *Mentha pulegium* at this location. Pennyroyal is associated with Small Fleabane in the Cadnam and Bramshaw area as it shares a similar need for close grazing and localised poaching (see Chapter 7: Plant communities and associated species for detailed account of plant associations). This site is worthy of resurvey in future years.

Bolton's Bench, Lyndhurst

There are site specific records of Small Fleabane from Bolton's Bench from the 1880's and 1890s. Whilst a focal point for livestock to congregate there are currently no holdings turning stock onto the Forest at Bolton's Bench. The close cropped lawns and seasonal pond of Bolton's Bench have little bare ground apart from that associated with car parking and erosion by pedestrians. There is one holding turning cattle onto the Forest from a yard at Vernal's Farm. This holding accesses Bolton's Bench by way of a drove road and wayside green. The drove road and green presented very promising habitat which despite close inspection resulted in no Small Fleabane plants being found. This site is worthy of resurvey in future years.

Brockenhurst

This historic site is described in the account of South Weirs in Chapter 5: Detailed site accounts.

Emery Down

There are records of Small Fleabane from Emery Down from the late 1870s.
The greens and waysides around Emery Down were surveyed. The area covered ran from Swan Green in the south to Acres Down Farm in the north. The survey included the minor road towards Lyndhurst.

No Small Fleabane plants were found. In the most part there were no areas of suitable habitat. There were no holdings turning out livestock within the village. The close cropped lawns and waysides within the village had little bare ground apart from that associated with car parking. Further out from the village there are holdings adjacent to the Forest but no suitable habitat. In one case there is considerable ground disturbance caused by the congregation of stock. As this area is under shade it does not represent a suitable habitat for Small Fleabane.

Ibsley Water

In 1998 Geoffrey Field recorded a population of 6 plants from a mineral working which now forms the edge of Ibsley Water. The location was revisited by Neil Sanderson in 2013. Whilst being grazed by Forest ponies the habitats were deemed unsuitable and no plants were found. It is probable this was a short lived population associated with the gross disturbance created by mineral working in close proximity to the Mockbeggar Cross population.

Lyndhurst Church

There is a record of Small Fleabane from Lyndhurst Church from 1877. This area is characterised by the pavements and metalled highway of the enclosed village. No suitable habitats are present.

Surveys of potential sites

Following discussions with local naturalists visits were made to parts of the Open Forest where suitable habitats were deemed to occur.

Foxbury (Ringfeeders)

The National Trust are in the process of restoring the plantations at Foxbury to open habitats. Foxbury is contiguous with the Bramshaw Commons and historically was a part of the Open Forest.

Foxbury remains enclosed. The site is cattle grazed with stock locally concentrated around ring feeders. Given the history of the site, and the nature of the grazing, the feeding grounds were surveyed. These sites were found to contain few of the features or habitats of settlement edge lawns or waysides. No plants of Small Fleabane were found.

Fritham

The Open Forest lanes passing through the fields of Fritham provide direct access onto the Forest for at least one cattle enterprise. The cross roads, waysides and greens provided promising habitats for Small Fleabane but no plants were found. The area, including the cattle yards, is worthy of future surveys.

Hilltop, Beaulieu Heath

There is a yard adjacent to Beaulieu Heath at Hilltop where stock are known to congregate. The habitats, whilst close grazed and poached by ponies, tend to be on free draining gravel and there were only limited areas of suitable habitat. No plants of Small Fleabane were found.

Linwood

Toms Lane is within the Open Forest and gives access to the Forest for more than one cattle enterprise. The habitats of the grazed and trampled waysides were promising but were limited in extent and were frequently shaded by hedges and hedgerow trees. No plants of Small Fleabane were found. The area, including the cattle yards, is worthy of future surveys.

Longdown

The lawns and trackways at Longdown are found between the gate to the Open Forest from Longdown Farm to the gate to Farringdon Farm. These lawns and tracks are subject to localised concentrations of cattle. Longdown comprises extensive areas of Chamomile lawns with seasonally wet and parched hollows together with trampled trackways. Both sides of the gateways onto the Open Forest supported potential Small Fleabane habitats. No plants were recorded in an early October survey but this site, including both sides of the gateways, is worthy of resurvey in future years.

Moorbridge Farm, Furzley

Moorbridge Farm has direct access to the Open Forest and is the base for a significant cattle enterprise. There is a considerable area of promising Small Fleabane habitat with localised poaching and close cropping (Figure 14). This habitat extends to the north and east of the farm as well as across the bridge and around the pound. A modest population of Small Fleabane was located at this, a wholly new, site. The survey occurred towards the end of the drought period of the summer at a time when ponies were up-rooting even unpalatable plants. Further survey is required at an optimal time of year to determine the size of this population including a survey of the cattle yards. Moorbridge Farm needs to be added to the regularly monitored sites.

Figure 14: Small Fleabane habitat, Moorbridge

Nomansland

Nomansland had not been identified as a potential Small Fleabane site. It is not a locality where stock congregate to a point where the land supports typical Small Fleabane habitats. However, in the course of a survey in 2013 a single plant was located by Ginnie Copsey from a roadside ditch. Nomansland needs to be added to the regularly monitored sites.

Swallowfields

The cattle holding at Swallowfields is a relatively recent enterprise on the Bramshaw commons. The Swallowfields are historically recently enclosed heathland converted to pasture farming. As with other cattle enterprises the livestock congregate around the holding and create extensive areas of open habitats.

These habitats were surveyed and were found to be partially shaded bare ground with few of the features or habitats of the lawns and waysides of longer established holdings. No plants of Small Fleabane were found.

Chapter 5: Detailed site accounts

The following site accounts describe recent locations for Small Fleabane. The accounts report on population trends on individual sites and to comments on the grazing regimes and other management inputs into the sites.

The site accounts start with describing extant populations on the Crown Land followed by sites of recent localised extinctions on the Crown Land. There then follows accounts of the populations in the east of the Forest which address the Storms Farm tracks and Penn Common separately from the other populations given their distinct management histories. The populations in the west of the Forest are considered as a single entity. For completeness the Pithouse Farm populations are then considered as they represent the only Small Fleabane populations in Britain outside the perambulation of the New Forest.

Extant Crown Land populations

Bartley Greens

The Bartley Greens are the interconnected greens linking Brockishill Road with Beechwood Road at Bartley. The area to the east of Brockishill Road is known locally as Pundell's Green.

Small Fleabane has been known from the greens around Bartley since 1962 when it was described by Paul Bowman as in *"Grass hollows liable to flooding along small stream. Locally plentiful, scarce some years."* This statement implies that by 1962 Paul Bowman had known the site for some years.

There are records of the plant persisting through the 1970s with low thousands of plants being recorded by Francis Rose and Paul Bowman. In 1976 Paul Bowman described the distribution as the *"Bed of marshy grassed-over shallow pits, adjacent banks and margin and dry bed of stream, and ditch"*

In 1980 Tony Hare reported the plant growing naturally at c.SU 3060 1250 but also reported he had introduced seed to c.SU 3062 1266 where a population had established. Hare's 'natural population' is towards the southern end of Pundell's Green off the Brockishill Road. His 'introduced' site is by the access track to Little Pundells off the Brockishill Road. Neither site has been known to support the plant in recent decades.

The Small Fleabane population has been regularly monitored since 1985. The population has declined by an order of magnitude, as shown in Figure 15.

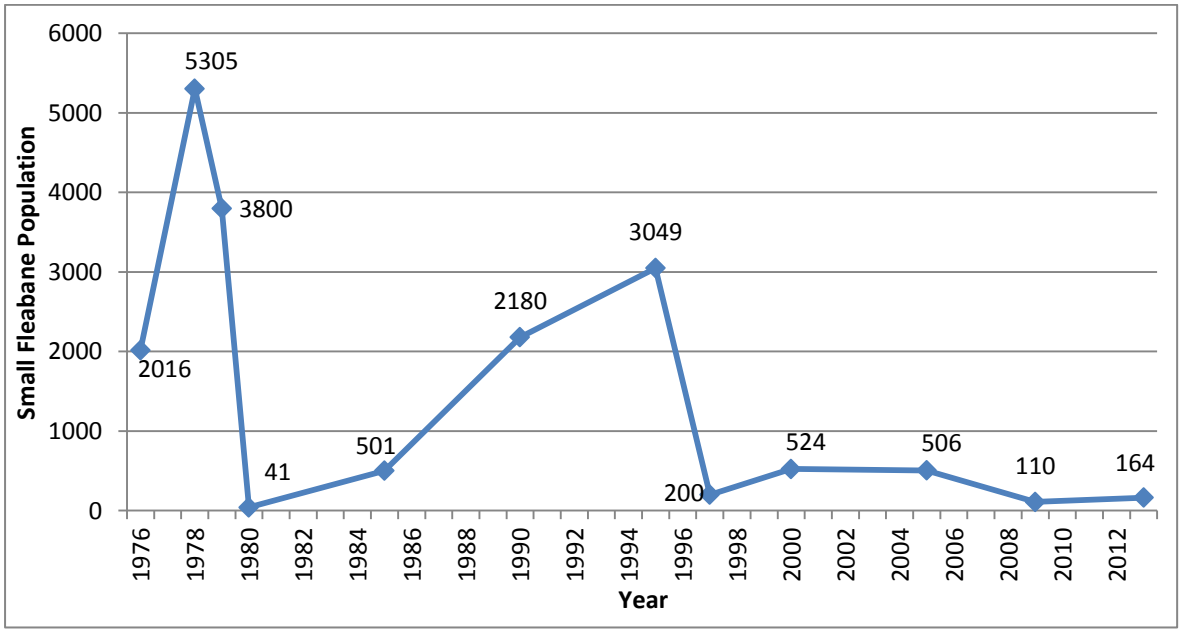

Figure 15: Bartley Green populations

Personal recollections (CC and NAS), supported by a series of photographs taken by Lady Rosemary Fitzgerald in 1995 suggest that over recent decades the shallow pits and river margins have become increasingly shaded by the growth of mature trees and dense scrub. The photographs of 1995 in Fitzgerald's report also illustrate the abundance of bare ground in which Small Fleabane had germinated, a feature rarely seen in recent years. Figure 16 and Figure 17 show the change in tree cover along one stretch of Beechwood Road over the course of a century..

The larger of the riverside hollows to the east of Brockishill road became colonised by the invasive non-native New Zealand Pygmyweed *Crassula helmsii* sometime between 1995 and 2000. Small Fleabane has been recorded growing through the mat of the Pygmyweed where cattle and ponies had poached it to create bare ground in which the fleabane germinated.

The 2013 survey reports a population in the order of 140-160 plants. This population reflects the persistent trend of long term decline. Neil Sanderson's observations include notes of the progressive shading of the greens by both tree canopies and scrub.

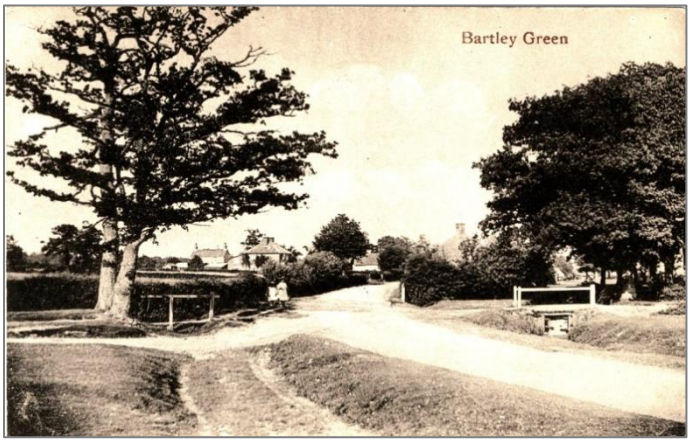

Figure 16: The Bartley Greens at Beechwood Road in the late nineteenth century

Figure 17: The same view in 2013

The history of livestock being turned onto the Forest around Bartley is fragmentary. Jo Page (1989)[33] cites 26 animals (unspecified species) being turned out from Bartley in 1972 rising to 140 animals in 1976 and 129 in 1978.

Contemporary data available from the Verderers' grazing scheme indicates that a significant number of livestock are turned out from addresses in the immediate vicinity of the greens. There are four roads in the immediate vicinity of Bartley Greens. These are Brockishill Road and Beechwood Road with direct access to the Open Forest together with Chinham Road and Shepherds Road within the adjacent enclosed land. There are currently 128 ponies, 75 cattle and 14 donkeys accounted for from addresses in Brockishill and Beechwood Roads. There are 17 ponies and 7 cattle accounted for from addresses in Chinham and Shepherds Roads.

The roads around Bartley Greens are the focal point for the second largest herd of cattle being turned out from a single address onto the Crown Land.

The immediate vicinity of the Bartley Greens is also associated with dwellings established under the Commoners' Dwelling Scheme. One such Commoners' holding has been established as Pond Farm at Beechwood Road and another has recently been given planning permission in Brockishill Road.

Nomansland

The Nomansland population represents a single plant discovered in 2013 by Ginnie Copsey in a roadside ditch on the Open Forest. The record has been confirmed by Martin Rand.

This population may be considered as the corollary to the population at Pipers Wait - Longcross. Small populations of species such as Small Fleabane are likely to occur on the periphery of substantial populations. The occurrence is consistent with the population manifesting the characteristics of a meta-population.

In contrast to Pipers Wait/Longcross the Nomansland site is adjacent to a Forest settlement. There are three addresses in Nomansland turning out a total of 14 Forest ponies between them. There are no cattle, donkeys, pigs or sheep registered from holdings at Nomansland.

The habitats at Nomansland contain few of the seasonal hollows and poached grasslands of 'typical' Small Fleabane sites. The Green at Nomansland is heavily influenced by car parking and amenity use. In contrast it is interesting to consider the habitats and management of Nomansland illustrated in Figure 18 which look ideal for the species.

Figure 18: Nomansland in the late nineteenth century

Extinct Crown Land populations

South Weirs

Small Fleabane has been recorded from unspecified locations around Brockenhurst since the late nineteenth century with a specific record for Brockenhurst by Ted Lousley from 1927. Early herbarium specimens include material from 'Brockenhurst' from 1900 and more specifically a 'Pond near Brockenhurst' from 1929 (Figure 23).

Site specific records relating to South Weirs are available from 1957. South Weirs is a reasonably well recorded botanical locality as it has been known not only for Small Fleabane but for other rarities. The pond by the telephone box (Figure 21), supports rarities including the Floating Water-plantain *Luronium natans,* Hampshire Purslane *Ludwigia palustris,* Lesser Marshwort *Apium inundatum and* Chamomile *Chamaemelum nobile.* The non-native invasive New Zealand Pygmyweed was first recorded in this pond in 2013.

Alick Westrup's 1957 record of Small Fleabane at South Weirs is complimented by a contemporary photograph of Harry Burt and his livestock outside his cottage (Figure 22).

There are population counts for Small Fleabane at South Weirs from the 1970s, presented in Figure 19. Over this period three commoning holdings adjacent to South Weirs have been known to turn out significant numbers of stock onto the Forest. The smallholding at the southern end of South Weirs ceased turning out stock in the mid-1980s. Harry Burt continued to turn out stock until his death in the mid-1990s. The third holding still turns out the occasional pony but ceased turning out significant numbers in the late 1990s. The Open Forest at South Weirs is still tightly grazed by livestock from holdings elsewhere. The habitats of broken ground around gateways and localised areas of high fertility from dung heaps and goose grazing are no longer a feature of South Weirs.

The settlement of South Weirs is typified by commoners' cottages and small holdings. A modest semi-detached cottage at South Weirs recently sold for £340,000[34]. Smallholdings of mixed agricultural uses have been converted to equestrian holdings with land at the Weirs being advertised at values in excess of £200,000/ha[35]. These values are well outside the reach of the local commoning economy.

The 2013 survey covered the lawns of the South Weirs together with the waysides and lawns between South Weirs and the ford at Brockenhurst. No plants of Small Fleabane were found. There is a network of well-worn tracks parallel to the highway between South Weirs and Brockenhurst. These tracks relate to the livery and riding school based at Ford Farm. It is interesting to note that the character of these tracks differs from the poached cattle tracks with which Small Fleabane is associated elsewhere in the Forest.

The persistence of grazing by commoners' livestock, and the presence of eroded trackways, appear in themselves inadequate substitutes for the effect of mixed livestock congregating around the gate of a commoner's holding.

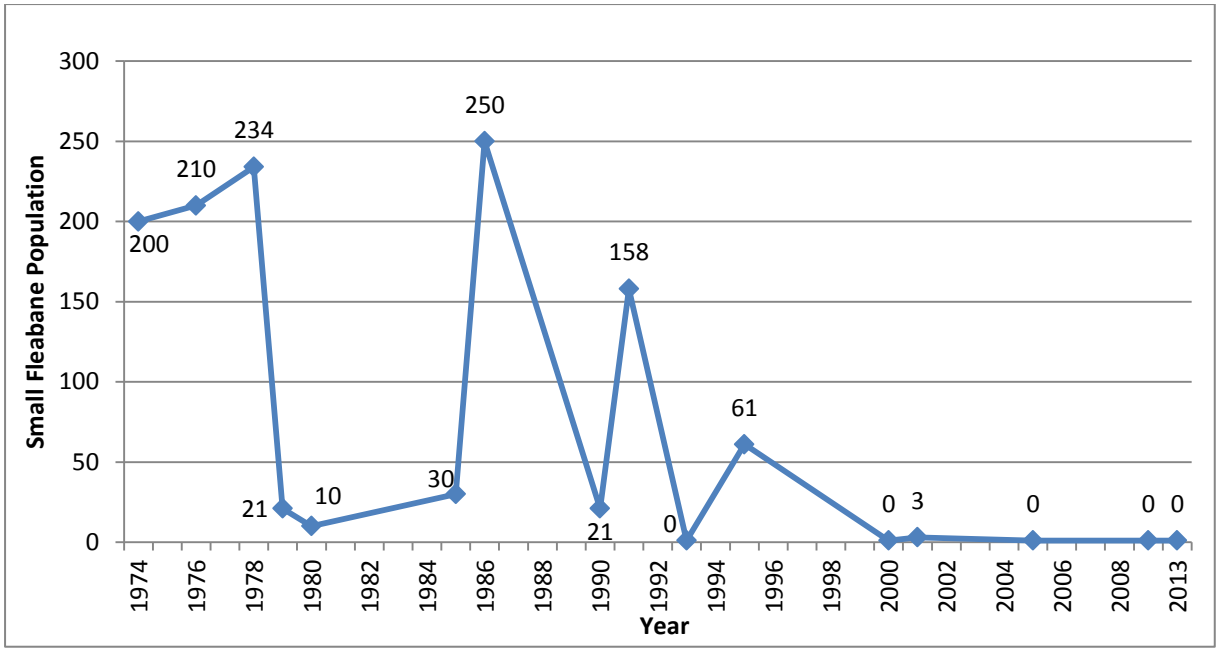

Figure 19: South Weirs population

Figure 20: The Weirs c. 1930

Figure 21: The same cottage in 2007 showing the telephone box pond

Figure 22: Harry Burt and his livestock at South Weirs, c. 1950

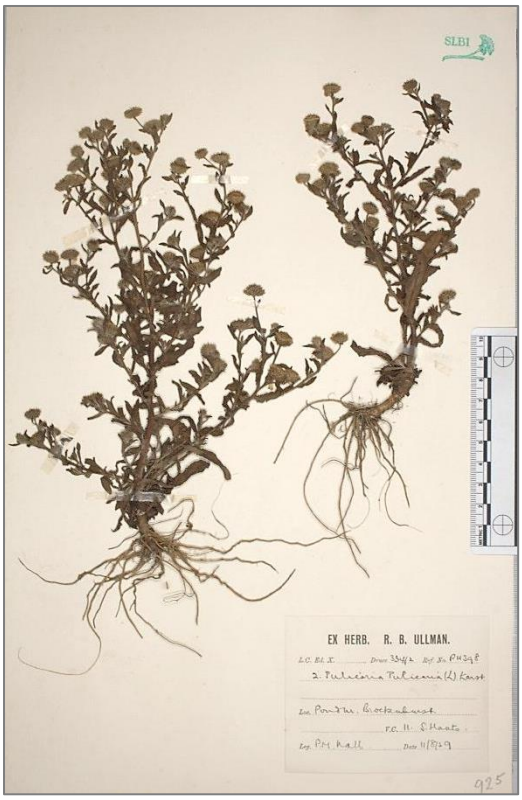

Figure 23: Small Fleabane herbarium specimens from 'pond near Brockenhurst', 1929

Pipers Wait / Longcross

The population of Small Fleabane at Pipers Wait / Longcross was a single plant discovered by Richard Reeves in 2009. The site was searched in 2010 and 2013 when no plants were found (Figure 24).

Such small and short lived populations on the periphery of substantial populations are what one may expect from a species such as Small Fleabane. The occurrence is consistent with the population manifesting the characteristic of a meta-population. Cattle from Penn Common are known to graze the plains at Longcross[c] and these stock are a potential vector for moving seed to this site.

Figure 24: The Pipers Wait / Longcross site, 2013

[c] Pers Comm, Verderers

Extant populations in the east of Forest

Cadnam Green and Adjacent Lanes

Records of Small Fleabane from Cadnam date from the late nineteenth century with a herbarium specimen held in Aberystwyth from 1893 (Figure 25).

Figure 25: 1893 specimen collected from Cadnam by Henry Haselfoot Haines

Site specific records relating to Cadnam Green are abundant from the 1970s onwards with records from Ted Lousely, Francis Rose and Paul Bowman. By the late 1970s the site became known to Tony Hare who undertook a great deal of research on the plant on and around the Green.

The records from the Cadnam area for the mid twentieth century are numerous. These records however appear to record different areas at different degrees of detail. Systematic records of the green and neighbouring lanes with estimates of populations are available from the late 1970s, with increasing detail available for sub-populations from 1995. The records shown below in Figure 26 are of the total populations found within the common grazing's of the Open Forest. The populations within the enclosed farmsteads are dealt with separately.

Since 1995 sub-populations have been lost from the edges of the green and in the narrower lanes. These losses have been attributed to shading from overgrown hedges made stock-proof through being supplemented by post and wire fences.

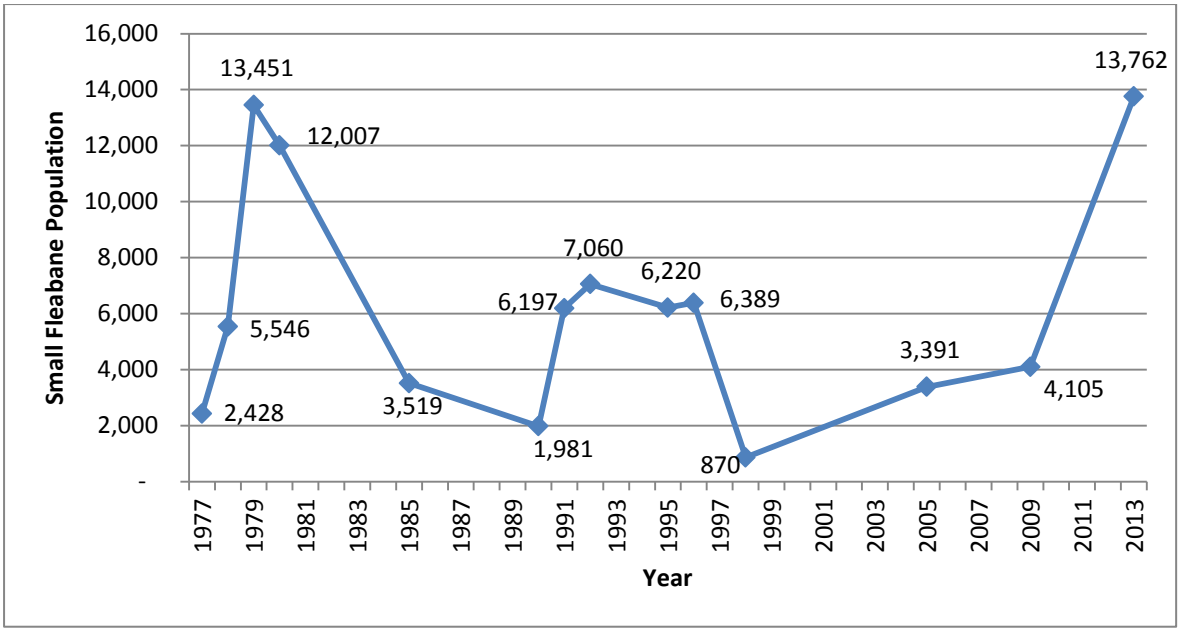

Figure 26: Changes in Population in and Around Cadnam Green

Biddlecombe Farm, Cadnam Green

Biddlecombe Farm is a small mixed farm and a commoners' holding at the southern end of Cadnam Green (Figure 27). The population within the farmyard of this commoners' holding was 'discovered' by Geoffrey Field in 1991. Further surveys in subsequent years revealed the full extent of the population within the enclosed farmland. The farmyard is used to hold a variety of livestock including free ranging pigs, geese and other fowl, donkeys, cattle and Forest ponies.

Figure 27: Biddlecombe Farm, 2009

In 1991 Geoffrey Field recorded;

'*Farm keep geese & yard which they go through to roost shed is tightly packed with big bushy plants. I couldn't begin to count & 5000+ is pure quesswork - it could be double that. Other plants scattered through rest of farm.*'

and in 1992:

'*Immense population, estimated 5000, in a small farmyard, principally where geese go to roost. Tightly packed.'*

In 1995 the population was estimated by Lady Rosemary Fitzgerald to have declined to c.2500 plants but by 2000 Geoffrey Field reported the population had returned to its former size but in a different part of the yard.

'The plants have shifted around considerably since 1995. The old goose yard now has hens and no Pulicaria but its spread into field S of house and the two yards have masses'.

In 2005 the farm yard was not surveyed but a population was found by Andy Byfield and Neil Sanderson elsewhere on the farm on the site of the former Dairy House Farm. This small field contains the footings of a former dwelling and relics of a garden. The field is used for pig keeping with pig arks and a pig gate giving access onto the green. Some 10,000 plants were recorded from the pig field with an additional 500 plants in an adjacent track.

In 2009 within and around the farmhouse and yard there were nine discrete populations totalling c. 530 plants including c.50 plants around the pig pen. There was another population in the field to the east of c. 360 plants. The field with the pig arks (Dairy House Farm, Figure 28) supported in excess of 11,000 plants and the adjacent trackway c.66 plants.

Figure 28: The Dairy House Farm Field at Biddlecombe Farm from the Green, 2009

In 2013 no Small Fleabane plants were found around the farmhouse and yard apart from in the vicinity of the pig pen where the population is of the same scale as 2009. The population in the field to the east had reduced from c.360 plants to a single plant. The 11,000 plants in the pig ark field had reduced to 8 plants with no plants in the trackway. Subsequent to the 2009 survey, and prior to the 2013 survey, the farm has been the subject of a Higher Level Stewardship agreement which has rationalised the use of the yard and sought to ensure compliance with environmental standards. The various survey results are presented in Figure 29.

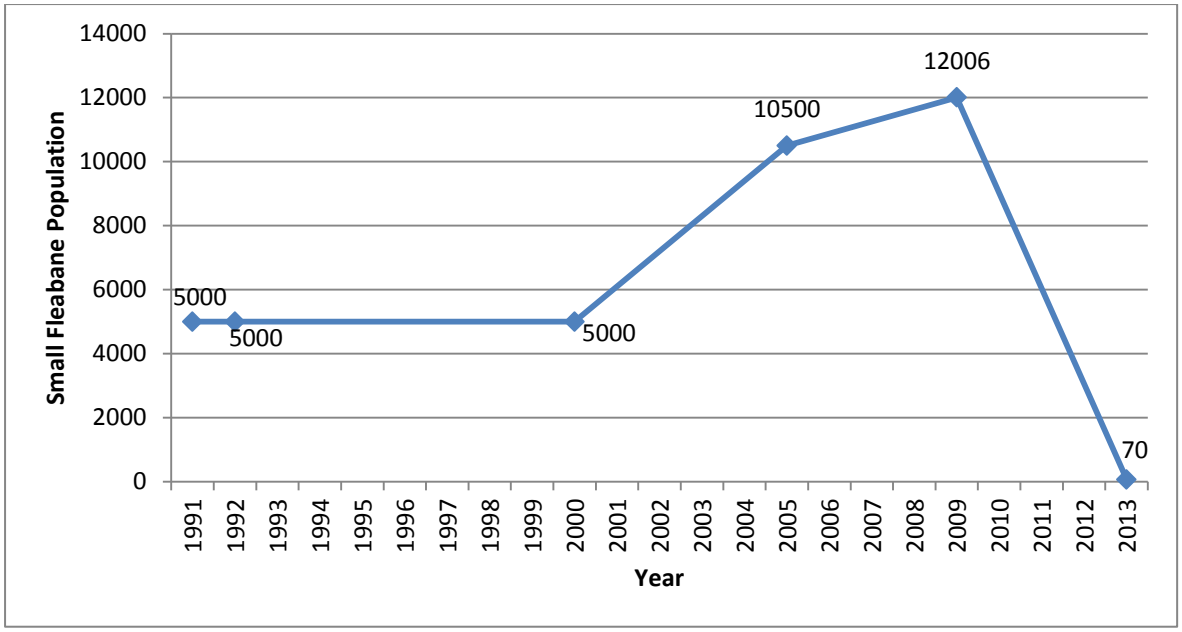

Figure 29: Population changes within Biddlecombe Farm

Withers Farm

Withers Farm is at the opposite end of Cadnam Green to Biddlecombe Farm. The farm is a commoner's holding. A small field adjacent to the common is used to hold pigs, free ranging fowl and other livestock.

In 2005 Andy Byfield reported c. 250 plants from this field. A resurvey of 2009 by Steve Trotter and Richard Reeves reported uncounted 'thousands'. The 2013 survey reported in excess of 23,400 plants from the field.

Figure 30: Kerry Cattle from Withers Farm on Cadnam Green in 2009

Grazing around Cadnam Green

The Verderers Grazing Scheme records a number of holdings turning out livestock around Cadnam Green. Some locations are very specific, such as 'Cadnam Green', others are ambiguous such as 'Cadnam, Newbridge'. The best available interpretation of the figures indicate that Cadnam Green and the adjacent lanes are the location of holdings turning out a total of 154 ponies, 70 cattle and 15 donkeys. This places Cadnam Green at one of the highest foci of common livestock on the Forest

On a summers day in 2012 the author (CC) monitored the movement of livestock in and around Cadnam Green[36] (Figure 31). The stock were ranging over the 6.7ha of settlement edge lawns and waysides which thread through 1 km^2 of Forest edge farmland.

Using John Nix's (2009)[37] approach to 'Livestock Units' the grazing pressures were recorded ranging from 6.35 to 7.20 livestock units days/hectare. The livestock units were 53% equine (Forest ponies and Shetland ponies), 44% cattle and 3% pigs. These figures should be treated with due caution as they are mere snapshots in a constantly changing situation. However, they reflect the reality of when the counts were taken.

Figure 31: Livestock density on Cadnam Green, summer 2012

In February 2009 photographs were taken to estimate how muddy Cadnam Green became in the depth of a wet winter. Animals hanging around farm gates are very effective in making the place muddy. The 2009 photographs illustrate up to 80% mud and 20% vegetation across the Green; Figure 32 provides one example of this. On close inspection significant areas of muddy ground were actually mud spreading out over a well-vegetated sward. There is a lot of bare ground generated each winter but this may be less than is first apparent. The substantial areas of vegetation beneath the mud would help explain the rapid recovery of the greensward in spring with a scarcity of bare ground by early summer.

Figure 32: Cadnam Green, February 2009

Penn Common

Occasional plants of Small Fleabane have long been known from the waysides around Penn Common. Penn Common was surveyed in 2000 as part of the census of Small Fleabane and at that time no plants were reported.

In the winters of the opening years of the 2000s a commoner with a holding adjoining the Open Forest was reported to be using the common for supplementary feeding his overwintering livestock. Such supplementary feeding is contrary to established rights and practices but does occasionally occur. The result of stock feeding at Penn Common was the reduction of a substantial area to a muddy morass[38]. Action was duly taken to curtail the supplementary feeding and by 2005 the sward was recovering, albeit still tightly grazed by cattle, ponies, sheep, poultry and pigs.

In July 2005 Andy Byfield visited the common and reported the presence of a considerable population of Small Fleabane. An estimate of the population was made later that year at around 500,000 plants.

By 2009 the sward of the common was in the process of recovery and as bare ground was progressively vegetated by perennial grasses so the population of Small Fleabane declined. The tightly grazed sward and the pig wallows maintained Small Fleabane habitat albeit in more localised populations. In 2009 a population estimate of 2500+ plants was reported. Fortunately an estimate of density of plants per metre and the area of the population was recorded. A recalculation from these original field notes gives a population of c.250,000 covering an area of some 2 ha.

The 2013 survey estimated the population in the order of 200,000 plants covering broadly the same area as in previous surveys. The detailed distribution is described in Neil Sanderson's 2013 report accompanying this study. The population of Small Fleabane at Penn Common is larger than all the combined populations of all other Small Fleabane sites in Britain. Figure 33 presents the population data for Penn Common.

There are a substantial number of livestock recorded from addresses around Penn Common and Penn Road. Current (2013) records include:

Forest[d] Ponies…….. 95
Common Ponies….. 36
Common Cattle…… 123
Common Donkeys.. 19
Common Sheep…... 29

In addition this part of the Forest is also known for poultry and for free-ranging pigs throughout the year (Figure 35).

The agisters advise that the stock turned out on Penn Common have a home range which includes Longcross Plain and Pipers Wait.

In addition to the population on Penn Common Neil Sanderson was aware of the population also occurring within the yard of the adjacent holding. Similar reports have been received from the National Trust. This is worthy of further investigation.

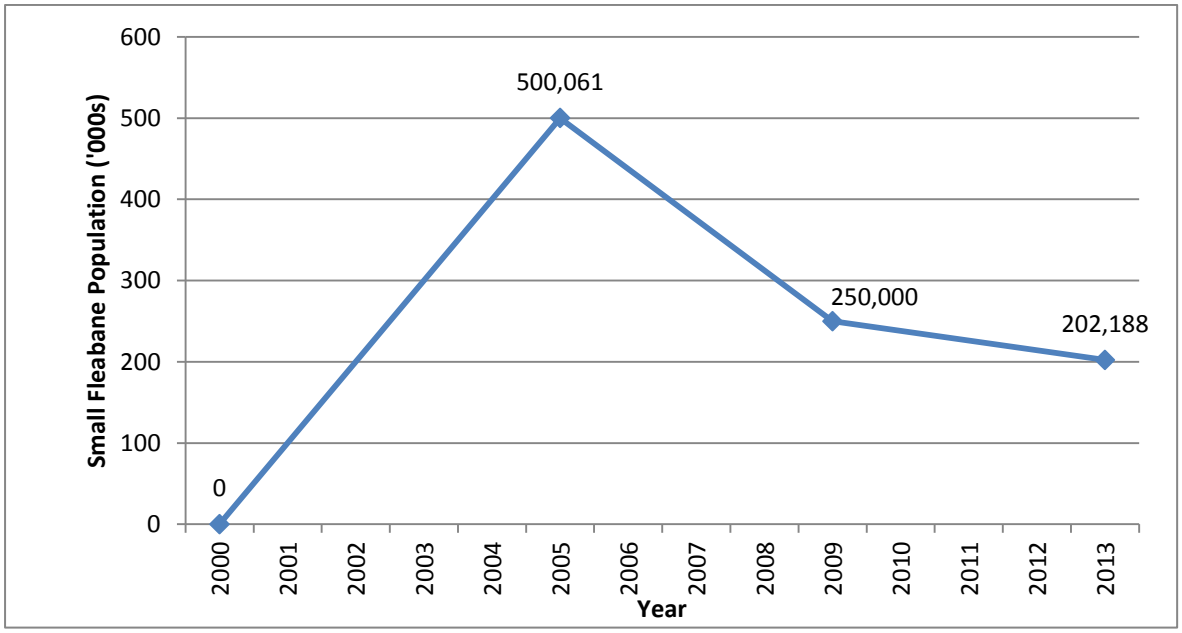

Figure 33: Penn Common population

[d] As Penn is an 'adjacent Common' within the administration of the New Forest, the difference is recorded between animals turned out under common rights from those turned out under Forest rights.

Figure 34: A view across Penn Common, 2013

Figure 35: Penn Common, 2013, with attendant poultry, sheep and pony

Moorbridge Farm and Nomansland

A brief account of discovery of Small Fleabane populations at Nomansland and at Moorbridge Farm is given in Chapter 4: The 2013 surveyChapter 4: The 2013 survey.

Storms Farm

The Storms Farm population relates to a heavily rutted section of heath between Storms Farm and the public road at the Newbridge cattle grid.

This population is associated with an enterprise based at Storms Farm taking commercial vehicles some 700m across the heath to the public road. This activity occurred in the early 1980s and resulted in gross disturbance to the common including creating a series of deep ruts. The practice was curtailed by the mid-1980s but there are records of agricultural vehicles taking the same 'short cut' up until the mid-1990s. This short term expansion of the population is presented as Figure 36. The use of this route by mechanised vehicles is now regulated through classification as a restricted byway. The presence of bare ground along the route is now very limited (Figure 37).

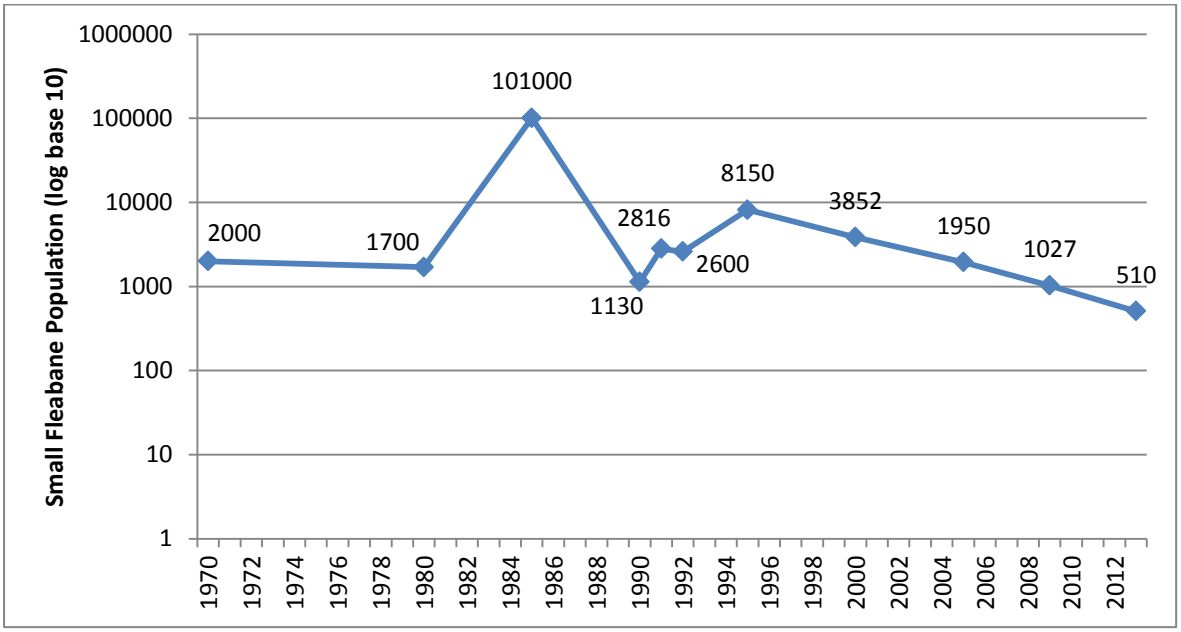

Figure 36: Storms Farm population

The history of commoning from Storms Farm is unknown. However it is has been observed that stock turned out from Cadnam Green range over this part of Cadnam Common. The account of livestock at Cadnam Green may be applied to this part of Cadnam Common.

In c.1980 Tony Hare sought to establish a population of Small Fleabane on the common close to the cattle grid at Newbridge. The population did not become established[e].

[e] Hare *Pers Comm* to CC

Figure 37: Storms Farm track, 2009

Extant populations in the Western Commons

Lanes and greens around Mockbeggar and Gorley

A series of interconnected lanes and greens link the high heathland commons of the west of the Forest with the lower terraces, and eventually the floodplain, of the Avon Valley. The fencing of the perambulation in the 1960s retained part of the network of lanes within the Open Forest between Moyles Court and North Gorley.

Small Fleabane has been known from these series of lanes and greens since the 1840s when it was described by the Reverend Bromfield[39].

There are a number of records of Small Fleabane from this general area from the mid-nineteenth to the mid-twentieth century. Detailed studies of the populations began in the early 1980s with site specific records being made by Andy Byfield and Paul Bowman. Tony Hare's research of the 1980s reviewed historic populations and noted the persistence of the plant in the area but did not generate many new records.

The Small Fleabane populations of the west of the New Forest are much smaller than the populations to the east and nowhere exhibit concentrations of the plant such as those known from Penn Common and around Cadnam Green. As with the east of the Forest the Small Fleabane populations are associated with proximity to some of the larger commoners who turn our herds of cattle. The geography of the western lanes, and the location of the commoners' holdings, is such that the effects of the livestock are more dissipated than those in the east. It is possible, even probable, that populations of Small Fleabane have yet to be found within the yards of commoners' holdings adjoining the western lanes.

Data are not available to indicate the recent history of livestock enterprises in this part of the Forest. What is known of current circumstances is set out in Chapter 8: Grazing and other management inputs.

To assist the description of these populations the area has been artificially divided up into four sub-sites. These are the lanes around Mockbeggar Cross, the lanes along the Hucklebrook Stream leading to South Gorley Green, the North Gorley 'Buddle' Green and associated lanes together with the pond at Newlands near Moyles Court.

The Mockbeggar populations (Figure 40), may be synonymous with the historic Ibsley records supported by herbarium specimens since the 1930s (Figure 38). There are multiple records including population estimates from Mockbeggar Cross and its adjacent lanes since the early 1980s.The Mockbeggar population has experienced substantial fluctuations in population through the 1990s. The reason for these fluctuations is thought to be associated with the periodic digging out of roadside ditches.

Site specific records associated with the green at South Gorley date from Francis Rose's 1972 record. In 1976 Paul Bowman accompanied by Phoebe Yule extended the records along the lane following the Hucklesbrook. The data included in the account of South Gorley include the population found at Venyards which lies between the two Gorley Greens. The South Gorley populations appear to be in long term decline (Figure 41).

North Gorley Green records date from 1980 when both Paul Bowman and Andy Byfield independently recorded a population. This population has been in decline since it was first recorded with only two plants being recorded in a single year since 1995 (Figure 42).

Figure 38: Small Fleabane specimens gathered at Ibsley in 1938 by Dr Richard Charles L'Estrange Burges

The population at on Rockford Common at Newlands near Moyles Court was discovered by Mike Faherty in 2009 (Figure 39). This pond was well known to the author (CC) through the 1990s and had been surveyed as part of a habitat survey in 2000 by Neil Sanderson. Small Fleabane was not known from this site. The evidence suggests that a population became established sometime between 2000 and 2009. With only two population counts it would be unwise to deduce a trend (Figure 43)Figure 43: Rockford Common pond.

Figure 39: The Rockford Common pond, 2009

Population trends of Small Fleabane in the west of the New Forest

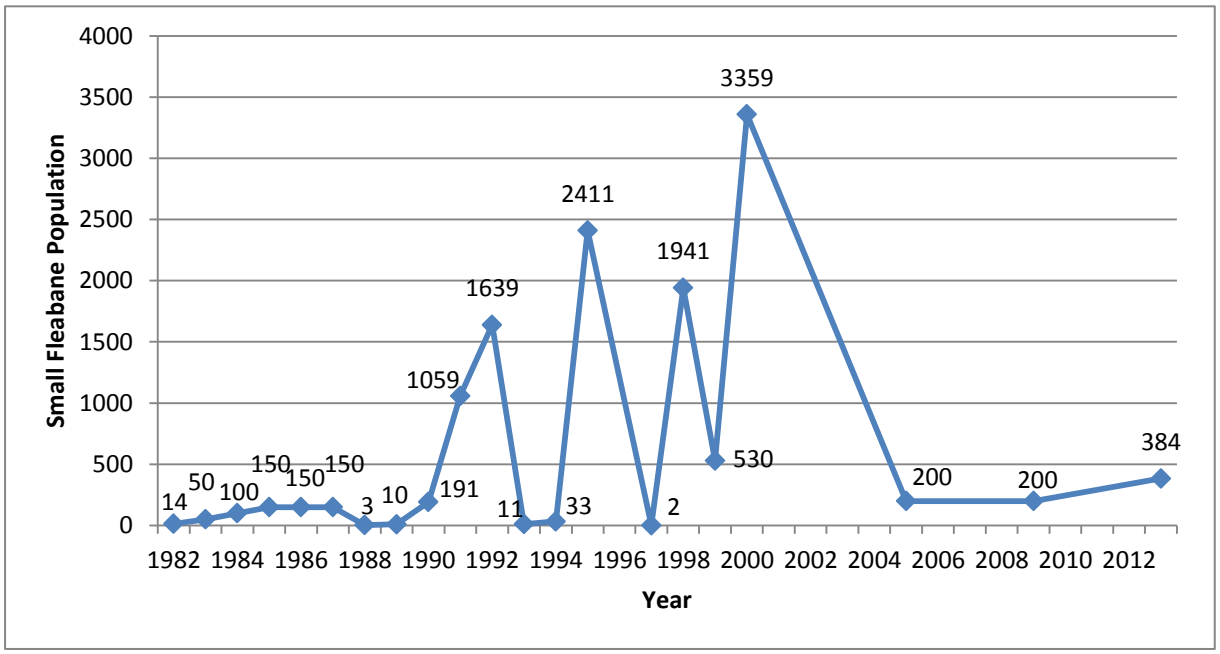

Figure 40: Mockbeggar and adjacent lanes

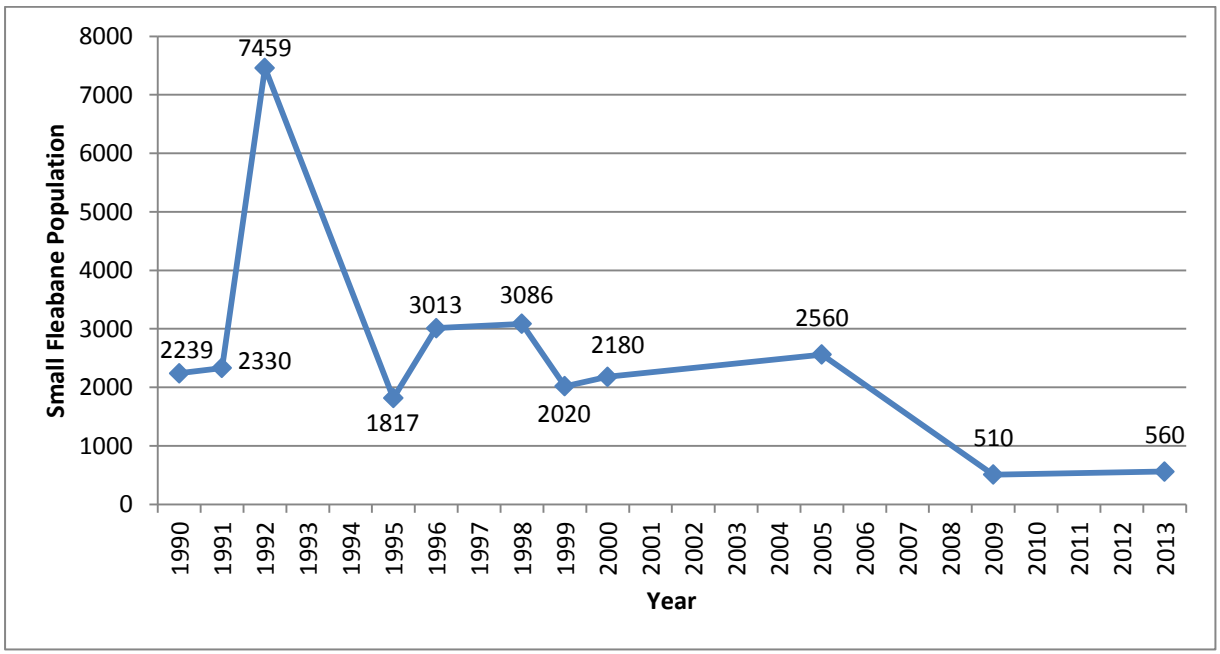

Figure 41: South Gorley, Hucklesbrook and adjacent lanes

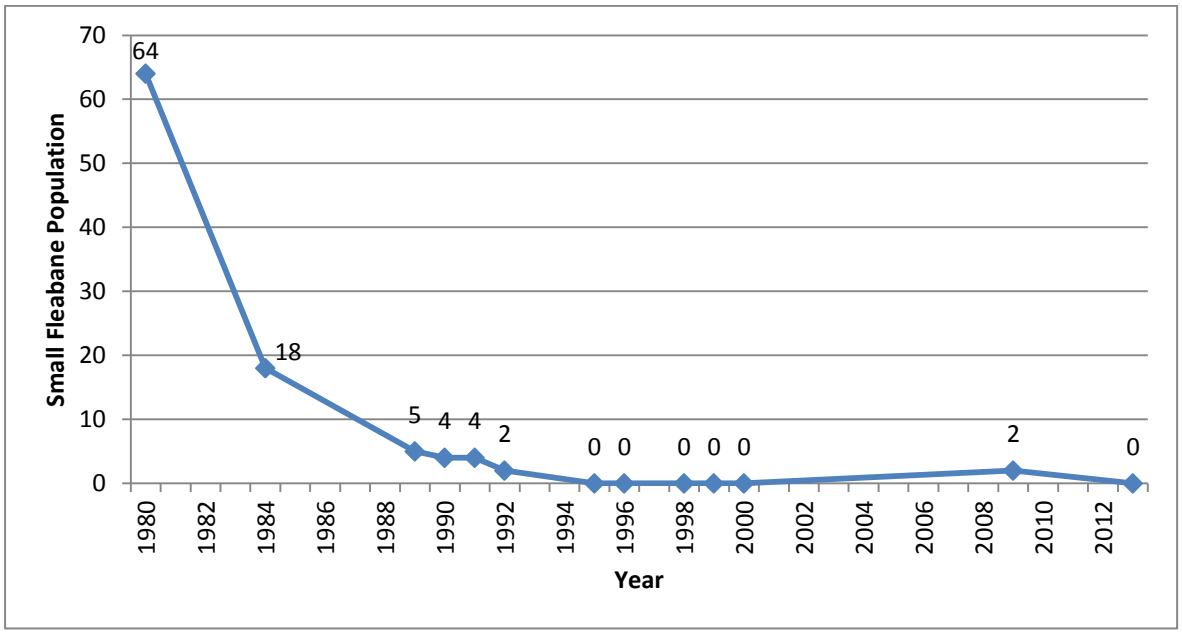

Figure 42: Population at North Gorley Green and adjacent lanes

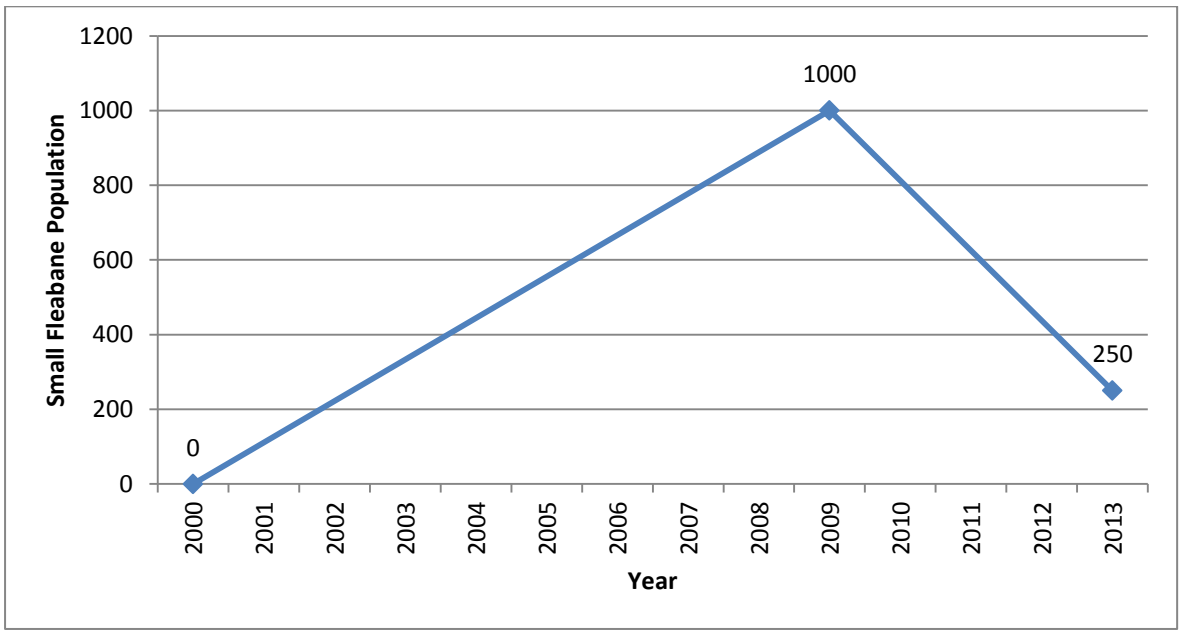

Figure 43: Rockford Common pond

Avon Valley populations

Pithouse Farm

The Small Fleabane population at Pithouse Farm was 'discovered' by Paul Bowman and Andy Byfield on the 12th September 1987. Paul and Andy were visiting the area to investigate the records of 1867 and 1931 for Small Fleabane in an unspecified location in the Hurn area.

In the late 1980s Pithouse Farm was a small dairy farm. The dairy-herd made twice daily journeys along the tracks from the farm to the nearby pastures and meadows. The farm is situated on the junction of the seasonally parched species-poor acid grasslands of a gravel terrace and the seasonally flooded species–rich grasslands of the Avon floodplain. The main population of Small Fleabane was found along the main farm track leading from the terrace to the floodplain but was also scattered across the farm both where the herd walked and where the farm's dung-heaps were spread on the land and in the garden.

Later investigations into the history of the farm demonstrated that prior to enclosure in the nineteenth century the main farm track was a drove road linking the commons of the Dorset heaths with the commons of the New Forest[40] by way of the historic Tyrrell's Ford[41]. An early photograph of the ford is reproduced as Figure 47. The dairy farming had inadvertently perpetuated the hard grazing and trampling of the wayside of the historic drove. It is conceivable the Small Fleabane was a relic of this historic landscape.

The farm is part of the Avon Tyrell Estate and until the early 2010s was farmed by two generations of the Burford family. The family understood the importance of the population of Small Fleabane and its association with their farming practices. The family enthusiastically engaged with the conservation of the plant and its farmed habitats.

In common with many other small dairy farms the enterprise of dairying at Pithouse ceased in the 1990s. The Burfords continued farming the land and devised ways of sustaining the Small Fleabane habitat within their new enterprise of horse livery and beef cattle. Disturbed habitats were sustained by the considered use of tractor ruts and the careful placement of ring feeders. Following the change from dairying the distribution of Small Fleabane changed. The numerous outlying individual plants and small populations diminished. By 2005, with the exception of a single plant, the distribution of Small Fleabane on the farm was confined to the deliberately managed tracks and the ring feeder field.

In 2013 the population continued to be concentrated in and around the drove with two notable outlying populations. One population was recorded around a seasonally parched gateway near the former ring-feeding station and the other is growing on ground disturbed through ditch maintenance. The changes in Small Fleabane populations at Pithouse are illustrated in Figure 44 to Figure 46.

Following the retirement of the Burfords the grasslands at Pithouse became part of an enterprise of extensive beef rearing. In early 2013 the management system for the new enterprise was at an early stage of development. The tenant was pleased to be introduced to the plant and understands its association with grazing and disturbed ground.

There are indications that the drove is a useful part of the farm infrastructure for corralling stock and it has been gated for the purpose. Similarly the previous creative use of ring feeders to conserve Small Fleabane is understood by the new tenant. Current indications are that those elements of the farming system of the past which supported Small Fleabane are likely to be perpetuated in the future.

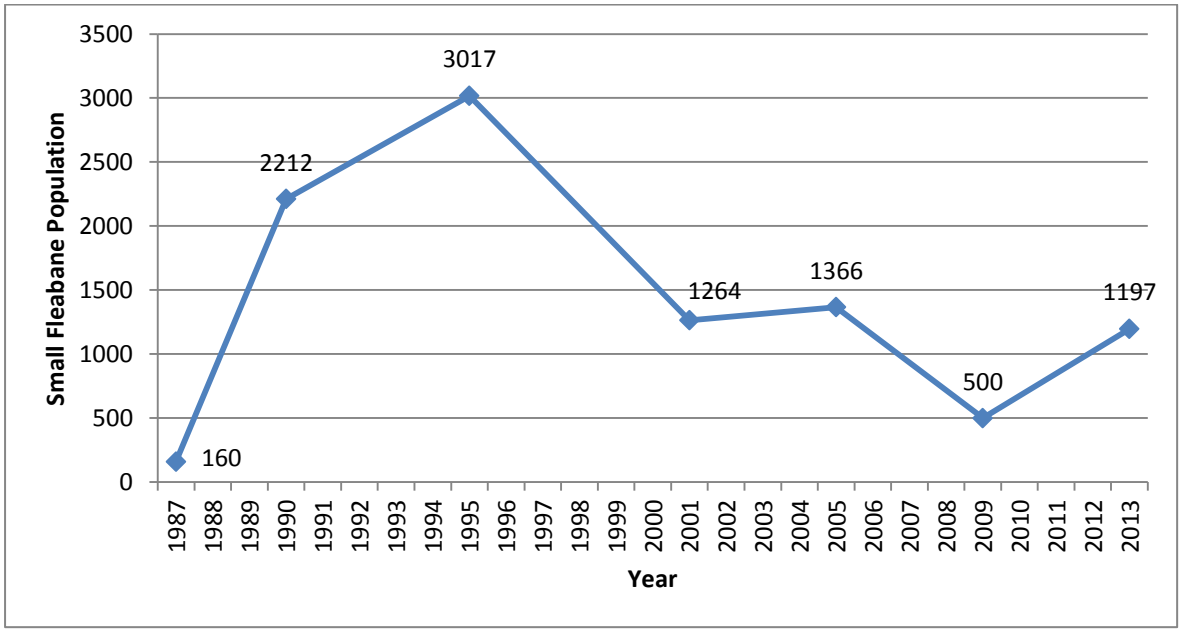

Figure 44: Populations of Small Fleabane throughout Pithouse Farm

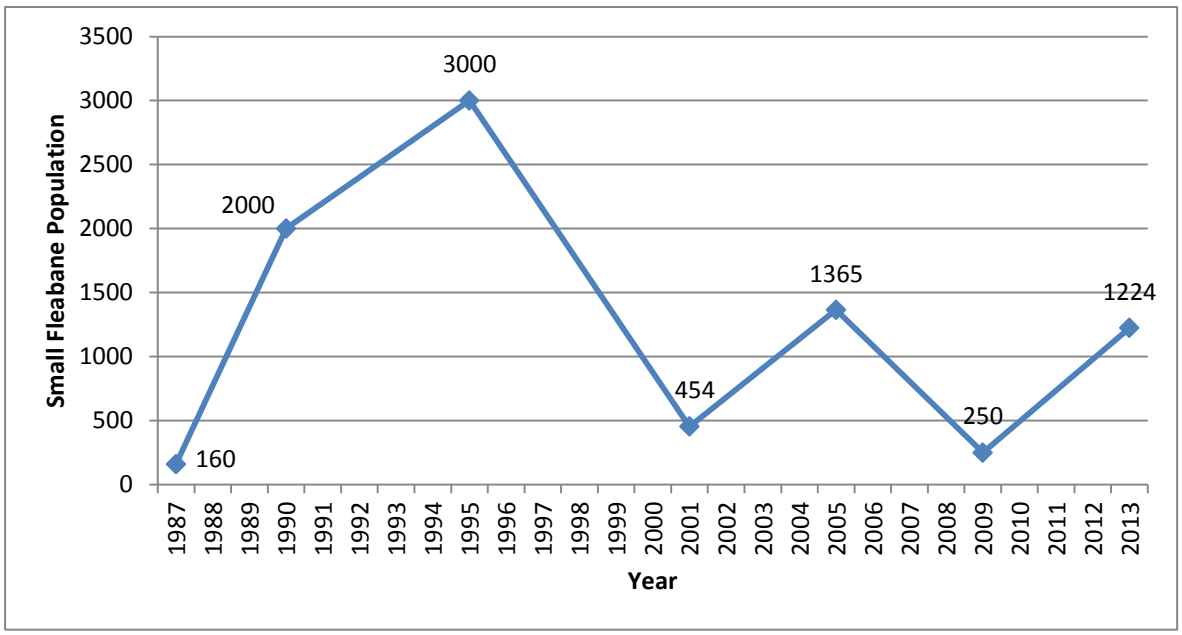

Figure 45: Populations of Small Fleabane at Pithouse Farm Drove

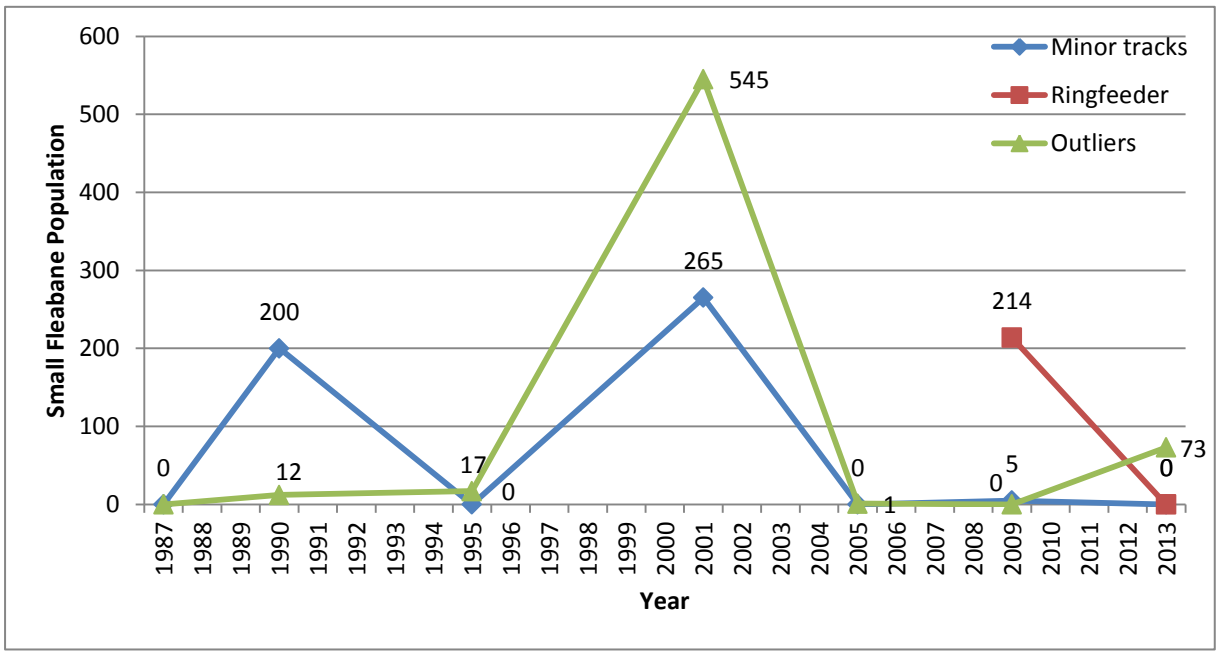

Figure 46: Populations of Small Fleabane at Pithouse Farm away from the main drove

Figure 47: Tyrrell's Ford, c.1900-1910

Chapter 6: Population and distribution trends

The changing population and distribution of Small Fleabane in England is detailed in Chapter 2: An introduction to Small Fleabane, its ecology, distribution and history to 2009. In summary since records began the distribution of Small Fleabane has reduced from being a widespread species to being confined to the New Forest and its immediate environs. At the same time the total population has grown. The site accounts of different populations in Chapter 5: Detailed site accounts illustrate the details of those changes.

Data are not available to report on population trends prior to 1980. One may reasonably assume the population trends prior to 1980 would reflect the declining distribution. The trend in all populations since 1980 is illustrated below in Figure 48. Within this national trend there are important local trends to consider. Whilst the national population has undergone significant expansion this is due to localised events such as the supplementary feeding on Penn Common and the use of the Storms Farm track. These events mask an overall decline of most populations, particularly those on the western commons and on the Crown Land.

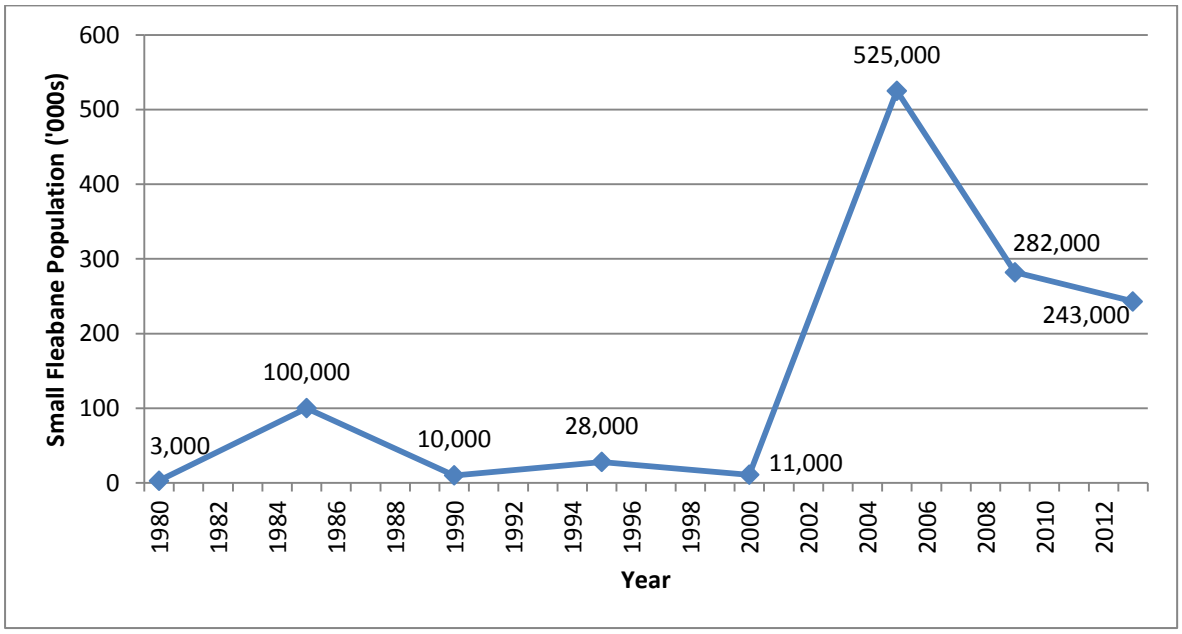

Figure 48: Small Fleabane Populations in England 1980-2013

The primary purpose of this contract is to report on the Small Fleabane populations of the Crown Land. Over recent decades the distribution of Small Fleabane on the Crown Land has reduced from two populations (South Weirs and Bartley Greens) to one (Bartley Greens) with occasional single outlying plants.

The trend in these populations is shown in Figure 49. The overall trend is of a fluctuation of populations through the first two decades of monitoring followed by a sustained decline over the most recent decades. The trends on the Crown Land run contrary to the national trend.

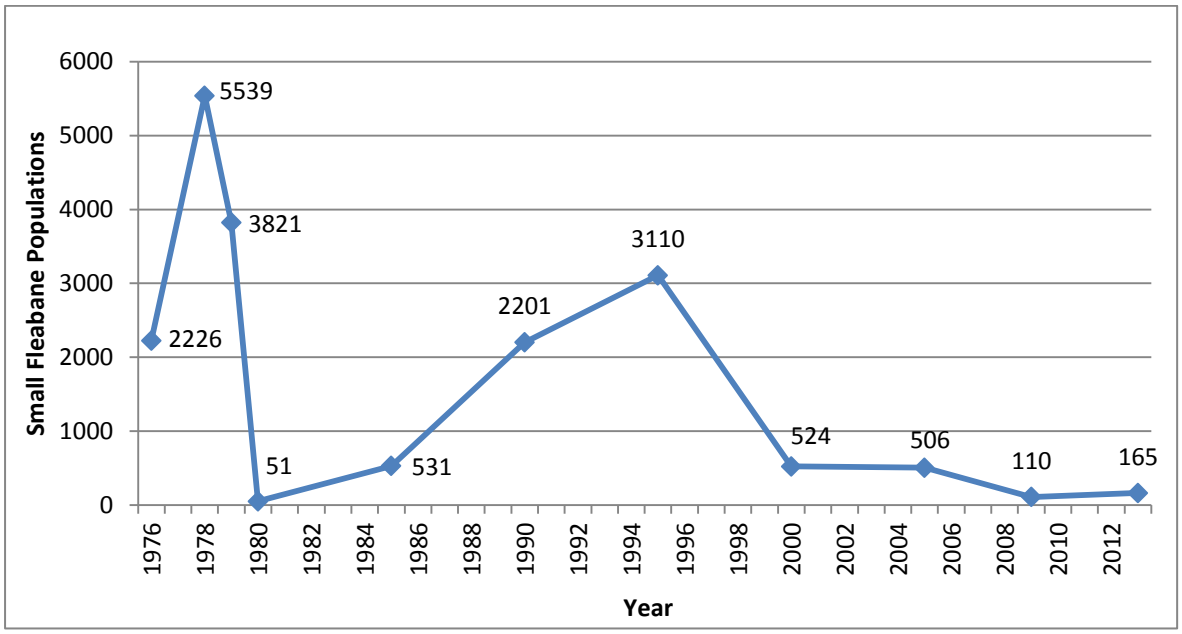

Figure 49: Small Fleabane populations on the Crown Land 1976-2013

The Crown Land populations may be considered within the context of the whole Open Forest. Unsurprisingly the Open Forest population trend (Figure 50), follows broadly the same pattern as the national trend (Figure 48). This trend however is highly influenced by the events resulting in peaks in local populations at Storms Farm track in the 1980s and at Penn Common over the last decade. These events have been removed from the adjusted graph (Figure 51).

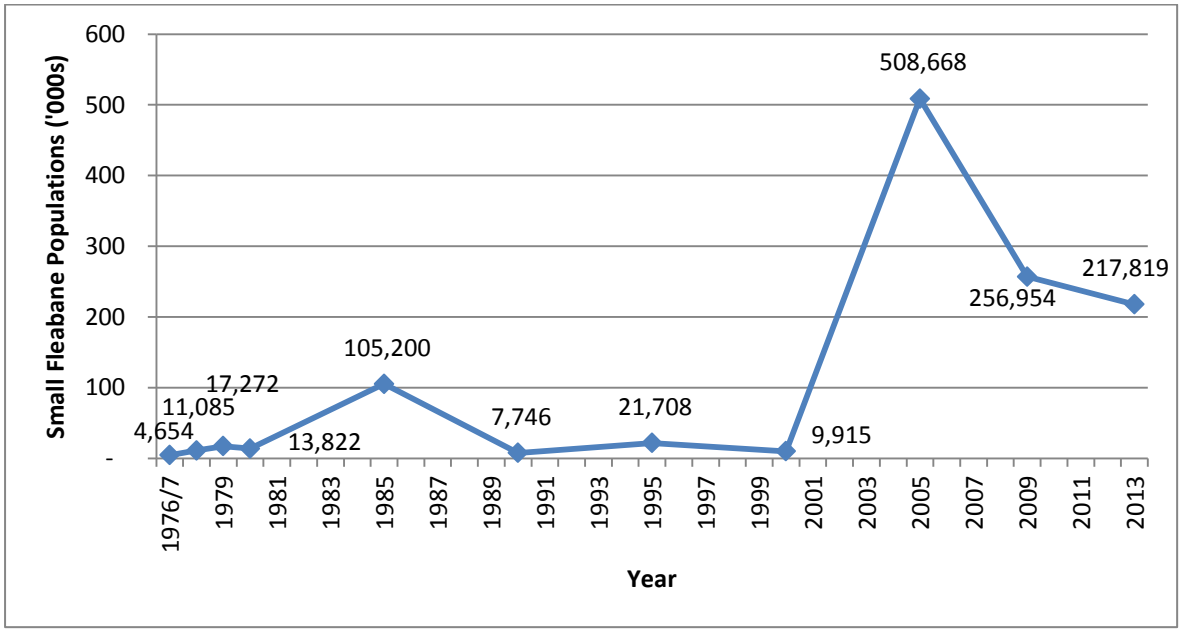

Figure 50: Small Fleabane Populations on the Open Forest 1976-2013

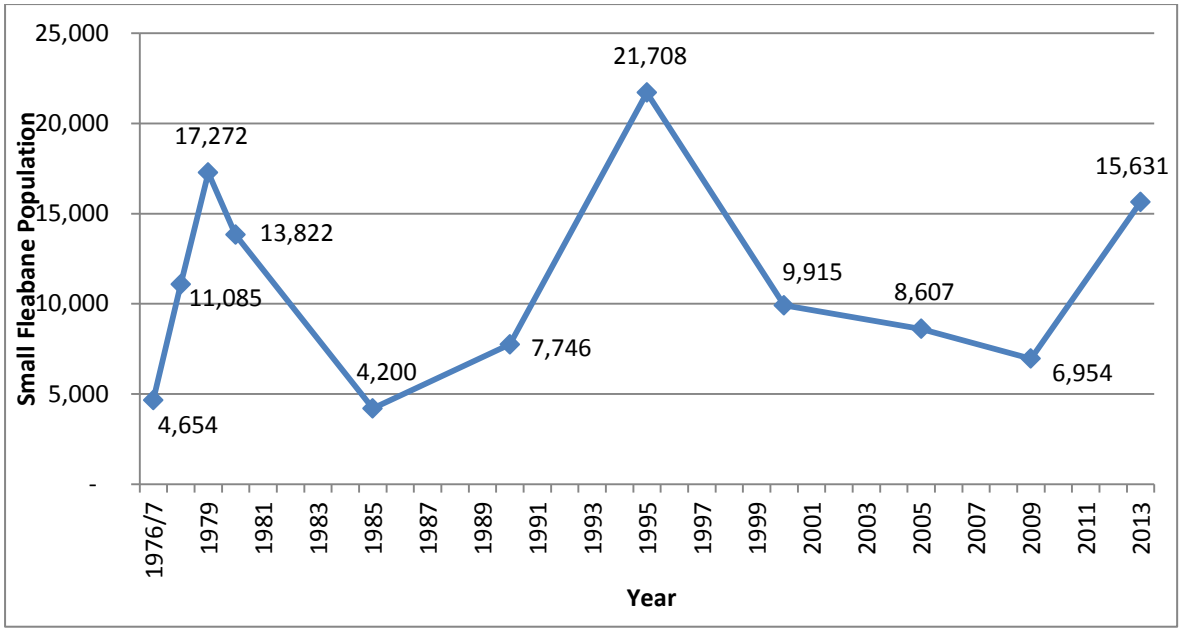

Figure 51: Adjusted Open Forest population trend. 1976-2013

The adjusted trend illustrates long term population fluctuations between medium thousands, to low tens of thousands, of plants. The Crown Land trend runs contrary to the Open Forest trend.

Populations within commoners' holdings

The populations of Small Fleabane within holdings have not been subject to this analysis. The data sets are insufficient to support identifying general trends even though they are useful in considering individual populations as described in Chapter 5: Detailed site accounts.

The emergence of an understanding of the importance of holdings for Small Fleabane arose after the designation of site boundaries intended to conserve the species. In 2009 some 8% of the population was found outside the land designated as SSSI, a figure rising to around 12% in 2013 despite the dramatic decline of populations in the Biddlecombe Farm yards. The reports of an unquantified population within the yard adjacent to Penn Common, and the potential for undiscovered populations within enclosed land in the west of the Forest suggest a greater proportion may fall outside the SSSI network. Should the order of magnitude of the Penn Common holding be as reported the proportion of Small Fleabane population in Britain within commoners' holdings and outside SSSI designated areas may be in the order of 40%.

Distribution of populations by designation and land ownership

The 2013 survey data was mapped and compared against the boundaries of various site designations and land ownerships. The results were further scrutinised by using the author's (CC) local knowledge to ensure accuracy and are illustrated in Figure 52.

All of the Small Fleabane populations on the Open Forest fall within the New Forest SSSI. Similarly all the Small Fleabane populations in the Avon Valley fall within the Avon Valley SSSI. As described above there are significant populations of Small Fleabane outside SSSI designations where these fall within commoners' holdings.

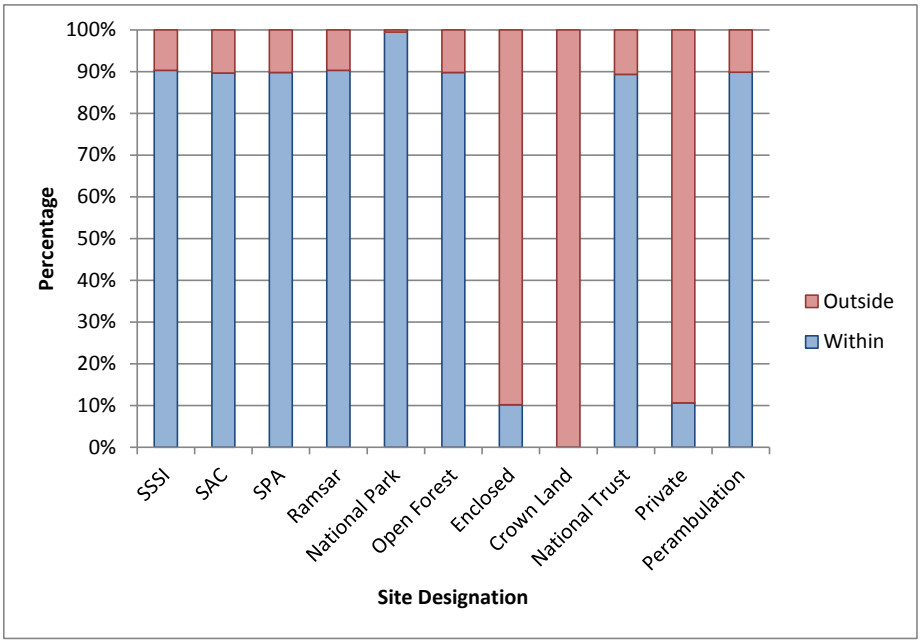

Figure 52: Populations by site designation (adjusted to exclude Penn Farm estimated population)

Appendix A identifies Small Fleabane as being an element in the designation of the Ramsar sites in the New Forest and Avon Valley. The New Forest Ramsar boundary does not cover precisely the same area as the New Forest SSSI. In 2013 some 76 plants of Small Fleabane in seven locations within the New Forest SSSI fell outside the New Forest Ramsar site. These populations are within the lanes of the western Commons and Bramshaw Commons and represent a fraction of one percent of the population.

The majority of the Small Fleabane population, in the order of 89%, grows on land owned by the National Trust. Some 10% of the population grows on land in private ownership with the population on the Crown Land representing less than one percent.

Over 99% of the population grows within the New Forest National Park. Nearly 90% of the population grows within the perambulation of the New Forest with a similar order on the Open Forest.

Meta-populations and extinction debts

In drawing conclusions from these data one needs to be aware of the ecological concepts of meta-populations and extinction debts.

Concepts relating to meta-populations were originally applied to invertebrate populations. Small Fleabane populations however exhibit similar characteristics. Meta-populations consist of a group of spatially separated populations of the same species which interact at some level[42].

A meta-population is generally considered to consist of several distinct populations together with areas of suitable habitat which are currently unoccupied. In classical meta-population theory, each population changes in relative independence of the other populations and eventually goes extinct as a consequence of changing local circumstances. The smaller the population, the more prone it is to extinction.

Although individual populations have finite life-spans, the meta-population as a whole is often stable because immigrants from one population (which may, for example, be experiencing a population boom) are likely to re-colonise nearby suitable but currently unoccupied habitats. Although no single population may be able to guarantee the long-term survival of a given species, the combined effect of many populations may be able to do this.

With regard to Small Fleabane and the New Forest one therefore may judge the success, or otherwise, of conservation measures by looking at population dynamics across the whole Forest and not solely at changes in individual locations.

Extinction debt is a concept in ecology that describes the future extinction of species due to events in the past[43]. Extinction debt occurs because of time delays between impacts on a species, such as destruction of habitat, and the species' ultimate disappearance. For instance, long-lived trees may survive for many years even after reproduction of new trees has become impossible, and thus they may be committed to extinction. Technically, extinction debt generally refers to the number of species in an area likely to go extinct, rather than the prospects of any one species, but colloquially it refers to any occurrence of delayed extinction.

With regard to Small Fleabane and the New Forest the cause of local extinctions may be correlated with changes in the pattern and practice of commoning (Chapter 8: Grazing and other management inputs). Changes in the concentration of livestock around commoners holdings may take many years, in the order of a decade, to become manifest in local extinctions.

Chapter 7: Plant communities and associated species

The 2013 survey recorded the plant communities within which Small Fleabane grows together with associated notable species.

The detailed quadrat data and community descriptions for each population are set out in the separate report of the 2013 field survey by Neil Sanderson *'Survey of Pulicaria vulgaris on the New Forest 2013'*.

The Small Fleabane is a species of seasonally inundated and parched hollows within a grassland matrix. The plant communities within which Small Fleabane has been recorded may be allied to the National Vegetation Communities (NVC) OV21 and OV28 together with OV31 and 35 within a matrix of U1 and MG6 grasslands.

The following account of the plant communities is taken from Neil Sanderson's report of the field survey:

"Across all the quadrats there are seven constants: *Agrostis stolonifera*, *Plantago major*, *Polygonum aviculare*, *Persicaria hydropiper*, *Gnaphalium uliginosum*, *Ranunculus repens* and *Poa annua*.

"The open wetter stands have six constants: *Agrostis stolonifera*, *Plantago major*, *Polygonum aviculare*, *Persicaria hydropiper*, *Alopecurus geniculatus* and *Gnaphalium uliginosum*. Other less frequent species prominent in these quadrats include *Lythrum portula*, *Persicaria minor* and *Ranunculus flammula* and with *Juncus bufonius* and *Rorippa palustris* shared with the more closed wetter swards (OV28). This seems closest to the NVC community *Rorippa palustris – Gnaphalium uliginosum* Community (OV31) but is perhaps less wet and less nutrient enriched than the core community envisaged by the NVC. On the other hand the community is certainly found in more nutrient enriched situations than the *Lythrum portula – Ranunculus flammula* Community (OV35), which is widespread in the New Forest and tends to replace the OV31 community in similar situations in wet lawns. It is possible that this type of OV31, would be best separated off from the core *Rorippa palustris – Gnaphalium uliginosum* Community (OV31) as a separate *Persicaria hydropiper – Polygonum aviculare* community or sub-community. A very well developed example of more typical OV31 with *Cyperus fuscus* can be seen locally at Breamore Marsh (Sanderson, 2013), notably, although it has much more *Rorippa palustris*, it has less *Gnaphalium uliginosum* and no *Polygonum aviculare* or *Persicaria hydropiper*, suggesting there is room for partitioning OV31. The NVC describes OV31 as occurring widely in suitable habitats in the lowlands, but some stands can support some very rare and declining species.

"The stands with more closed swards with *Agrostis stolonifera* cover high, appear essentially to be more closed swards in similar situation to above, where grass cover has increased, but the sward is sufficiently open for an OV31 type assemblage survive in the gaps between the grass mats. There are six constants: *Agrostis stolonifera*, *Plantago major*, *Polygonum aviculare*, *Gnaphalium uliginosum*, *Ranunculus repens* and *Trifolium repens*. Other less frequent species which are more prominent in these quadrats than others include *Potentilla anserina*, *Chamaemelum nobile*, *Senecio aquaticus* and *Rumex conglomeratus*. Species shared with the more open wetter swards (OV31) are *Juncus bufonius* and *Rorippa palustris*, while *Lolium perenne* and *Poa annua* are shared with the drier open swards (OV21). There is quite a good match with the NVC community *Agrostis stolonifera – Ranunculus repens* Community *Poa annua – Polygonum aviculare* sub-community (OV28b).

"This is a widespread community of trampled depressions in pastures and along track ways (Rodwell, 2000). The NVC does not mention the occurrence of any rare species.

"The drier open swards have five constants: *Agrostis stolonifera*, *Plantago major*, *Polygonum aviculare*, *Poa annua* and *Lolium perenne*. Two species more frequent in this community than the others are *Matricaria discoidea* and *Tripleurospermum inodorum*. Some species confined to this community, but occurring rarely were *Echinochloa crus-galli* recorded in a quadrat and *Galinsoga quadriradiata* and the Vulnerable *Chenopodium glaucum*, recorded outside of the quadrats. The best match in the NVC is the *Poa annua – Plantago major* Community, *Polygonum aviculare – Trifolium repens* sub-community (OV21c). Another possibility is the *Poa annua – Tripleurospermum inodorum* Community (OV19), but none of the sub-communities are such a good match and OV19 is a community of ungrazed situations, while OV21 is typical of grazed and/or trampled situations. At the Dairy House Farm field on Cadnam Green, a photograph from 2005, when the yard was grazed, shows dense stands of *Pulicaria vulgaris* in a tallish OV21. In 2013, the yard was very lightly grazed and *Pulicaria vulgaris* rare, confined to surviving patches of OV21. The rest of the yard lacked *Pulicaria vulgaris* and was dominated by tall dense *Tripleurospermum inodorum – Atriplex patula* vegetation, referable to OV19. This is a very common community nationally (Rodwell, 2000). The NVC does not mention the occurrence of any rare species."

The notable species growing in association with Small Fleabane in 2013 were Pennyroyal Mint *Mentha pulegium* (Figure 53), and the Small Water-pepper *Persicaria minor*.

Pennyroyal Mint occurs with Small Fleabane in the greens and grazed waysides around the Bramshaw Commons. It also grows on the Crown Land but not together with Small Fleabane.

The natural distribution of Pennyroyal Mint has become obscured in recent years through its inclusion in wildflower seed mixes. However the New Forest populations are longstanding and are regarded as native. Pennyroyal Mint is a protected species under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended). Pennyroyal is a UK BAP priority species and is included as a species of principal interest under Section 41 of the Natural Environment and Rural Communities Act of 2006. Pennyroyal Mint shares a similar habitat requirement with Small Fleabane in being associated with heavily grazed settlement edge lawns, greens and waysides. Unlike Small Fleabane Pennyroyal Mint is a perennial species and does not require a continuous supply of bare ground in which to germinate.

The Small Water-pepper has undergone a contraction in distribution and abundance in Britain to a point where it is classified in the Red Data Book as 'vulnerable'. Like Small Fleabane the Small Water-pepper is an annual plant needing a continuous supply of bare ground to geminate. The hard-grazed seasonal wetlands in and around the New Forest and Avon Valley are regarded as a national stronghold for the Small Water-pepper.

The invertebrate communities of the seasonal ponds supporting Small Fleabane have not been surveyed as a part of this contract. However previous surveys have identified these seasonal wetlands as supporting the Fairy Shrimp *Chirocephalus diaphanous.* This freshwater crustacean is fully protected under the provisions of Schedule 5 of the Wildlife and Countryside Act 1981.

Figure 53: Small Fleabane seed heads amongst flowering Pennyroyal Mint, Cadnam, 2009

The distribution of plant communities currently, and potentially, supporting significant Small Fleabane populations in the New Forest is highly localised. The Open Forest has not be definitively mapped but is estimated to extend over c.23,000ha. The character and extent of grasslands in the Open Forest was discussed in detail by Neil Sanderson in 1998[44]. This account indicates 'Chamomile' and 'Neutral' grasslands associated with Small Fleabane populations may extend to c.200ha or less than 1% of the area of Open Forest. These habitats tend to be located adjacent to historic settlements and within wayside greens.

Chapter 8: Grazing and other management inputs

This chapter explores the relationship of grazing and other management inputs with populations of Small Fleabane. The chapter starts with a summary of the history of grazing in the New Forest. This history considers the whole Forest over the period since Small Fleabane was first described from the area in the mid-nineteenth century.
The chapter continues with considering whether or not Small Fleabane can be proven to be dependent upon grazing, and if so, at what geographical scale and in what circumstances. The chapter concludes with considering what other management inputs, if any, are associated with Small Fleabane.

A summary of trends in grazing the New Forest since 1854

There are a number of accounts of the history of grazing in the New Forest. This summary draws heavily on the review of Colin Tubbs of evidence pre-dating the mid-1960s[45]. Data relating to recent decades has been drawn from a number of sources, principally raw datasets from the Verderers together with the summary of recent evidence compiled by Jonathan Cox[46].

The data available indicate how the New Forest has been grazed over the last 150 years. The number and size of holdings indicates the number and general character of enterprises turning livestock out to graze. Similarly the number and type of livestock give a general indication of grazing pressures.

A summary of trends in the number and sizes of commoners' holdings

There are four broadly comparable studies which consider the size of holdings turning livestock out onto the Open Forest. These are W. Easdaile's evidence to the Select Committee of 1875 which reported on holdings in 1854, an anonymous Countryside Commission report of 1984, Jo Ivey's report of 2005 and data provided by the Verderers in 2013. The full references to these data sets are available in Cox 2013. These studies have been summarised in Figure 54 to Figure 57. To assist comparisons to be drawn the areas have been converted to hectares and the number of holdings in each size class expressed as percentages. The size classes have been made as consistent as the data allow.

In 1854 there were some 1200 commoners' holdings (n=1199) nearly half of which were larger than 12ha.

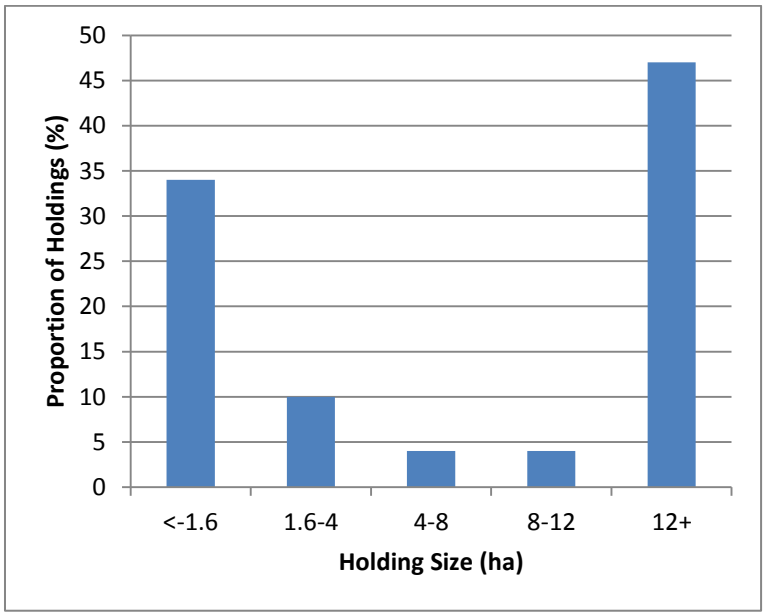

Figure 54: Analysis of 1854 Register of Claims given as evidence in 1875

By 1984 in a survey of 75 selected commoners' holdings nearly three quarters of holdings were smaller than 2.5ha.

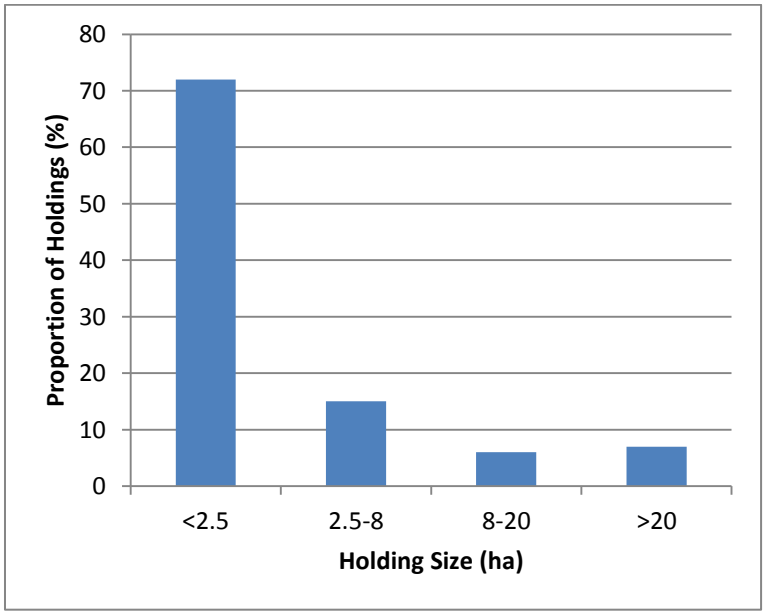

Figure 55: Commoners' holdings in the New Forest, Countryside Commission, 1984

Some twenty years later in 2005 a sample survey (n=216) indicated most commoners' holdings were still small with some three quarters of the holdings being less than 8ha.

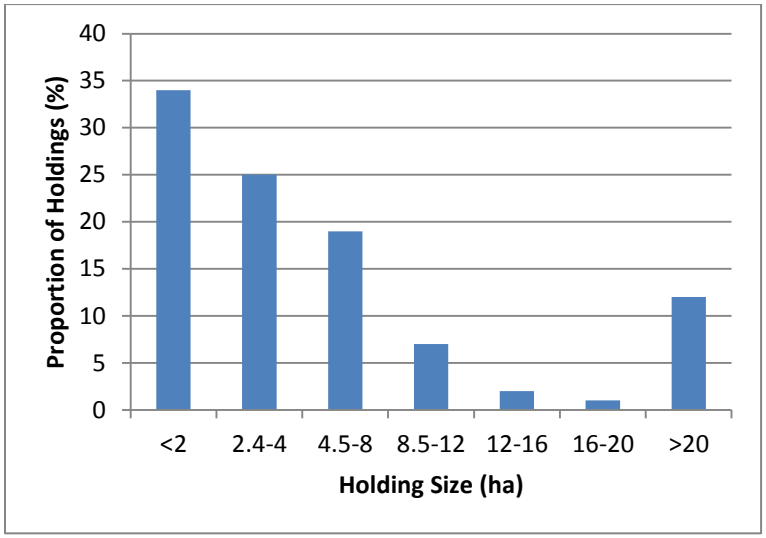

Figure 56: Commoners' holdings in the New Forest, Ivey 2005

Between 1984 and 2005 there was a modest growth in holdings larger than 20ha from 7% to 12%. This apparent growth should be treated with caution as the sample sizes and methodologies of these studies are not the same.

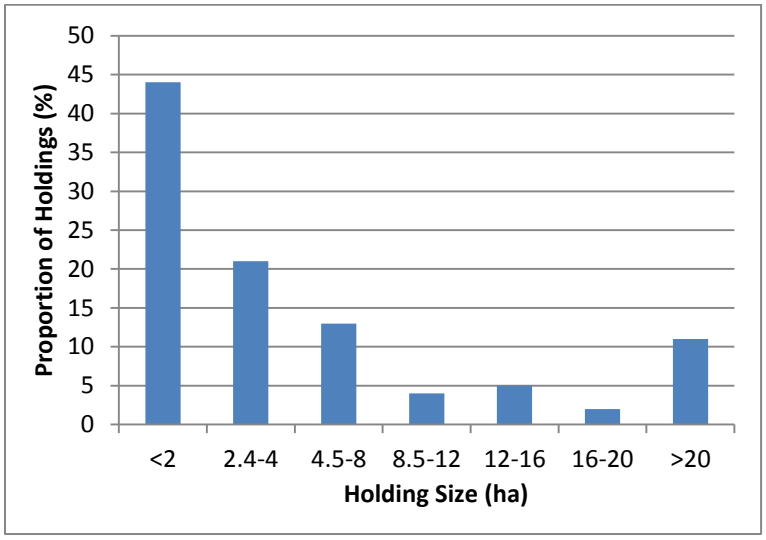

Figure 57: Commoners' holdings in the New Forest, 2013

The 2013 data of all holdings (n=503) indicate a broadly similar pattern of holding sizes with an indication of a decline in the average size of holdings since 2005. As the methodologies between the 2005 and 2013 data differ, caution should be applied to any analysis.

Over the last 150 years one may summarise the trends as a significant reduction in the number of holdings from c.1200 to c.500 together with a reversal in the proportional distribution of sizes of holdings. The differences are that larger holdings are relatively less abundant today than in 1854 and that smaller holdings are relatively more abundant today than in 1854.

The character of Forest holdings has changed. In the nineteenth century, through to the mid-twentieth century, Forest smallholdings were characterised by highly diverse enterprises. There would be a variety of livestock, land set down for hay as well as cultivated for a variety of crops including winter-feed for the stock. This diversity has been replaced by smaller holdings now tending to be wholly pasture and limited to pony keeping. Cattle are strongly associated with the larger holdings where they are present as herds rather than small groups or individual animals. Larger holdings tend to include both cattle and ponies on permanent pastures with arable cultivation persisting locally as a rarity.

A summary of trends in the number and type of livestock

Any review of numbers of livestock on the Open Forest needs to recognise the limitations of the data available. There are long sequences of records of stock numbers held by the Verderers which may be supplemented by other historic sources. In interpreting these data one needs to be mindful that over time circumstances have differed which may result in more or less livestock being known to the Verderers. Circumstances have also changed so that the time an animal spends on the Open Forest may vary. Equally the area of Open Forest available to livestock has fluctuated considerably over the historic period with changes to enclosures, silvicultural inclosures (both being fenced and thrown open) and the fencing of the perambulation. With those caveats the datasets available are remarkable and are undoubtedly a fair reflection of broad trends.

Colin Tubbs cites numerous sources to indicate a trend through the 1850's and 1870's for an increase in both dairy stock and ponies. This trend resulted in a peak of some 3194 head of stock in 1885. From that point pony numbers declined but cattle numbers held up fluctuating between 2098 and 2893 head between 1875 and1893. Good market prices for dairy products supported stock numbers into the 1920s after which there was a steady decline. This was a national trend associated with the success of the dairy industry in New Zealand and Australia combined with technological improvements to enable those goods to be imported. By 1939 stock numbers had declined to 1757 head, of which 1000 were cattle.

With the advent of the Second World War, and the associated declines in imported food, market prices improved and so did stock numbers. There was a strong market for dairy products, beef and horse-flesh. By 1946 stock numbers stood at 3082 cattle and 775 ponies. Since the end of the war stock numbers continued to grow, a trend which continues to the present day.

Publishing in 1968 Colin Tubbs reports from personal experience that 'during the past decade' whilst cattle numbers had grown this had masked a trend away from dairy stock to store cattle. The trend was predicted as 'likely to continue', which it did. The last dairy herd known to the author (CC) was turned out onto the Bramshaw Commons by a commoner with a holding adjoining the Open Forest in neighbouring Wiltshire. This practice probably ceased sometime in the 1980s.

The Verderers hold detailed records of stock numbers since the 1950s. Figure 58 illustrates changes in numbers of cattle, ponies and pigs. The total numbers of livestock are recorded from 1956 with a detailed breakdown of cattle, ponies and pigs since 1980. Figure 59 presents data from 1956 expressed as 'Feeding units'. (1 feeding unit = 1 pony = 2 cattle). Feeding units are useful in understanding grazing pressures as cattle and ponies have different impacts on vegetation. This relates both in the volumes of forage they require and their ability to exploit different types of forage.

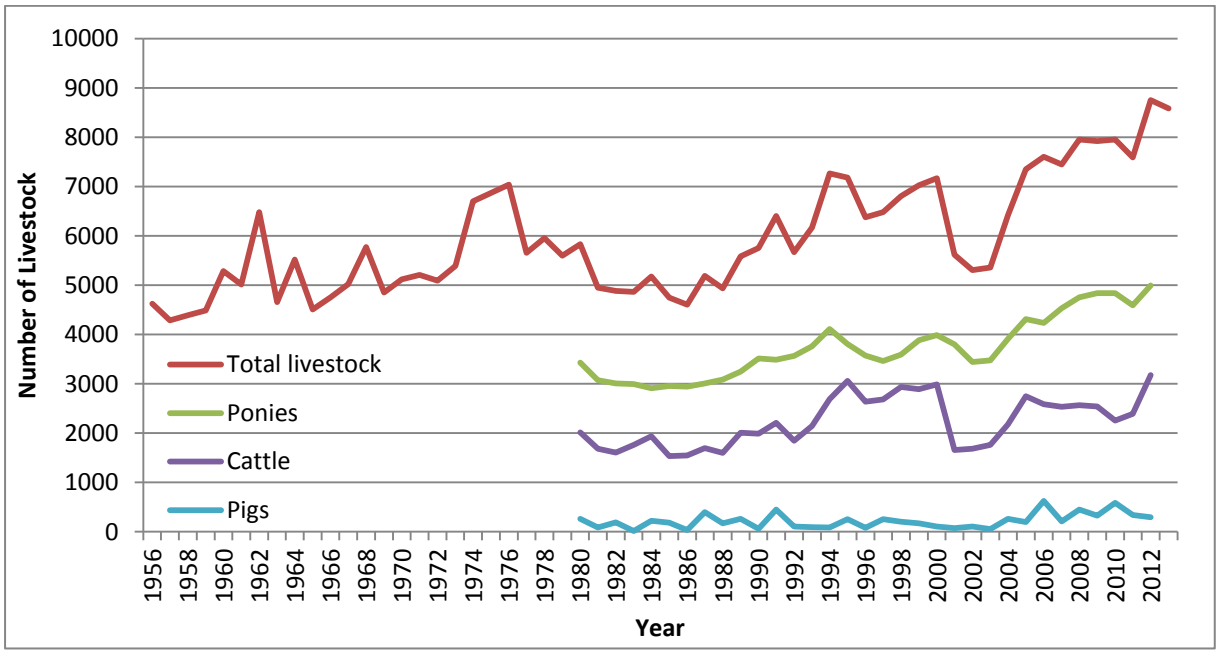

Figure 58: Numbers of Ponies, Pigs and Cattle Recorded as Being Turned Out on the Open Forest. Redrawn from Cox, 2013

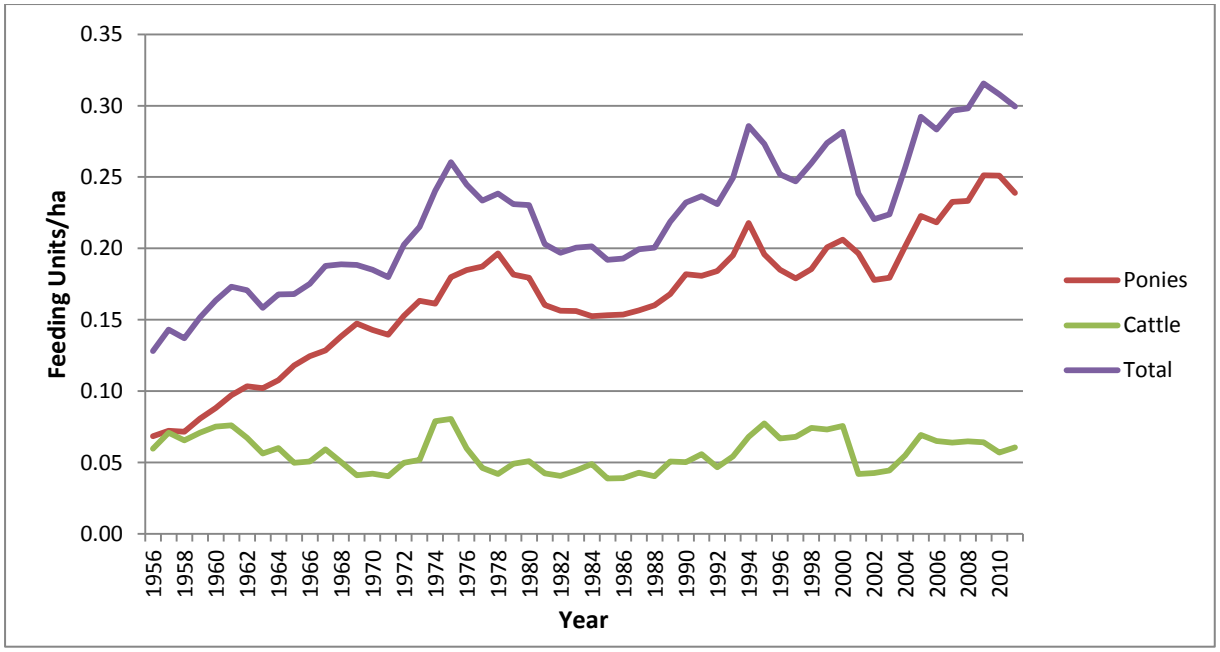

Figure 59: Changing Level of Grazing Pressure (1956-2010) Measured in 'Feeding Units/ha'. Redrawn from Cox, 2013

NB. These graphs do not include sheep and other 'minority' livestock such as donkeys.

Pigs and other animals

The presence of pigs is a conspicuous feature of some of the larger populations of Small Fleabane, both on the Open Forest and within commoners' smallholdings. The pig field contiguous with Cadnam Green has supported some of the largest and densest populations of Small Fleabane in the New Forest. Pigs appear to be an integral part of the grazing regimes upon which the larger populations of Small Fleabane are associated.

Historic accounts reflect the importance of pigs to the smallholders economy in the nineteenth century (Figure 60). Colin Tubbs reported pig numbers on the Forest in the nineteenth century as fluctuating around 5000. In 1968 Tubbs reported a 'recent peak' in numbers of 1778 pigs turned out in 1962. Figure 58 illustrates that in recent decade's pig numbers have fluctuated at less than 1000 animals dropping on occasion below 100 animals.

Figure 60: Pigs are a longstanding part of the Forest's economy

There are parts of the Open Forest where pigs may be turned out year-round. The majority of such sites are on the adjacent commons and include Penn Common and Cadnam Green. Commoners with rights to pannage, also called rights of mast, may turn pigs out onto the commons during the autumn pannage season. The pannage season is set annually by the Court of Verderers and may vary depending on the predicted crop of mast (acorns and beechmast). There are a few Crown freeholds around the Forest where by custom and practice the tenant may turn out breeding sows through the year. These 'privileged pigs' represent a very small proportion of the pigs on the Forest.

There are a small number of commoners' holdings with sheep rights. These rights are exercised and flocks are present such as on the Small Fleabane site at Penn Common. However sheep do not appear to have an association with Small Fleabane other than contributing to the overall grazing pressure.

Donkeys, and occasionally mules, are a locally conspicuous feature on Small Fleabane sites such as Cadnam Green. However, like sheep, donkeys do not appear to have an association with Small Fleabane other than contributing to the overall grazing pressure.

Geese and other domestic fowl, including chickens and Guinea fowl, are associated with a number of sites supporting Small Fleabane. These sites include both on the Open Forest and within the commoners' holdings at Penn Common, Moorbridge and Cadnam Green. The relationship between domestic birds and Small Fleabane is unclear. Historic accounts, such as Ted Lousley's 1976 account in the Flora of Surrey quoted in Chapter 2: An introduction to Small Fleabane, its ecology, distribution and history to 2009, clearly identify an association. The number and density of goose flocks and other domestic fowl on the Forest in recent decades are probably too low to have a significant ecological effect. However Geoffrey Field's records from the 1990's of Biddlecombe Farm on Cadnam Green indicate that local concentrations of geese in a farmyard has been associated with Small Fleabane populations in the recent past. This matter deserves further investigation.

Is Small Fleabane a grazing dependant species?

The literature referred to in Chapter 2: An introduction to Small Fleabane, its ecology, distribution and history to 2009 cites various authorities who associate the decline in grazing commons and waysides with the loss of Small Fleabane. Similarly Tony Hare's thesis of 1986 and the various accounts published in the Red Data Books and Watsonia make frequent references to the relationship of Small Fleabane with grazing. However the relationship, to a point of dependency, has not been unambiguously stated.

Populations of Small Fleabane have been monitored since 1985. This monitoring included recording whether the plant was in an area subject to grazing for at least part of the year. Between 1985 and 2013 the management of over 1,114,000 plants of Small Fleabane has been recorded. Of these only 0.00017% of the population were recorded from sites where livestock were permanently excluded.

On the basis of this evidence it is reasonable to conclude that Small Fleabane is very strongly associated with grazed habitats.

Has the growth in livestock numbers across the New Forest resulted in an increase in Small Fleabane populations?

The increase in numbers of livestock on the Forest over the historic period is described earlier in this chapter. Chapter 6: Population and distribution trends summarises changes in the population and distribution of Small Fleabane in the New Forest. The detailed site accounts illustrate population increases tend to be associated with extreme events in specific localities such as supplementary feeding on Penn Common and the gross disturbance of the Storms Farm track.

Over the period of detailed population monitoring there have been declines in populations of Small Fleabane from various sites around the Forest. These declines have been particularly profound on the Crown Land with the local extinction of the population at South Weirs, Brockenhurst. The population at North Gorley appears also to be in a state of terminal decline.

The changing population of Small Fleabane cannot be correlated to changes in grazing pressures across the Open Forest.

How does Small Fleabane distribution relate to local circumstances?

Livestock grazing the New Forest are not confined to their holdings of origin. Theoretically any animal turned out anywhere on the Forest may wander into any other part of the Forest. In practice most stock have their home ranges. The distribution of livestock on the Forest is indicated in data collected by the agisters.

Data collected by the agisters are available to indicate the relative grazing pressures on the Open Forest in July 2013. These data are summarised in Table 1. These figures should be treated with due caution as they represent a 'snapshot' of the distribution of livestock. Similarly comparisons of livestock numbers and feeding units should be tempered by the unequal size and forage quality of the drift areas to which they relate.

Table 1: Stock Distribution by Drift Area, July 2013

Drift area	Ponies	Cattle	Total headage	Feeding Units	Small Fleabane Present
Amberwood	0.0	0.0	0.0	0.0	
Appleslade	59.0	51.0	110.0	84.5	**
Ashurst	72.0	338.0	410.0	241.0	
Backley	104.0	0.0	104.0	104.0	
Bagnum	26.0	0.0	26.0	26.0	
Balmer Lawn	118.0	117.0	235.0	176.5	
Bartley	52.0	19.0	71.0	61.5	**
Beaulieu	0.0	0.0	0.0	0.0	
Beaulieu aerodrome	151.0	43.0	194.0	172.5	
Beauliey Road/ Iron Arch	69.0	23.0	92.0	80.5	
Bolderwood	52.0	158.0	210.0	131.0	
Brockenhurst	0.0	0.0	0.0	0.0	
Broomy	60.0	0.0	60.0	60.0	
Burley Lawn	112.0	0.0	112.0	112.0	
Burley Rocks	114.0	15.0	129.0	121.5	
Busketts	0.0	0.0	0.0	0.0	
Canterton	20.0	48.0	68.0	44.0	
Culverley	103.0	38.0	141.0	122.0	
Dur Hill	85.0	0.0	85.0	85.0	
East Boldre	134.0	121.0	255.0	194.5	
Fritham	176.0	34.0	210.0	193.0	
Frogham	104.0	0.0	104.0	104.0	*
Furzey Lodge	31.0	0.0	31.0	31.0	
Godshill	176.0	34.0	210.0	193.0	
Hale and Turf Hill	74.0	139.0	213.0	143.5	
Hawkhill	0.0	0.0	0.0	0.0	
Hightown	33.0	29.0	62.0	47.5	
Hilltop	0.0	0.0	0.0	0.0	

Drift area	Ponies	Cattle	Total headage	Feeding Units	Small Fleabane Present
Hilltop and Blackfield	176.0	216.0	392.0	284.0	
Holmsley 1	0.0	0.0	0.0	0.0	
Holmsley 2	91.0	79.0	170.0	130.5	
Hursthill	40.0	0.0	40.0	40.0	
Ipley	183.0	86.0	269.0	226.0	
Latchmoor	231.0	0.0	231.0	231.0	
Linford and Bratley	104.0	0.0	104.0	104.0	
Linwood	130.0	88.0	218.0	174.0	
Lyndhurst	0.0	0.0	0.0	0.0	
Lyndhurst racecourse	139.0	48.0	187.0	163.0	
Nomansland	39.0	86.0	125.0	82.0	*
Ober	140.0	0.0	140.0	140.0	
Ogdens	195.0	252.0	447.0	321.0	
Park Ground	0.0	0.0	0.0	0.0	
Parkhill	0.0	0.0	0.0	0.0	
Penn Common	267.0	624.0	891.0	579.0	***
Pondhead	60.0	48.0	108.0	84.0	
Setthorns	39.0	19.0	58.0	48.5	
Shappen	39.0	34.0	73.0	56.0	
Slufters	130.0	111.0	241.0	185.5	
Stoney Cross	55.0	114.0	169.0	112.0	
The Weirs	163.0	150.0	313.0	238.0	
Wilverley	217.0	0.0	217.0	217.0	
Withybeds	68.0	0.0	68.0	68.0	
Woodfidley	114.0	0.0	114.0	114.0	
Woodgreen	91.0	0.0	91.0	91.0	
Wootton	156.0	36.0	192.0	174.0	

TABLE NOTES:

1) One Feeding Unit is one pony or two cattle.
2) The number of stars relates to the relative size of the Small Fleabane populations in that drift area.

The data show that the Penn Common drift area has the highest number of both cattle and ponies of any drift area and subsequently the highest headage and highest number of feeding units. The Penn Common drift area supports over 98% of the Small Fleabane populations growing on the Open Forest and 84% of the total British population of Small Fleabane. If one includes the populations within the commoners' holdings adjacent to the Penn Common drift area then this area supports 97% of the total British population of Small Fleabane.

Small Fleabane is therefore strongly associated with the parts of the Open Forest experiencing the highest grazing pressures.

What is the proximity of Small Fleabane populations on the open forest to commoners' holdings?

This analysis draws on the distribution of Small Fleabane populations with regard to commoners' holdings. The precise location of commoners' holdings, together with details of the livestock turned out from those holdings, is held by the Verderers. The full details are held as commercially confidential information. The following analysis draws on what information has been made available to the study combined with knowledge of the distribution of commoners' holding held by the authors gained during field survey since the 1980s.

The proximity of Small Fleabane to larger cattle holdings

Not all commoners' holding are the same. The following analysis therefore considers those holdings turning out 40 or more head of cattle as field observation indicates these are the holdings strongly associated with Small Fleabane.

The populations included in Table 2 are as described in 2013. Populations of less than 100 plants are not considered.

This analysis considers both Small Fleabane populations and proximity by order of magnitude.

Table 2: Proximity of Small Fleabane populations to commoners' holdings turning out 40 or more cattle

	10s of metres	100s of metres	1-2 km	>2 km
Hundreds of thousands of plants	1 population			
Tens of thousands of plants				
Thousands of plants	1 population	1 population		
Hundreds of plants		7 populations		1 population

With the notable exception of the recently discovered population on Rockford Common all of the substantial Small Fleabane populations are within tens, or hundreds, of metres from commoners' holdings turning out forty or more head of cattle.

The proximity of Small Fleabane to all cattle holdings

This association of commoners' holdings turning out cattle with Small Fleabane can be further explored by considering all holdings. The following analysis considers commoners turning out cattle under Forest rights and then commoners turning out cattle on adjacent commons under common rights.

There are 96 holdings turning out cattle under Forest rights onto the Crown Land. The number of holdings turning out various numbers of cattle is illustrated in Figure 61. The sole remaining population of Small Fleabane on the Crown Land is associated with the penultimate category where the plant is associated with one of the two holdings turning out between 70 and 80 cattle.

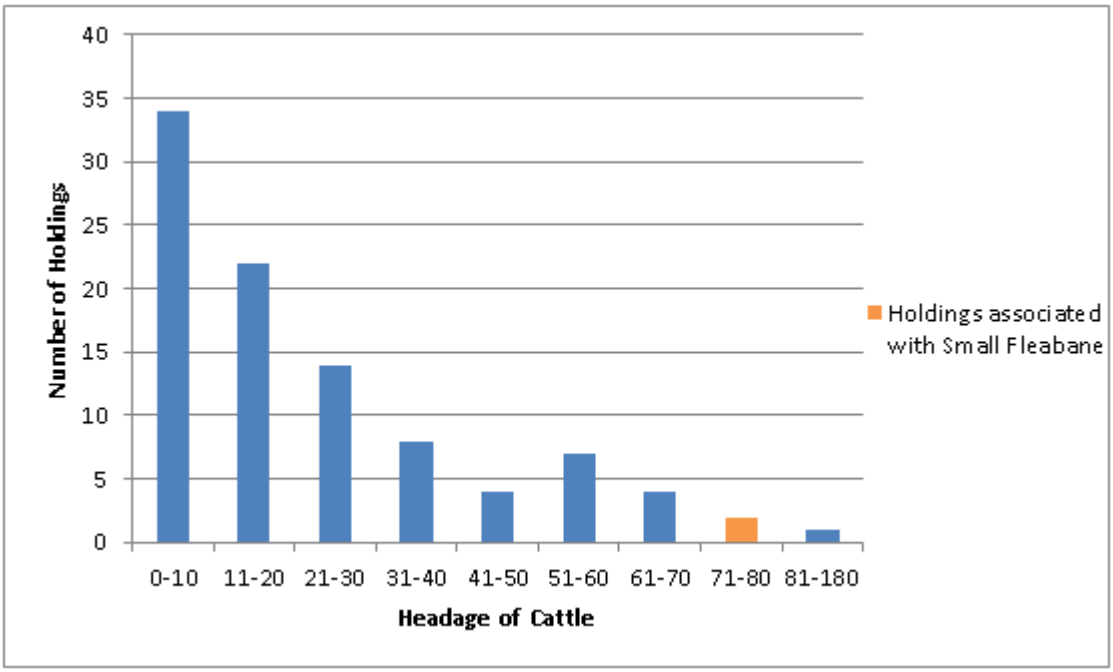

Figure 61: Number of holdings turning out different headage of cattle under Forest rights

There are 36 holdings turning out cattle onto adjacent commons under common rights. The number of holdings turning out various numbers of cattle is illustrated in Figure 62. Significant populations of Small Fleabane are associated with four of the ten holdings turning out the largest number of cattle. The four holdings in this category associated with Small Fleabane all turn out 60 head of cattle.

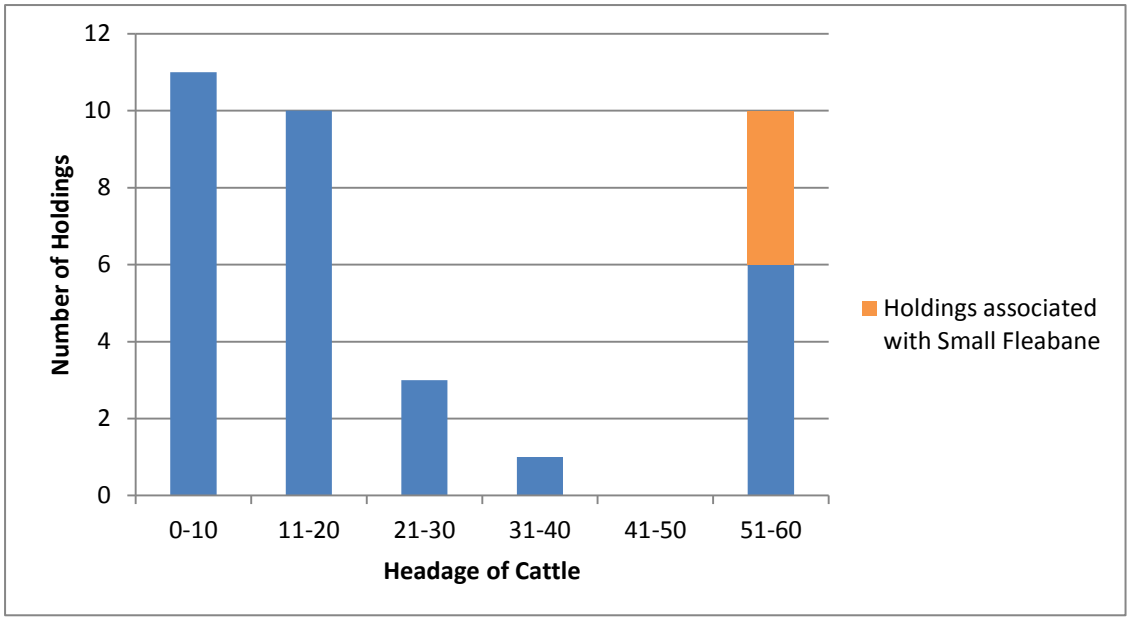

Figure 62: Number of holdings turning out different headage of cattle under common rights

There is a clear correlation between Small Fleabane populations and the larger holdings turning out cattle.

Small Fleabane within commoners' holdings

The discovery and appreciation of Small Fleabane populations within commoners' holdings is set out in the accounts of Biddlecombe and Withers Farms in Chapter 5: Detailed site accounts. The 2013 survey identified, but did not quantify, an additional substantial population within the yard and fields of a commoners' holding in the Bramshaw area. It would be reasonable to assume that additional populations may yet be discovered in holdings elsewhere.

The populations of Small Fleabane within commoners' holdings are dependent on a management regime which supports the habitats of the species. The history of management change of Biddlecombe Farm illustrates the potential for dramatic changes in population size and distribution.

Small Fleabane populations within commoners' holding represent an important proportion of the British population and is worthy of further understanding and investment.

Shade, vehicles and ditches

Small Fleabane is a species of open habitats free from shade. Records have been made from a number of sites which have become increasingly shaded over recent decades. These are detailed on a site-by-site basis in Neil Sanderson's report.

Shade is being cast from trees and shrubs growing on the Open Forest and through the growth of adjacent tree planting schemes, hedgerows and hedgerow trees along roadsides and wayside greens. An increase in shade may be associated with local losses and declines in Small Fleabane populations and is particularly notable on the Crown Land at Bartley Cross.

Roadsides ditches are frequent on the Open Forest serving both as drains and to prevent vehicles driving onto the Forest. The disturbance caused by ditching generates abundant bare ground. In suitable circumstances Small Fleabane may benefit from this disturbance. Such sites include around the Gorley triangle, Penn Common, the verges between Cadnam Green and the M27 together with the recently discovered Nomansland location. These sites tend to support individual plants rather than substantive populations.

Where roadside ditches and banks are absent then vehicles may overrun the verges causing compaction, abrasion and ruts. Such localised disturbance, if infrequent and allowed to repair naturally, can produce the bare ground in which Small Fleabane germinates. As with the roadside ditches these sites tend to support individual plants rather than substantive populations.

A population of Small Fleabane was discovered on grazed and overrun verges along a minor lane off Hucklesbrook in 2005. This population was not re-recorded in 2009 and in 2013 was recorded as absent. The condition of the lane is not recorded from 2009 but in 2013 the whole lane, including the verges up to the hedge bottoms, had recently been surfaced with gravel.

Figure 63: Poached and overrun verge, Cadnam, February 2009

Chapter 9: The landscape context

The landscape context of Small Fleabane populations may be described using historic maps together with contemporary landscape definitions.

Landscape Character Assessment

The New Forest National Park Landscape Character Assessment (draft of September 2013) describes the landscapes of the New Forest. The District is subdivided into 27 Landscape Character Areas. Each Landscape Character Area is the subdivided and assigned to one of 21 landscape types.

The scale and methodology of this assessment permits, with some interpretation, the assignment of the locations of Small Fleabane populations into both Landscape Character Areas and landscape types.

The Small Fleabane populations described in 2013 in the east of the Forest fall within:

LCA 10: West Wellow Heaths and Commons
LCA 11: Copythorne Forest Farmlands
LCA 22: Furzey Woodlands and Villages

The populations mostly fall within the landscape type 7, Ancient Forest Farmland, together with where that landscape adjoins landscape type 20, Heathland.

The Small Fleabane populations described in 2013 in the west of the Forest fall along the boundary of the adjacent Landscape Character Areas 6 and 21.

LCA 6: Upper Avon Valley
LCA 21: Northern Heathland and Forest

In both Landscape Character Areas the Small Fleabane populations are found within landscape type 7, Ancient Forest Farmland together with where that landscape type adjoins landscape type 20, Heathland.

The Pithouse Farm population falls outside the New Forest District and therefore was not assessed.

The ‘Ancient Forest Farmland’ landscape type is characterised by as intimate mixture of farms within grazed lanes and commons. The field patterns reflect historic enclosures from the Open Forest pre-dating the predominantly rectilinear enclosures of the late eighteenth and nineteenth centuries.

The Ancient Forest Farmland landscape type is closely associated with the more productive soils of the Forest which tend to be concentrated below spring-lines and along shallow valleys and terraces. As such this landscape types occupies the 'lowlands' of the Forest in contrast to the higher heathland plateaux. Of the Small Fleabane population of 220,000 plants described in 2013 all but one plant were found within the 25 and 50 metre contours. This can be considered within the context of the New Forest ranging in altitude from sea level to c.125m. Of the detailed records of 1,114,000 plants made between 1985 and 2013 over 99.9% of the Small Fleabane population were recorded between the 16 and 50m contours with all but two plants found on higher ground.

Historic landscapes

The association of Small Fleabane with Ancient Forest Farmland can be considered in greater detail drawing on early maps. The first detailed map describing the whole of the New Forest is the First Edition Ordnance Survey, published in 1810[47] and drawing on earlier field surveys. Predating the Ordnance Survey is a similarly detailed map published by Milne. Milne's map of Hampshire of 1791[48] only mapped Hampshire and thus did not include much of the land around Bramshaw as at that time the parish was administratively Wiltshire. Milne did however describe Pithouse Farm which was at that time in Hampshire, albeit the mapping of the Avon Valley was not particularly detailed.

The Milne and Ordnance Survey maps complement one another. Both maps were produced at a scale of one inch to the mile. The two maps were made at different times during a period on enclosure around the Forest and illustrate the significant reduction in the Open Forest landscapes through the late eighteenth and early nineteenth centuries.

Extracts of the maps annotated with the locations of historic and current Small Fleabane populations form Appendix C.

The maps confirm the contemporary (2013) locations of Small Fleabane as all falling within an historic landscape of settlements within, and adjacent to, the Open Forest.

Chapter 10: Critique of this study

As with all surveys, caution needs to be applied to the data.

Changes in recorded populations

Over the course of monitoring the populations of Small Fleabane since 1985 the populations have changed from year to year. Records of change may be attributed to three causes.

Firstly, and simply, that a known population within a known area has changed.

The second cause is a greater understanding where Small Fleabane grows. Since the advent of the systematic surveys a new habitat for Small Fleabane has been recognised. This habitat is the commoners' holding adjacent to the Open Forest. Whilst the overall population in a site may appear to have grown over the years with the inclusion of these newly described populations, in reality the population is likely to have remained broadly the same, it is just we now know better where to look for the plants.

The final reason for a change is the discovery of wholly new populations well away from existing populations. These changes may also show up as changes in distribution.

Recorder error and variation

Recorder error and variation of survey technique may account for reported changes in population. Since 1985 those recording Small Fleabane in and around the New Forest have worked together with a strong continuity of both recording technique and recorders. Whilst error is always possible the continuity of personnel and recording technique is notable.

Transcription errors, and loss of original data, are likely sources of errors. Fortunately the manuscript field notes of the systematic surveys have been archived by the Wildlife Trust and so provide reliable contemporary records[f].

The recording of particularly large populations has posed difficulties. The recording of small (<10 plants) populations to populations running into hundreds of plants bring consistent data from different recorders. Where populations extend into thousands, or tens of thousands or even hundreds of thousands of plants, then population estimates can vary in an order of magnitude. To manage this variation recorders have been encouraged to record the density of plants in a unit area and then the overall area covered by that population. This has allowed recalculations to be made when a recorder has indicated a figure such as *n* thousand+ plants but the quantum of + is unknown.

[f] The exception is the loss of the 2009 map for the Bartley Greens. In the records this map has been redrawn from the manuscript notes and memory of the surveyor (CC)

Population size changes according to season

A population estimate of Small Fleabane will be influenced by the time of year of the survey. Tony Hare studied how the number of plants in plots on Cadnam Green changed over the course of 1980. Tony monitored plots within three habitats types namely 'lawn' 'edge of depression' and 'centre of depression' (Figure 64). The number of plants is greatest in high summer and rapidly declines towards the end of the year.

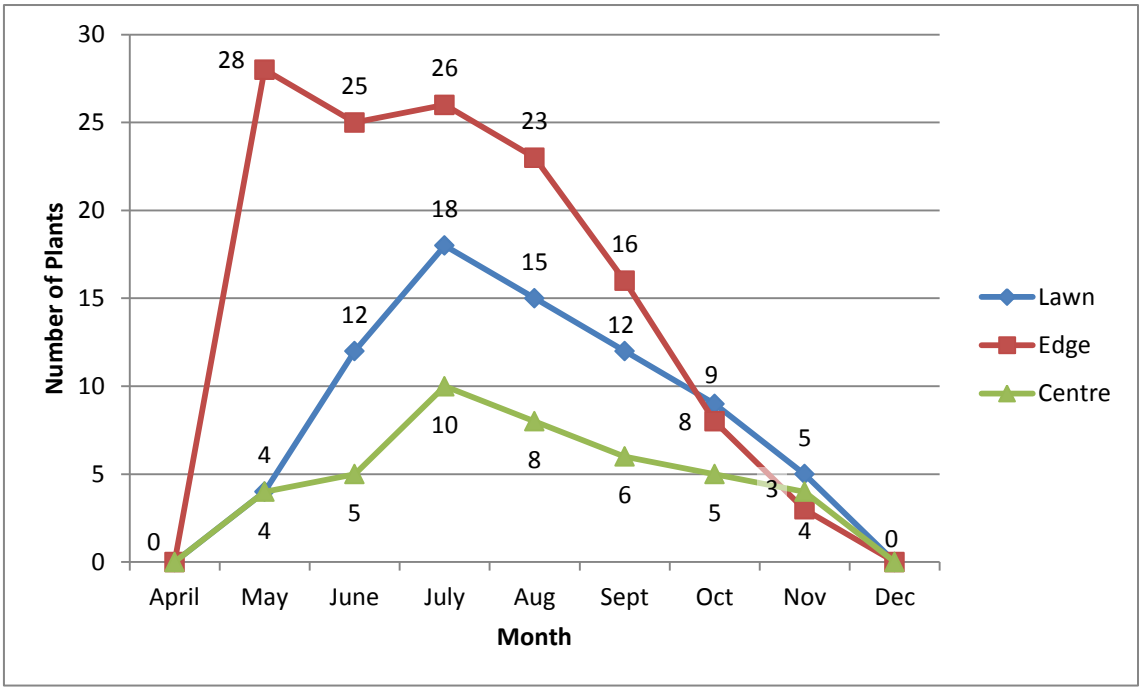

Figure 64: Number of Small Fleabane plants in plots on Cadnam Green, 1980. (Redrawn from Hare, 1980)

Limitations of available socio-economic, grazing regime and land-use data

This study has drawn upon the best available data we are aware of.

Data relating to the personal circumstances of individual commoners is rightly held by the Verderers as 'commercial in confidence'. The data on commoning has proved valuable with data sets enabling trends across the whole Forest to be identified. The importance of commoning as a cultural tradition in its own right, and as a means to ensure the management of a considerable proportion of the New Forest, is widely recognised. It is however difficult to articulate key issues relating to commoning from the available data other than in the broadest strategic terms.

Similarly the importance of grazing by domestic livestock to the wildlife and landscape character of the New Forest is widely recognised. We are unaware of any data sets which support an understanding of the impacts of changing livestock numbers and distribution on the natural features for which the New Forest has importance. The current monitoring of the statutory nature conservation designations is insufficiently detailed or precise to draw conclusions relating to site specific changes in grazing regime or other management inputs.

The importance of the enclosed landscape of the New Forest is of recognised importance as part of the National Park's special qualities together with being part of the infrastructure upon which the special qualities are dependent. With notable exceptions there is limited data on trends on the condition and management of the enclosed landscape. From what limited data are available it appears that fundamental changes are occurring in the ownership and management of enclosed land which will militate against the maintenance of commoning and other special qualities of the National Park.

11. Conservation recommendations

An element of the contract is to make recommendations to the Higher Level Stewardship (HLS) partners.

The following recommendations are structured to address strategic issues relating to the conservation of Small Fleabane followed by site specific detailed recommendations. In drawing up these recommendations it is recognised that Small Fleabane is just one of the many interests for which the New Forest has national and international importance. The strategic recommendations have therefore been drafted to have significance for a broad range of interests associated with the rural economy, historic landscapes, cultural traditions and wildlife of the Forest.

As the contract includes the dissemination of the findings of this report this action has not been included in the recommendations.

Small Fleabane is a species dependent upon;

a) the maintenance of concentrations of livestock, particularly cattle, on the Open Forest around historic settlement edges.

b) the maintenance of concentrations of free ranging stock, particularly cattle and pigs in yards and fields adjacent to historic settlement edge lawns.

Strategic recommendations

SR1 That HLS partners take action to support enterprises turning out significant numbers of cattle and pigs on the Open Forest particularly from holdings associated with Ancient Forest Farmland and historic settlement edge lawns.

This support may take a number of forms including

- The preferential letting of land under the control of the HLS partners to enterprises meeting these criteria.

- Assisting securing land and holdings in the vicinity of historic settlements in philanthropic, public or charitable ownership with the purpose of supporting livestock enterprises.

- To use development management procedures to regulate changes in land-use in the Forest's Ancient Farmland so as to secure the agricultural nature of enclosed land around historic settlements.

- To review initiatives such as the Commoners' Dwelling Scheme so that they may assist establishing enterprises turning out significant numbers of cattle and pigs onto settlement edge lawns.

- Continue to support the initiatives of current and future enterprises to enhance the aspects of the local economy which enable livestock to be turned out onto the Open Forest.

- When reconsidering the location of facilities for visitors and neighbouring residential and recreation areas, such as car parks and access tracks, to seek to reduce existing impacts on settlement edge lawns and to redirect such uses to less sensitive locations.

- The promotion of the importance of the historic landscapes and land-uses of settlement edge lawns and to celebrate the special character of those areas.

SR 2 That HLS partners review what data is required to monitor strategic changes in the Forest's rural economy and land-use and to establish a means to gather and analyse that data.

- This review has highlighted various deficiencies in data relating to the management of the New Forest. Given the cultural importance of commoning *per se,* together with the vital role commoning plays in managing the Forest, it would be timely to review what data need gathering and to establish a means to gather and analyse that data.

Specific recommendations

1. That reducing the tree and scrub cover on the lawns around the Bartley Greens is considered by the Forestry Commission.

2. That the non-native species present in the seasonal wetlands of the Bartley Greens and the South Weirs Pond be eradicated.

3. That the New Forest Land Advice Service, and other promoting agri-environment schemes, promote initiatives which enhance the management of the Open Forest together with holdings adjacent to the Open Forest. Elements to consider include the management of hedgerows and hedgerow trees to reduce encroachment and shading of Forest waysides together with the desirability of maintaining highly disturbed and eutrophic habitats along waysides and on historic settlement edge lawns together with fields and yards adjacent to the Open Forest.

4. That further survey work is undertaken to understand the populations of Small Fleabane within commoners' holdings and to consider what measures may be necessary to support the maintenance of those populations.

5. That populations of Small Fleabane continue to be monitored as at present. As part of the monitoring programmes that a means of reporting changes requiring management is established. (i.e. arrival of non-native species, growth of shade)

APPENDICES

Appendix A: The conservation status of Small Fleabane and its localities.

This appendix describes the changing conservation status of Small Fleabane since 1977 together with the status of the sites where it has been found since 1981.

Conservation status and statutory protection for Small Fleabane

Small Fleabane was first identified as being a conservation priority in 1977 in the first edition of the British Red Data Book for vascular plants[49]. Between 1977 and 2005 the status of the plant has changed through varies degrees of vulnerability until 2005 when it was recognised as being *'Critically endangered'* and considered to be *'facing an extremely high risk of extinction in the wild'*.

1977 Red Data Book Vascular Plants. First edition. *'Vulnerable'. 'It has been decreasing rapidly'*

1983 Red Data Book Vascular Plants. Second edition[50]. '*Vulnerable' 'Likely to move into the endangered category in the near future if the causal factors continue operating'.*

1988 Small Fleabane is added to Schedule 8 of the Wildlife and Countryside Act 1981 as amended. As such, the species enjoys the highest level of protection under UK law.

1995 Small Fleabane is listed as a priority species within the UK Biodiversity Action Plan.

1999 Red Data Book. Vascular Plants. Third edition[51]. '*Vulnerable' 'Facing a high risk of extinction in the wild in the near future'.*

2005 Red Data Book. Vascular Plants[52]. *'Critically endangered'.* Considered to be *'facing an extremely high risk of extinction in the wild'.*

2006 Small Fleabane is listed under section 41 of the Natural Environment and Rural Communities Act as a species of principal importance for the conservation of biodiversity in England.

Statutory designations relating to Small Fleabane sites

In addition to the plant receiving recognition as a conservation priority in its own right so have the sites in which it grows. The follow account relates to the sites of populations of Small Fleabane post-dating the Wildlife and Countryside Act of 1981. This date has been chosen as it was following the Act of 1981 that mechanisms supported by statute and regulatory processes were introduced to safeguard sites.

Undesignated sites

Two of the post-1981 Small Fleabane sites had, and have, no statutory conservation status. These are Backside Common in Surrey and the green at Poulshot in Wiltshire. Small Fleabane is no longer present at these sites.

Ashford Hill Meadows (North Hampshire)

The Ashford Hill Woods and Meadows Site of Special Scientific Interest (SSSI) was designated an SSSI in 1986 and declared a National Nature Reserve shortly afterwards. The Small Fleabane does not appear in the SSSI citation but does in the National Nature Reserve Management Plan. Small Fleabane is no longer present on this site.

Bramshill and Springwater Farm (North Hampshire)

The Bramshill SSSI, including the Small Fleabane site at Springwater Farm, was designated in 1988 with a specific reference to Small Fleabane in the citation. Small Fleabane is no longer present on this site.

Avon Valley Designations (Wiltshire-Dorset-Hampshire)

The notification of SSSI's in the Avon Valley has a complex history of consolidation of a series of SSSI's. By 1989 the population of the Small Fleabane in the Avon Valley was included within the boundary of the designated site with a description of the species in the citation. In 1998 the Avon Valley was recognised as a Wetland of International Importance under the Ramsar Convention. The designation of the Ramsar site included criterion 2 features supporting '*a diverse assemblage of wetland flora and fauna including several nationally rare species'* with the data sheet relating to the site specifically referring to Small Fleabane.

New Forest designations (Hampshire-Wiltshire)

The perambulation of the New Forest was most recently defined by the New Forest Act 1964. All but one, Whithers Farm at Cadnam Green, of the current (2013) New Forest populations of Small Fleabane fall within the perambulation.

The history of notifications of Sites of Special Scientific Interest in the New Forest is complex with a history of consolidation and expansion of SSSIs. However by 1987 The New Forest SSSI included many sites for Small Fleabane with additional sites being included in the 1996 boundary revision. The 1987 and 1996 citations make specific reference to Small Fleabane. The New Forest SSSI includes most, but not all, of the Small Fleabane populations on the communally grazed Open Forest. The SSSI does not include the populations within the enclosed landscape and therefore the SSSI currently includes a minority of the overall population.

In 1993 The New Forest was recognised as a Wetland of International Importance under the Ramsar Convention. The designation of the Ramsar site included criterion 2 features supporting *'a diverse assemblage of wetland flora and fauna including several nationally rare species'* with the data sheet relating to the site specifically referring to Small Fleabane. The New Forest Ramsar site includes most, but not all, of the Small Fleabane populations on the communally grazed Open Forest. The Ramsar site does not included the populations within the enclosed landscape and therefore the Ramsar site currently includes a minority of the overall population.

Small Fleabane is not specifically cited in the Natura 2000 site designations of the New Forest.

In 2005 The New Forest became a National Park under the provisions of the Environment Act 1995. All the current (2013) New Forest populations of Small Fleabane fall within the National Park boundary.

Appendix B. Gazetteer of sites

The following are six figure grid references for places mentioned in the report.

Acres Down Farm	SU 268098
Ashford Hill	SU 562622
Ashurst	SU 334101
Ashurst Lodge	SU 337085
Backside Common	SU 943507
Bartley Cross	SU 306128
Bartley Greens	SU 306127
Beechwood Road	SU 302127
Biddlecombe Farm	SU 290139
Bisterne	SU 148012
Blashford	SU 149071
Bloodoaks	SU 269165
Bolton's Bench	SU 304080
Bramshill	SU 744618
Breamore Marsh	SU 156180
Brockenhurst	SU 301019
Brockishill Road	SU 305125
Buddle Green	SU 161117
Cadnam	SU 295137
Cadnam Green	SU 294142
Cat and Fiddle	SZ 203518
Chinham Road	SU 307128
Christchurch	SZ 158285
Corfe Common (Dorset)	SY 957811
Cottage Plantation	SU 163099
Dairy House Farm	SU 293142
Emery Down	SU 287083
Farringdon Farm	SU 368084
Foxbury	SU 299171
Fritham	SU 239140
Furzley	SU 286163
Gorley Triangle	SU 162105
Hilltop	SU 400042
Hinton	SZ 211546
Hinton Admiral	SZ 203479
Hucklesbrook	SU 164107
Hurn (Dorset)	SZ 127698
Ibsley Water	SU 151088
Kewlake	SU 287144
Kingston	SU 151026
Linwood	SU 187093
Little Pundells	SU 307126

Longcross Plain	SU 241152
Longdown Farm	SU 363086
Lyndhurst Church	SU 298081
Marchwood	SU 385102
Milton	SZ 238428
Mockbeggar Cross	SU 160093
Moorbridge Farm	SU 285169
Moyles Court	SU 161084
Newbridge Cattlegrid	SU 295151
Newlands Plantation	SU 168088
Nomansland	SU 253173
North Gorley Green	SU 161117
Passenger Farm (Surrey)	SU 943507
Penn Common	SU 273167
Pipers Wait	SU 247164
Pithouse Farm (Dorset)	SZ 139823
Pooks Green	SU 372108
Pundell's Green	SU 306127
Ringwood	SU 145053
Rockford Common	SU 168084
Shepherds Road	SU 309127
South Gorley Green	SU 162105
South Weirs	SU 268015
Stocks Cross	SU 270154
Storms Farm	SU 289148
Swallowfields	SU 294174
Swan Green	SU 290081
The Weirs	SU 286018
Tom's Lane	SU 185096
Tyrrel's Ford	SZ 143851
Venard's House	SU 160109
Vernal's Farm	SU 305077
Withers Farm	SU 295144
Wittensford	SU 285139

Appendix C: Historic maps

Around Lyndhurst, Emery Down and Ashurst

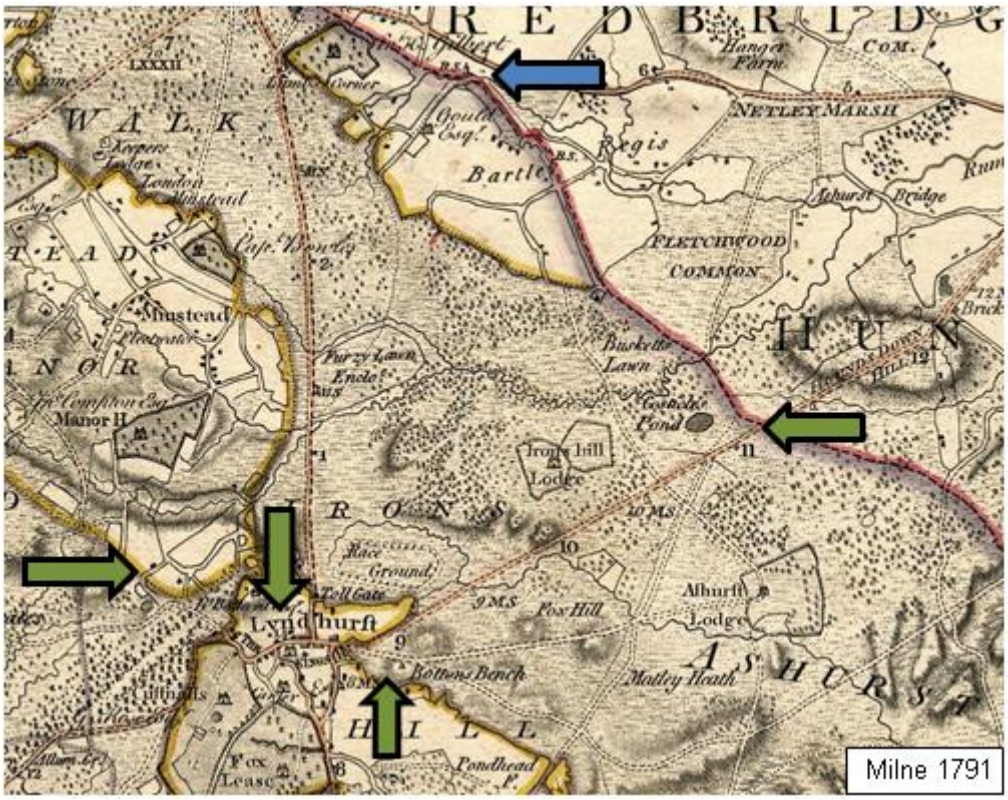

Figure C 1

Figure C 2

The Milne map and the Ordnance Survey show the east of the New Forest during the period of enclosure. In the period between the production of the two maps the extensive commons of Fletchwood, Netley Marsh, Bartley Regis and Hounsdown have been enclosed. The Ordnance Survey map has been re-engraved to show the Southampton and Dorchester Railway together with Lyndhurst Road Station which was opened in 1847.

The green arrow indicates the potential easternmost extent of the population of Small Fleabane recorded by FI Warner. This ambiguous record may have referred to Bolton's Bench for which there are other records; this too is marked with a green arrow as is Lyndhurst church. The map also shows Emery Down, another ambiguously located historic record together with a blue arrow to show the extant population at Bartley. The historic records shown are;

Between Lyndhurst Station and Town. Pre 1904 F I Warner

Lyndhurst Church 1877 (British Museum)

The following three records are likely all to relate to Bolton's Bench.

Lyndhurst. Pond on Beaulieu Road. 1880 (British Museum in Hare)

Lyndhurst 'Below the Cricket Ground' 1892 (British Museum in Hare)

Lyndhurst 'on a bank near the town' 1906 (British Museum in Hare)

Emery Down c. 1879 J G Baker

The West of the Forest

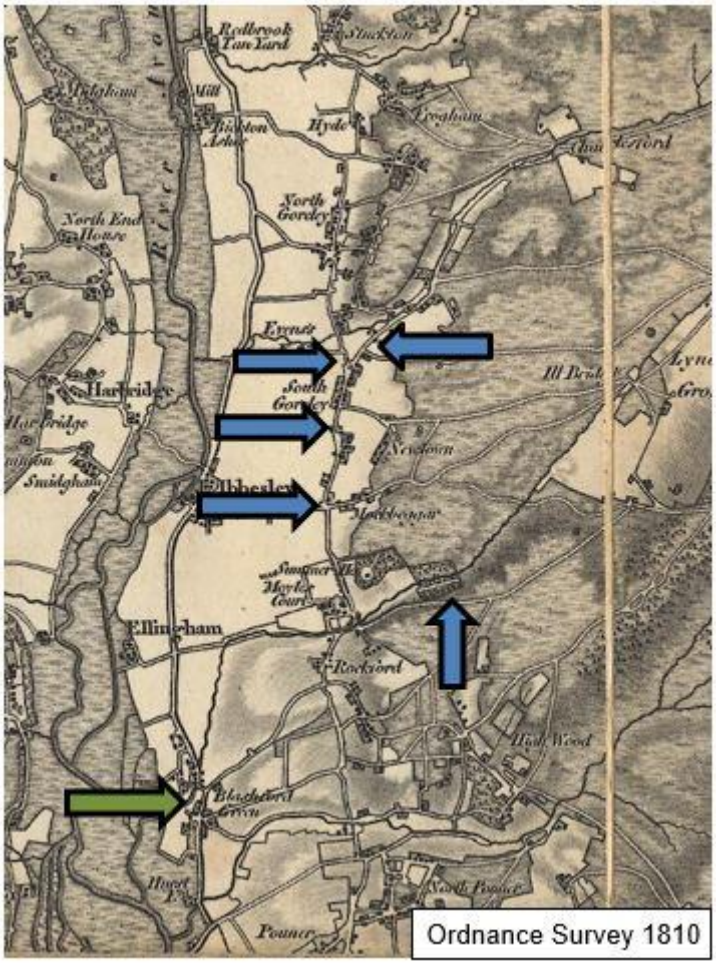

Figure C 3

The Ordnance Survey map of 1810 illustrates the common grazing lands of the New Forest, the floodplain of the Avon Valley and the interconnecting droves and wayside greens.

The blue arrows indicate the centre of extant populations.

One historic record is shown. This relates to an unspecified location at Blashford. The green arrow indicates Blashford Green which historically was a remarkably rich botanical site with a series of closely grazed seasonal ponds. This green and its ponds became colonised with secondary woodland when the perambulation was fenced in the 1960s. This is the most likely location of the historic record.

About Blashford pre-1848 Rev Bromfield

The Bramshaw Commons

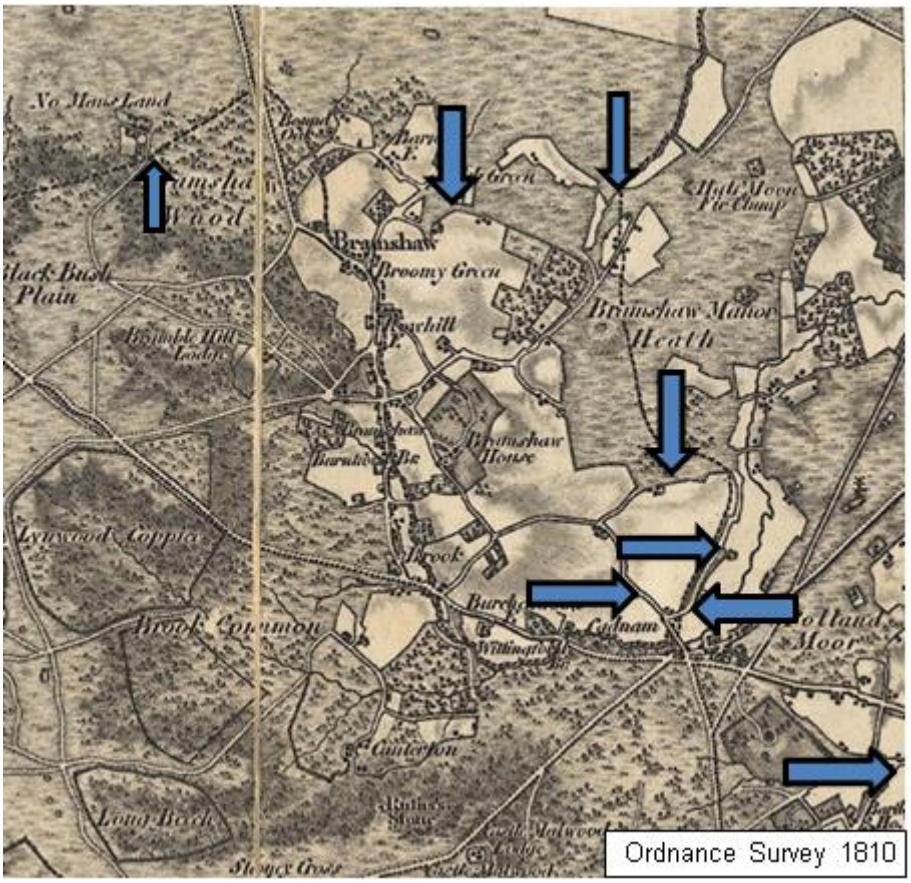

Figure C 4

The Ordnance Survey illustrates a landscape around Cadnam and Bramshaw which a far greater extent of heathland than is present today. Not all of the lanes around Cadnam were shown in this edition.

The blue arrows indicate the centre of extant populations. Not all of the smaller populations are shown as this would obscure the underlying map. All of the historic locations known from around Bramshaw and Cadnam are extant populations. There have been no local extinctions in this part of the New Forest.

Marchwood and Pooks Green

The 1791 Milne map and the 1810 First Edition Ordnance Survey illustrate the progressive enclosure of the Forest edge. However in 1810 map still shows the common grazings of the Crown Land and how they were linked by a series of droves and greens to the common-grazed saltmarshes of Southampton Water.

Figure C 5

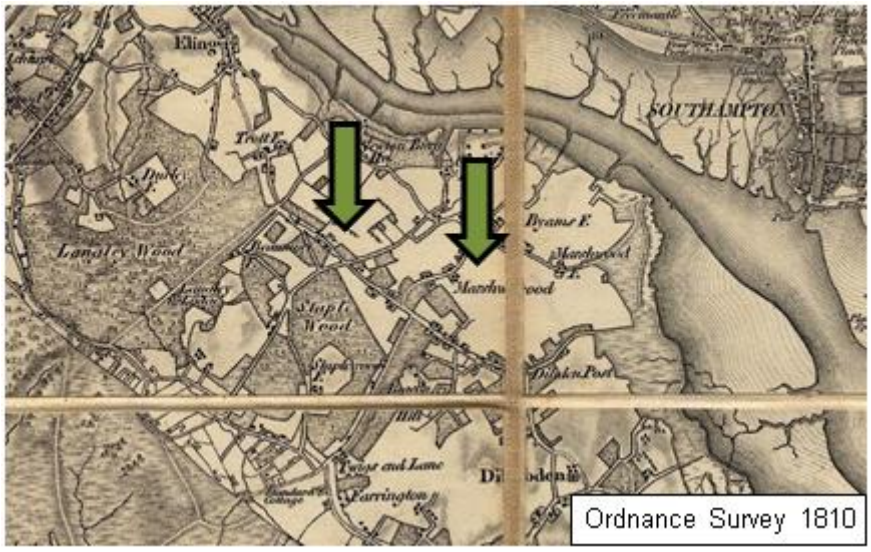

Figure C 6

The green arrows indicate historic Small Fleabane sites. There is a general record for Marchwood by the Rev. Bromfield from pre-1848. A more localised record was made at Pooks Green to the west of Marchwood village in 1962. During the 1960s the perambulation of the Forest was fenced which excluded grazing from the drove roads.

Ringwood

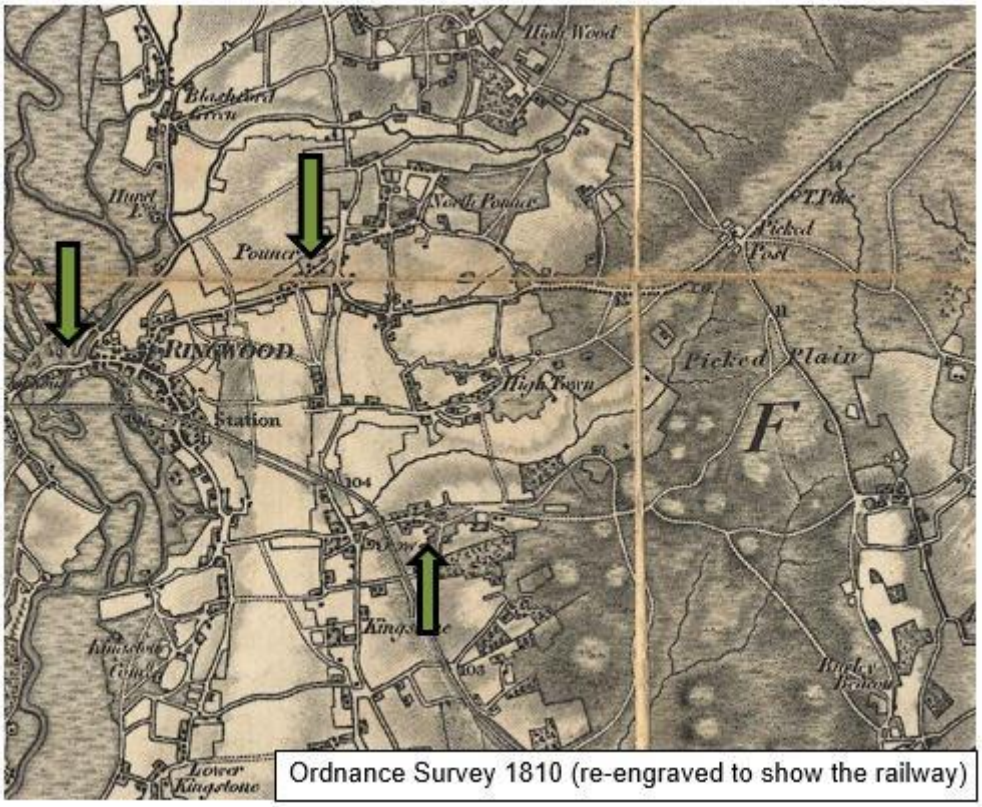

Figure C 7

There are a series of historic records from around Ringwood or varying detail. The Ordnance Survey illustrates a network of drove roads and wayside greens linking Ringwood to the Open Forest and onwards to the Dorset heaths. With the fencing of the perambulation none of these sites are within the Open Forest.

The precise locations of the historic records are open to interpretation. A general indication is given with green arrows.

Pools by roadside from Burley to Ringwood, about one mile from later. Pre-1848 Rev. Bromfield

East of Ringwood ‘Plentiful in some dried-up splashes’ 1898 (British Museum in Hare)

Ringwood 1885 CGE

Near Ringwood 1883 Frederick Townsend

South of Ringwood

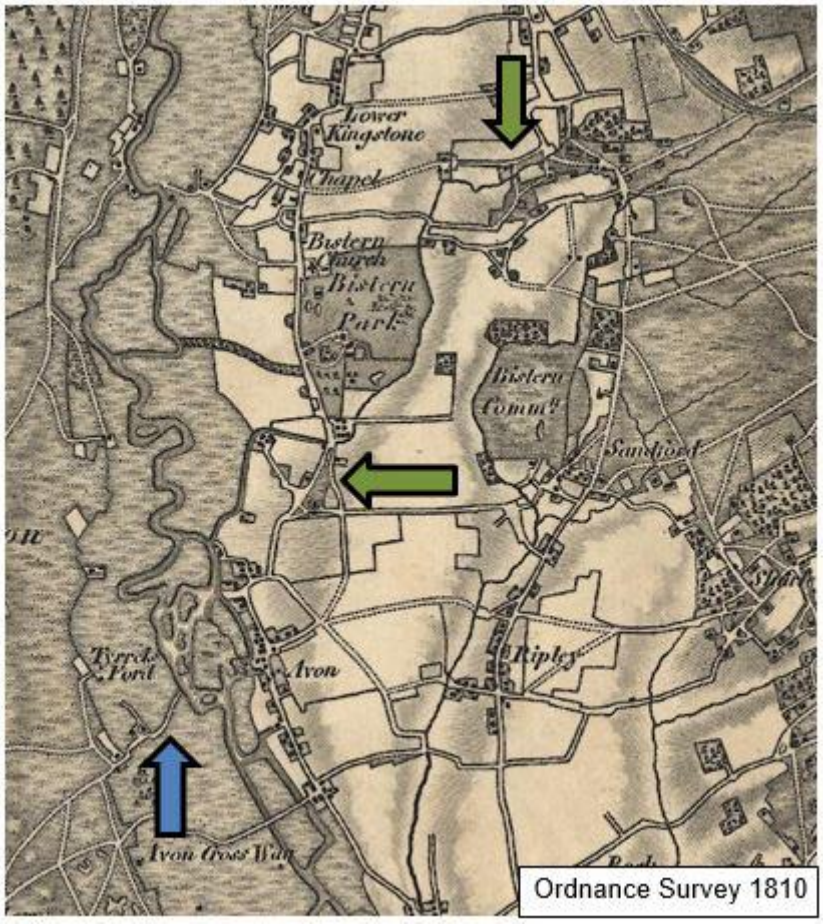

Figure C 8

The Ordnance Survey of 1810 illustrates a landscape where a narrow band of farmland lay between the extensive commons of Dorset and the New Forest. The floodplain of the Avon Valley is similarly engraved although clearly separate from the Dorset heaths. The common grazings of these landscapes are interconnected through a series of drove roads and wayside green. The blue arrow identifies Pithouse Farm, an extant Small Fleabane site. The green arrows indicate two historic records at;

Kingston pre 1900 Linton

Bisterne pre 1867 by Wilkinson

Both Kingston and Bisterne straddle the boundaries of the New Forest commons and the commons of the Avon Valley terraces. The precise locations of these historic records are difficult to place. The arrows indicate the larger wayside greens at Bisterne and Upper Kingston. With the fencing of the perambulation neither of these sites are within the Open Forest.

South Weirs

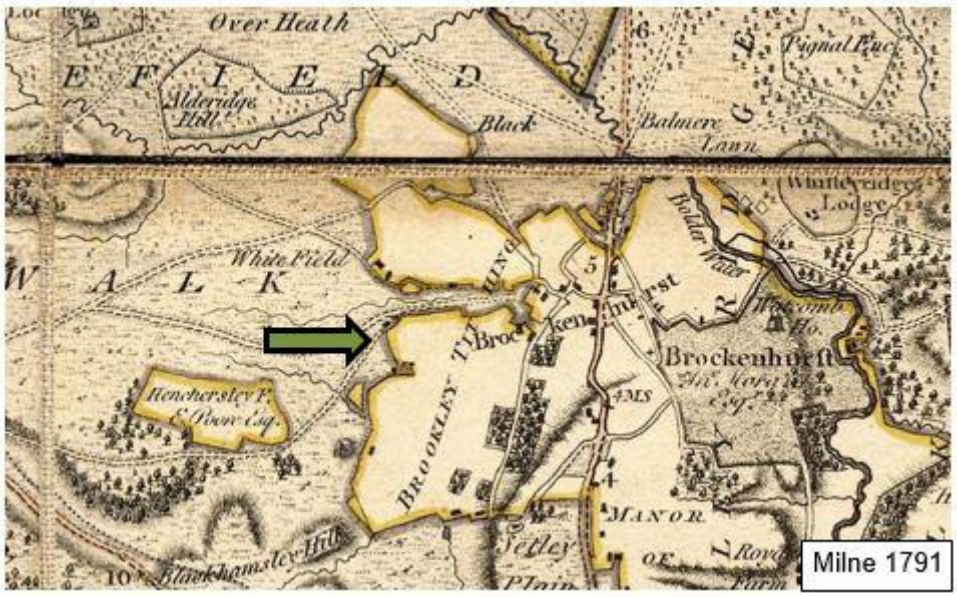

Figure C 9

The landscape setting of Brockenhurst has barely changed since Milne's map of 1791. Whilst the settlement itself has grown considerably with the coming of the railway the pattern of Open Forest, interconnecting lanes and greens is little altered.

The historic site of Small Fleabane is shown with a green arrow. The detailed history of the decline and loss of this site is set out in the full report.

Christchurch to Milton

Milne's 1791 map illustrates the extent of Open Forest landscapes of south west Hampshire before enclosure. Heathlands and greens are both named and engraved with a rough texture. These should not be confused with ornamental parks which have a similar, but denser, engraving and which are shown with clearer boundaries together with the name of the owner.

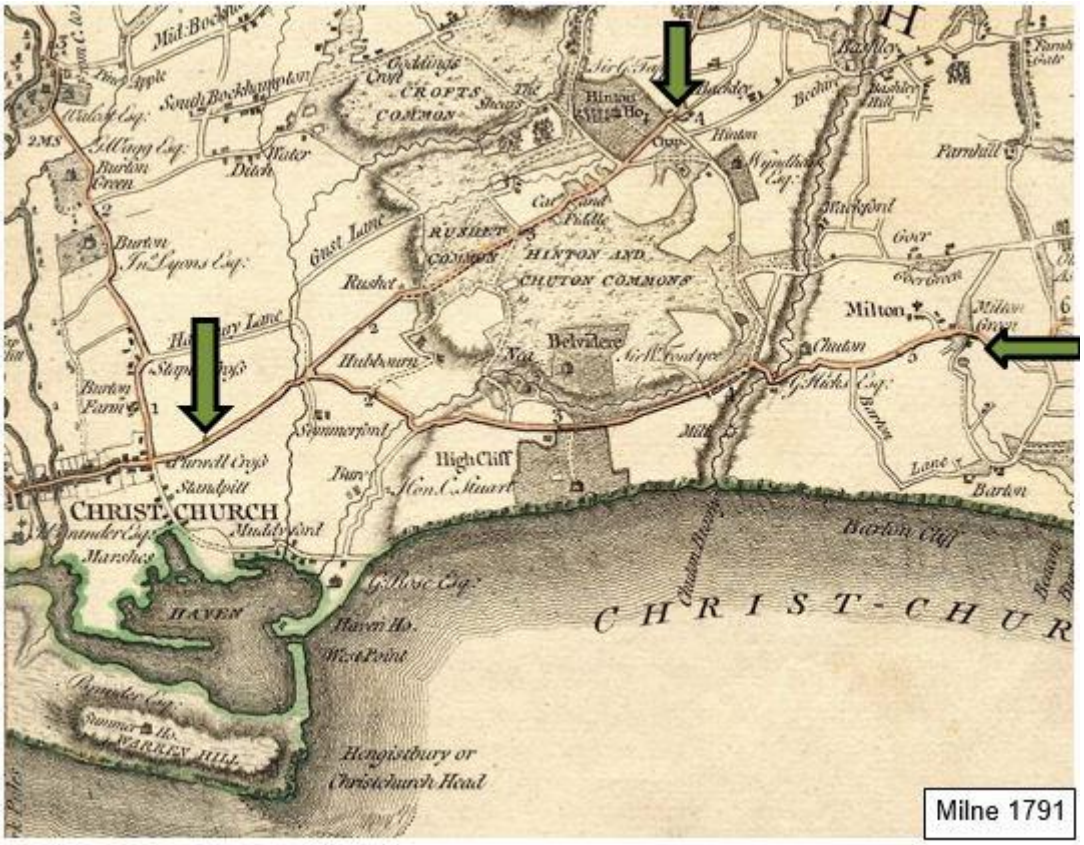

Figure C 10

The green arrows all show the approximate location of historic Small Fleabane records;

Near Christchurch 1835 Mrs Russell

Roadside at Hinton in several places c.1880 Bolton King

Milton c 1899-1903 Rev J E Kelsall

With the fencing of the perambulation none of these sites are within the Open Forest.

Appendix D: The Surrey population at Passengers Farm, Backside Common

The last of the Small Fleabane populations in Surrey was around the gateway of Passengers Farm at Backside Common near Normandy. There are generalised records for Small Fleabane from the Normandy Area since 1888 and a precise record of the plant being present at Backside Common by Passengers Farm in 1934.

Hare reports the plant being present in 1972 but grazing ceasing in the same year. In 1979 Hare reports the common as being tussocky grassland that had been subject to mowing. Whilst there are no data reporting an absence of the species from the site in the mid-1970s this may be deduced from Hare and Rose[53]. In 1979 cattle grazing was reinstated on the common with livestock from Passengers Farm. In the same year the plant reappeared on the common in the gateway to the farm.

Grazing ceased in 1985 as a new farmer took occupancy. In 1986-7 there are records of the area around the gateway being scarified with the plants present in ruts caused by a tractor and horses. There was a diminishing population until 1993 when cattle returned to the common from the farm. An excellent population was subsequently reported in 1995 from around the gate and in adjacent hollows.

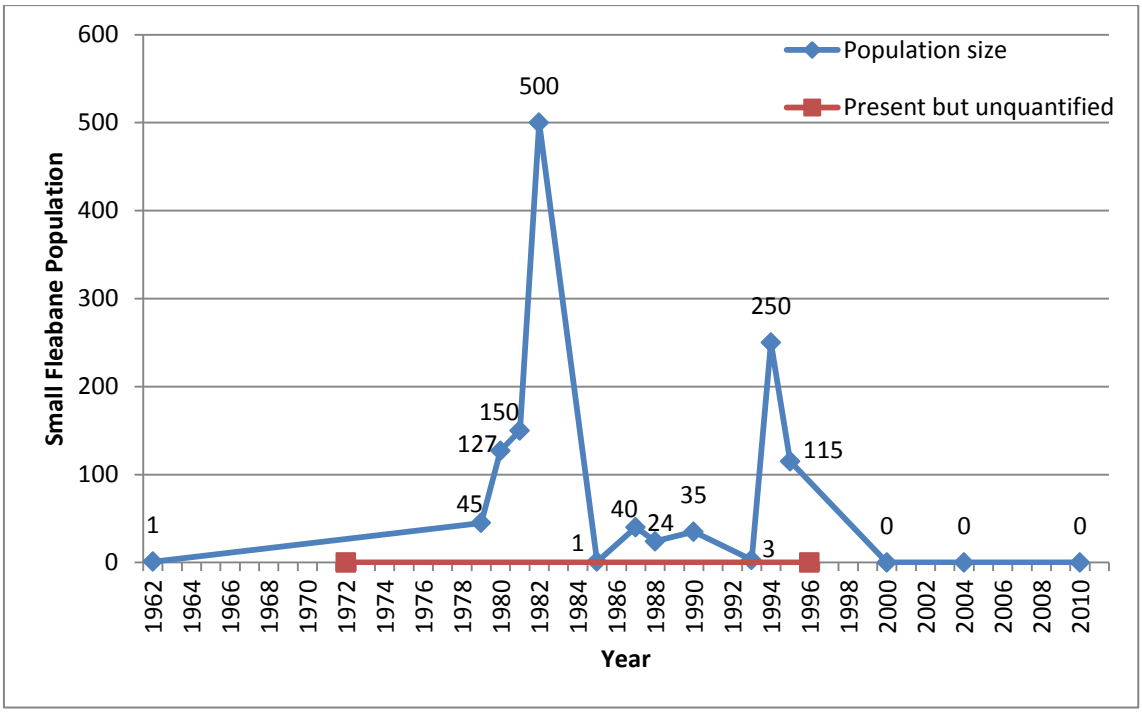

Figure D 1: Population Trends, Passengers Farm, Surrey

The grazing from Passengers Farm ceased in 2000. There was a change in the character and tenure of the farm with cattle being replaced by a livery yard. The last definitive record of Small Fleabane was from 1996. Surveys in 2000 to the present record the plant as absent.

Grazing was reinstated to Backside Common in 2010-11. A small herd of Belted Galloway cattle were held on the site over winter. At present the Small Fleabane population has not reappeared and it is uncertain whether it will be possible to concentrate the livestock at the appropriate density to rejuvenate the open habitats required by the species.

Acknowledgements

We acknowledge the considerable assistance of Colin Draper in providing data relating to the current pattern of commoners holding together with insights into the pattern of grazing on the Open Forest. Our thanks also go to Richard Reeves and the Christopher Tower Library at the New Forest Centre for historic images relating to Small Fleabane sites. Laura Baker at the National Trust has been most helpful in clarifying the extent of the National Trust's ownership and discussing management issues relating to their estate. Charlotte William and colleagues at Surrey Wildlife Trust have been very generous in providing data on the recent management history of Backside Common.

Our thanks go to all the private landowners, estates and commoners who gave us permission to undertake this work.

The monitoring of Small Fleabane in the New Forest has been made possible by numerous volunteers for the Botanical Society of The British Isles together with the Hampshire and Isle of Wight Wildlife Trust. There are too many of these volunteers to acknowledge personally but we salute their vital contribution to the conservation of Small Fleabane in the New Forest.

Glossary

Agister

The agisters are the officers of the Court of Verderers.

Crown Land

The Crown Land is the name given to the historic royal estate. The Crown Land forms the majority of the land managed by the Forestry Commission and also represents the majority of the Open Forest.

Drift

Drifts are occasions when livestock freely roaming on the Open Forest are rounded up for the purposes of marking and veterinary treatment and possible removal from the Forest.

Open Forest

The Open Forest is a collective term used to describe the commonable grazed lands of the New Forest. The Open Forest comprises a network of the unenclosed Crown Land, Manor Wastes, adjacent Commons, liberties and other lands. These are the lands across which all livestock roam which are turned out to graze under both Forest and Common rights. As there is no definitive map of the Open Forest and the land which is subject to commonable grazing is subject to change. The Open Forest is currently some 20,000ha of contiguous open habitat which a matrix of enclosed land of some 40,000ha.

Perambulation

The perambulation of the New Forest is an administrative boundary set by statute relating to the common grazing of the New Forest and the role of the Court of Verderers. The current perambulation is defined by the New Forest Act of 1964. See http://www.verderers.org.uk/index.html

Verderers

The Verderers are the statutory officials administering the common grazings of the New Forest and are constituted as a court under the provisions of the New Forest Acts.

Vice-county

Vice-counties are units for biological recording. These units differ from administrative boundaries which are subject to occasional administrative changes. Therefore the Pithouse Farm population of Small Fleabane is in the administrative county of Dorset but in the vice-county of South Hampshire. In contrast some of the populations of Small Fleabane around Bramshaw are administratively in Hampshire but are within the vice-county of South Wiltshire. For a detailed explanation see Chapter VIII by Paul Bowman in Brewis et al[54]. See also Dandy J.E (1969) *Watsonian Vice-Counties of Great Britain.* Ray Society London.

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