21. Isle of Wight

21.1 Physical

Geology

The Isle of Wight is renowned as a geological microcosm of south east England. The hills of the Island are composed of Chalk and form an east to west spine, and occur as a ridge along the south east coast. Below the Chalk, Lower Cretaceous sediments outcrop on the south of the east-west spine and include the Lower Greensand. To the north, mainly clay Tertiary sediments outcrop above the Chalk. Plateau gravels locally cap the Tertiary deposits and the tops of some of the Downs.

Soils

Brown earths and surface-water gleys dominate the Island soils off the chalk. No areas are recorded as being dominated by podzols or brown sands on the soil map (**Map 1b**). Brown sands are, however, a component part of the Fyfield soil association which is developed on the Lower Greensand in the south.

21.2 Landscape history

19th Century

On the 1810 1 inch OS map about half the original Parkhurst Forest is shown, and is the largest area of unenclosed heathland and pasture woodland on the Island. The rest had been enclosed a few years before as farmland, with the remainder soon to be converted to plantations. Over the rest of the north of the Island there were still many small commons. On the Lower Greensand there were a few medium sized commons including Bleak Down and Blackpan Common. The Downs were largely rough pasture, and rough pasture was present on coastal spits such as St Helen's Duver.

Current landscapes and Natural Areas

The Island's landscapes are as varied as its geology but much of its heathland and acid grasslands have been lost since the 19th century, with quarrying and rubbish tips now accounting for the once rich Bleak Down. Patches do remain, mainly in the south of the Island.

21.3 Existing information

Flora

The coincidence maps (**Maps 2** to **4**) of species listed in **Table 1** suggest a rich lowland acid grassland flora has been recorded from the Isle of Wight, but there have been recent losses. The Flora of the Isle of Wight (Bevis *et al*, 1978) confirms that, in spite of losses of several rich sites since the 19th century, there was still a rich acid grassland flora on the Island in the 1970s. Some species thought lost by Bevis et al (1978) such as *Filago minima* have been refound. A total of 18 acid grassland species from **Table 1** have been recorded of which 2 are apparently extinct (see extract of **Table 6** below). These include Wild Gladiolus, *Gladiolus illyricus*, which was recorded from Bracken in sandy commons in the Blackpan Common area. Bluebell-rich Bracken still exists here but *G. illyricus* has long been extinct. Lack of grazing probably led to habitat degradation and its loss. The most outstanding site described in the Flora is St Helen's Duver (SZ6389), a shingle spit. Its outstanding flora, includes all six clovers listed in Table 1, the grass *Vulpia ciliata ambigua* and an outlying locality for *Scilla autumnalis*. Other sites mentioned include Redcliff by Yaverland (SZ6185) with clover species and *Silene nutans*.

Habitat surveys

The Grassland Inventory notes acid grassland as having been found with calcicolous grassland on three western Downs in 1987 and in the coastal grazing marsh of Brading Marshes in 1984. The English Nature Chalk grassland data set includes a record of a 2.24ha transition between MG5b and U4 at Garlstone Down. Personal experience (Neil Sanderson, EPR), however, suggests that the pure acid grassland that does occur on small patches of drift on these Downs is in fact parched acid grassland (U1).

Two habitat surveys cover well developed acid grassland (Sanderson, 1991 & 1997a). The first, Brading Marshes (SZ6387), is a very unusual site; an embanked grazing marsh enclosed by a sea wall in 1875. Rather than the small stands of parched acid grassland on banks typical of Solent grazing marshes, about 18ha of former sand banks are occupied by acid grassland. This includes about 6ha of Deschampsia flexuosa grassland (U2a) and areas of parched acid grassland (Festuca-Agrostis-Rumex grassland typical sub-community and Anthoxanthum-Lotus sub-community, U1b & U1d). The most peculiar feature, however, is a large area of *Nardus* grassland associated with *Agrostis capillaris*, *Polytrichum juniperinum*, *Rumex acetosella* and *Festuca ovina* with the lichens *Cladonia portentosa*, *C. crispata*, *C. furcata*, *C. floerkeana* and *C. cervicornis* and little else. Other than *Nardus* and *Agrostis capillaris*, this community has nothing in common with Nardus-Galium saxatile grassland (U5) and is best regarded as a form of Festuca-Agrostis-Rumex grassland (U1b) with *Nardus*, rather than a transition to U5.

At Osborne House (SZ5195) (Sanderson, 1997a), the lawns in the landscape parkland have patches of parched acid grassland (U1). These are referable to the Hypochaeris sub-community (U1f) and contain species such as *Festuca filiformis* and *Dicranum scoparium*, which are unexpected in ornamental lawns. Few specialist acid grassland species are present except for a new record of *Moenchia erecta*, now a rare species on the Island.

The Sand Dune Vegetation Survey of Great Britain (Radley, 1994) recorded 5.54ha of parched acid grassland from St Helen's Duver. The quadrat data indicates that U1f is the main sub-community present. A transition to Festuca-Armeria Maritime grassland (MC8) is indicated locally. This finding is interesting as the Shingle Survey (Sneddon & Randall, 1994) also surveyed this site. They recorded the shingle communities SH33, SH43 and SH48. The first is considered as synonymous with Festuca-Armeria Maritime grassland (MC8) which is reasonable but the latter two are regarded as synonymous with Ammophila-Festuca Semi-fixed Dune community (SD7) (Sneddon & Randall, 1993). This community however, was not recorded from St Helen's Duver by Radley (1989). This confirms the impression that much parched acid grassland (U1) found on fixed shingle may have been mis-identified as sand dune communities by Sneddon & Randall (1993).

Summary of consultations with Local Team Conservation Officers

Abstraction of data from the recently completed SNCI survey (unpublished) has identified all known areas of acid grassland of conservation interest on the Island. Not all acid grasslands will have been included, as species poor acid grassland in grazed fields will be under- represented. A total of 128ha of acid grassland is known, of which 104ha are parched acid grasslands (U1), around 6ha of *Deschampsia flexuosa* grassland (U2a) in Brading Marshes and over 17ha of Bristle Bent *Agrostis curtisii* grassland (U3).

The sites include large areas of the Wydcombe Estate, an unintensively managed farm on the Lower Greensand hills north of Niton, St Catherine's Down (an Upper Greensand ridge) and Blackpan Common near Sandown, a heathland site. Coastal Greensand cliffs also bear related vegetation.

Rare species include *Filago minima* at St George's Down and Row Down. Radley (1989) also refound this species at St Helen's Duver. *Scleranthus annuus* occurs on Row Down, *Moenchia erecta* on Brightstone Down, *Orobanche purpurea*, *Trifolium glomeratum*, *Vicia lathyroides* and *Silene nutans* at Redcliff (U1f), *Chamaemelaum nobile* at St Helen's Common and Puckpool Point and *Vaccinium myrtillus* occurs as scattered plants in acid grassland on the north west slope of Head Down (this could be U4).

21.4 Summary of resource

Extent and composition

The Isle of Wight's acid grasslands are mainly confined to the south and are all fairly small, but can be components of larger habitat mosaics and coastal sites. Parched acid grassland, U1, predominates but U2 and U3 are present. The presence of U4 requires confirmation but it is likely to be rare. Some of the U1 stands are floristically rich.

Conservation value

St Helen's Duver is floristically of outstanding importance and is probably of national significance as an example of species-rich parched acid grassland in a stabilised dune system. Other sites are of considerable importance to the biodiversity of the Island.

21.5 Future requirements for survey and conservation

Survey

The best sites are known and there is no urgent need for a Phase 2 survey.

Conservation

St Helen's Duver is owned by the National Trust and is well protected. It is rabbit grazed and has been restored from being a golf course to a nature reserve, albeit with high levels of public pressure. Beyond this, the potential to reintroduce Wild Gladiolus *Gladiolus illyricus* could be considered, though restoring the derelict habitat at Blackpan would be required. The restoration of acid grassland and heath should also be encouraged on suitable soils elsewhere. Such a restoration is planned for the gravel workings at St George's Down.

21.6 References

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Extract from Table 6 for Isle of Wight: occurrence of plant species generally faithful to lowland acid grassland

County: Isle of Wight	
Natural Area:	**76**
Grasses	
Vulpia ciliata ambigua	1
Other Vascular Plants	
Chamaemelum nobile	1
Filago minima	1
Gladiolus illyricus	0
Hypochaeris glabra	1
Lotus angustissimus	0
Moenchia erecta	1
Ornithopus perpusillus	1
Sagina subulata	1
Stellaria pallida	1
Trifolium glomeratum	1
Trifolium ornithopodioides	1
Trifolium scabrum	1
Trifolium striatum	1
Trifolium subterraneum	1
Trifolium suffocatum	1
Vicia lathyroides	1
Viola lactea	1
Total no. of species extant	**16**
Total no. of species extinct	**2**
Total no. of species recorded	**18**

76 = Isle of Wight

1 = Recent record
0 = Apparently extinct

Isle of Wight acid grassland surveys

Survey Name	GR	Date	Landscape Types	Comments	No Sites	Site Area	Gr Area	AG Area	H Area	LHA
Grassland Inventory		1987-84	Coastal, Drift/calcicolous		4	322.0	30.5	NI		
Heatland Inventory		1984-89	Heath, Drift/calcicolous	Includes several apparently without AG	12	1386.0			26.3	
St Helen's Duver		1989	Coastal	Shingle/sand dune system (Radley, 1989)	1			5.5		
Brading Marshes		1991	Coastal	Coastal grazing marsh (Sanderson, 1991)	1			18.0		
Osborne House		1997	Park	Landscape park (Sanderson, 1997)	1			2.5		
SNCI Survey		1996	Above plus enclosure relic, Field	Colin Pope, Isle of Wight County Council	22			128.0		
Estimate, classes		1996		Colin Pope, Isle of Wight County Council				C		

Survey Name	U1	U1a	U1b	U1c	U1d	U1e	U1f	U2	U2a	U2b	U3	U4	U4a	U4b	U4c	U4d	U4e	U5	U6	SD10	SD11	U20r
Grassland Inv.																						
Heatland Inv.																						
St Helen's	5.5							5.5														
Brading	12.0		+		+			6.0	6.0													
Osborne House	2.5						2.5															
SNCI Survey	104.0							6.0	6.0		17.0											
Estimate, class	C		A		A		A	A	A		A											+

Key

Column headings

GR = Grid reference if relevant
No Sites = Number of sites
Site Area = Area of sites
GR Area = Area of grassland
A G Area = Area of acid grassland
H Area = Area of dry heath
LHA = Area of lichen heath
NI = No information
NA = Natural Area
U1-U20r = NVC communities/sub-communities

Area estimates

A = Less than 50 ha
B = 50-100 ha
C = 100-500 ha
D = 500-1,000 ha,
E = 1,000-5,000 ha
F = 5,000-10,000 ha
G = Greater than 10,000 ha
+ = Present but no area given
? = Possibly present

22. Kent

22.1 Physical

Geology

Kent occupies the north eastern side of the Wealden anticline. This produces a succession from Lower Cretaceous to Tertiary sediments north to south. Of these, the most significant deposits for acid grassland are the Lower Cretaceous Lower Greensands, especially the Folkestone Sands, nd the Tertiary Blackheath Pebble Beds. These are found to the south and north of the North Downs. Superficial deposits of Clay with Flints cover most of the dip slope of the Downs. Recent coastal deposits include substantial shingle areas.

Soils

No areas in Kent are recorded as being dominated by dry acid soils on the soil map (**Map 1b**).

22.2 Landscape history

19th Century

In the early 19th century Kent had no large areas of unenclosed land beyond Dungeness. Medium-sized and small commons and greens were scattered throughout the area north of the Downs, and on the Lower Greensand. On the latter there were some reasonably large areas to the west of the county, with much pastture woodland. Old parks were quite frequent. In contrast, woodland was abundant but heathland was rare in the High Weald.

Current landscapes and Natural Areas

The south of Kent is within the High Weald Natural Area (NA72). Here acid soils are frequent and woodland is more prominent than grassland. To the north of this, the clay-dominated Low Weald and Pevensey Natural Area (NA73) has a very low potential for acid grasslands. The extensive shingle beaches of Dungeness lie within the Romney Marshes Natural Area (NA 71)

The Lower Greensand in Kent is included within the Wealden Greensand Natural Area (NA70), although the landscape is different to that of the western Weald. Many of the once frequent small commons have been enclosed along the Greensand. It lacks the heathland dominated landscape of the western Wealden Greensands but smaller areas do occur. North of the Downs lies the North Kent Plain (NA68), where some heathland still remains.

22.3 Existing information

Flora

The coincidence maps of the lowland acid grassland species listed in **Table 1** (**Maps 2** to **4**) show that there were high concentrations north of the Downs, on the Lower Greensand, and especially on Dungeness. These areas, but especially the latter, are still very rich. The High Weald is recorded as rather species-poor on these maps.

The Atlas of the Flora of Kent (Philp 1982) demonstrated that common acid soil species such as *Galium saxatile* and *Rumex acetosella* show concentrations in the High Weald (NA72), on the shingle of the Romney Marshes (NA71) and in the west of the Wealden Greensand (NA70). A scatter of

records are present elsewhere and include the North Downs, presumably on drift deposits, and on the Eocene sands to the north of the Downs.

Species generally faithful to acid grassland (**Table 1**) are much more local. The High Weald is quite poor in such species, although Wild Chamomile *Chamaemelum nobile* and *Viola lactea* are, or were, restricted to this area. *Chamaemelum nobile* is nearly extinct (Winship, 1993) whilst*Viola lactea* is extinct. Otherwise, only *Ornithopus perpusillus* and *Trifolium subterraneum* have been recorded. Much richer are Dungeness, the Greensand and the area north of the Chalk. Acid grassland species found in these areas are listed on **Table 6**, a relevant extract of which is given below.

The huge shingle beach of Dungeness is the richest area, with fourteen extant species including many clovers and specialists such as *Medicago minima*. As well as these, other notable species include *Silene nutans*, and the RDB species *Gnapholium luteoalbum*, which has recently been recorded (Dr F. Rose, pers. comm.). The latter species is not found on the shingle itself but on deposits of a silty sand generated by the gravel extraction industry. The RDB lichen, *Cladonia mitis* also occurs on Dungeness acid grasslands (Brian Banks, EN, pers. comm.).

The Greensand still has 10 species and the area north of the Downs, thirteen, although these are more dispersed than on Dungeness. Hothfield Common is picked out as the richest area on the Greensand with a rich clover flora including *Trifolium glomeratum* and *Trifolium ornithopodioides*. The rarest species recorded north of the Downs is *Lotus angustissimus*, which has two localities.

Habitat surveys

The Grassland Inventory records only four sites: Hatch Park (TR04), Knole Park (TQ55), Hothfield Common (TQ94) and Old Park (TR15). The first three occur on the Lower Greensand and the latter on Tertiary deposits.

Two reports describe shingle beaches in Kent which contain an acid grassland element. The shingle survey of Great Britain (Sneddon & Randall, 1994) describes vegetation which is doubtless synonymous with parched acid grassland (U1) at Walmer (TR3750), and notes the scarce *Galium parisiense* as occurring within this community. Dungeness has been covered by an informative report (Ferry *et al*, 1990) which includes synonymies with the NVC.

Dungeness: a vegetation survey (Ferry et al, 1990)

The outstanding feature of Dungeness is the extent of parched acid grassland on the established shingle. A total of about 380ha of parched acid grassland was recorded in spite of large scale losses in the past to quarrying and military activity. The grassland remaining included 221ha of lichen-rich parched acid grassland (Cornicularia aculeata-Cladonia arbuscula sub-community, U1a), the largest stand recorded in Britain and possibly larger than the entire area of this community in Breckland. An extract of the data on this community is presented in Volume I, Appendix 1, as an example of acid grassland on coastal shingle. As well as this type, less oligotrophic areas support communities assigned to the Anthoxanthum-Lotus sub-community (U1d) and the Hypochaeris sub-community (U1f). Only where the shingle is being eroded on the south east coast do maritime communities occur, with swards referable to Festuca-Armeria Maritime community (MC8) and the Armeria-Cerastium Therophyte communities (MC5). A total of 6 lowland acid grassland species (**Table 1**) were recorded in the quadrat data and a further 14 locally characteristic species (**Table 2**) were recorded giving a total of 20 provisional indicators (**Table 8**). The U1a is very rich in lichen species compared to stands in Suffolk (Smith 1996, Smith and James 1995).

Summary of consultations with Local Team Conservation Officers

A Phase 1 survey of Kent has produced totals of 419.6 unimproved acid grassland and 317.9ha of semi-improved acid grassland. The amounts exclude the shingle grassland of Dungeness described above. Nearly all is parched acid grassland (U1). Deschampsia flexuosa grassland (U2a) is confined to scraps in the Charts, and the area of moist acid grassland (U4) is very small.

Much of the acid grassland is found in three parkland sites: Knole Park, Hatch Park and Old Park. The first two are grazed by stock but Old Park is ungrazed, except by rabbits in some places. Francis Rose described Knoll Park as rather species poor, probably mostly U1c, but Old Park is better with *Potentilla argentea* and *Trifolium glomeratum* and probably contains U1b. Much of it now appears to be more like neutral grassland, probably because of repeated mowing and leaving of the cuttings on the ground, carried out to control gorse (Rob Cameron, English Nature, pers. comm.). Hatch Park is largely U1e but has richer areas of U1b and U1a in old sand pits. Selected data from Hatch Park is presented in Volume I, Appendix 1, to provide an example of parkland U1 grassland.

Hothfield Common is excellent and very species-rich. North of the Downs, a notable site is Dartford Heath which includes approximately 50ha of U1 with *Trifolium ornithopodioides*. Other sizeable patches include parched acid grassland on former sand dunes within Romney Marsh, and tens of hectares of surviving lichen-rich acid grassland (U1a) at Hythe Ranges.

Other species-rich areas include fragments on the sites of former small commons along the Greensand including Willesborough Lees. At Folkestone the old sea cliff at TR109352 has parched acid grassland (U1) with *Silene nutans* and *Trifolium glomeratum*. There are a lot of small fragments in fields including stands with mire and neutral grassland in the High Weald. To the west, the Charts are pasture woodlands, which would have supported much more acid grassland in the past.

One curious area is the Lympne escarpment. This is composed of mildly base-rich sandstone with some interesting grassland but with unclear affinities in the NVC. From discussions with Dr Rose it seems these grasslands may be a mixture of, or transitional to, both MG5b and U1d. However, a recent assessment by English Nature reports that there is a mixture of *Brachypodium pinnatum* dominated areas and semi-improved neutral grassland.

The fauna of Dungeness has well researched and the site has rich invertebrate communities (see Morris and Parsons (1992)). Beyond the surviving commons and Dungeness, most of the acid grassland is grazed but there is the threat of improvement to the fragments that exist in fields. On Dungeness, rabbit grazing has been sufficient to maintain the parched acid grassland on what is a very low productivity site.

22.4 Summary of resource

Extent and composition

Kent has a few extensive acid grasslands and many smaller fragments. Parched acid grassland is dominant, with all sub-communities except U1c present. The lichen-rich form (U1a) is especially extensive. Sites with rich lowland acid grassland floras exist on the Eocene sands north of the Downs, on the Lower Greensand and Dungeness. Acid grasslands in the High Weald are rather species-poor.

Conservation value

The acid grasslands of Dungeness are likely to be of exceptional international value in their own right, independent of the coastal morphological value of the shingle structure. The lichen flora is also of

considerable nature conservation value. Beyond this, the best areas are present on the Greensand and to north of the Downs, and are likely to be of national importance for their floristic interest.

22.5 Future requirements for survey and conservation

Survey

Locally, it is considered that there is a need to survey the mixtures of acid grassland, mire and neutral grassland in small fields in the High Weald are these are a priority for survey due to their vulnerability to improvement.

EPR considers that whilst this may be a priority for the mire and neutral grassland communities, the poverty of acid grassland in the High Weald in a national context means that is a lower priority for acid grassland. Of much greater priority is the need to assess existing data on acid grassland, including floristic data, on the Lower Greensand and north of the Downs and to carry out Phase 2 survey sites where appropriate.

Conservation

The ungrazed areas on the Lower Greensand and north of the Downs are probably a priority for restoration management. Beyond this, both areas would certainly contain suitable areas for the creation of new acid grassland and heathland from farmland. Long term consideration should be given to restoring an extensive pastoral system to Dungeness.

22.6 References

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Extract from Table 6 for Kent: occurrence of plant species generally faithful to lowland acid grassland

County: Kent			
Natural Areas:	**71**	**70**	**68**
Grasses			
Vulpia ciliata ambigua	1	1	1
Other Vascular Plants			
Filago minima	1	1	1
Hypochaeris glabra	0		
Lotus angustissimus			1
Medicago minima	1		
Moenchia erecta	1	1	1
Ornithopus perpusillus	1	1	1
Potentilla argentea		1	1
Sagina subulata		0	
Silene conica	1		
Stellaria pallida	1	1	1
Teesdalia nudicaulis	1		
Trifolium glomeratum		1	1
Trifolium ornithopodioides	1	1	1
Trifolium scabrum	1		1
Trifolium striatum	1	1	1
Trifolium subterraneum	1	1	1
Trifolium suffocatum	1		
Vicia lathyroides	1		1
Total no. of species extant	**14**	**10**	**13**
Total no. of species extinct	**1**	**1**	**0**
Total no. of species recorded	**15**	**11**	**13**

71 = Romney Marshes (Dungeness)
70 = Wealden Greensand
68 = North Kent Plain

1 = Recent record
0 = Apparently extinct

Kent acid grassland surveys

Survey Name	GR	Date	Landscape Types	Comments	No Sites	Site Area	Gr Area	AG Area	H Area	LHA
Grassland Inventory		1985-91	Park, Heath	Mainly in Greensand NA	4	559.5	NI	NI		
Heathland Inventory		1986-91	Heath, enclosure relic	Mainly NA 72 & 70, some north of the N Downs	22	1825.0			64.6	
Dungeness Phase 2		1990	Shingle beach	Report on vegetation survey Ferry et al (1990)	1	1149.9	518.8	381.2		
Estimates, classes		1996		Richard Collingridge, English Nature				D		

Survey Name	U1	U1a	U1b	U1c	U1d	U1e	U1f	U2	U2a	U2b	U3	U4	U4a	U4b	U4c	U4d	U4e	U5	U6	SD10	SD11	U20r
Grassland Inv.																						
Heathland Inv.																						
Dungeness	381.2	220.9			54.5		33.0															
Estimates, class	D	C	B/D		B	B/D	A	A	A			A										

Key

Column headings
GR = Grid reference if relevant
No Sites = Number of sites
Site Area = Area of sites
GR Area = Area of grassland
A G Area = Area of acid grassland
H Area = Area of dry heath
LHA = Area of lichen heath
NI = No information
NA = Natural Area
U1-U20r = NVC communities/sub-communities

Area estimates
A = Less than 50 ha
B = 50-100 ha
C = 100-500 ha
D = 500-1,000 ha,
E = 1,000-5,000 ha
F = 5,000-10,000 ha
G = Greater than 10,000 ha
+ = Present but no area given
? = Possibly present

23. Lancashire

23.1 Physical

Geology

The east of the county lies on New Red Sandstone, with Carboniferous sediments to the west. Millstone Grit forms the uplands of the Pennines and the Forest of Bowland. Glacial drift, including gravels and windblown sand, cover a great deal of the lowlands.

Soils

Podzols are widespread in the south of the county with patches dominated by brown sands elsewhere (**Map 1e**).

23.2 Landscape history

19th Century

The 1840's 1 inch OS maps show extensive raised mires and dune grazings in the lowlands but only very small areas of common land.

Current landscapes and Natural Areas

Truly lowland conditions are confined to the Lancashire Plain and Valleys Natural Area (NA13). The Area is intensively farmed and unimproved grassland is rare.

23.3 Existing information

Flora

The coincidence maps (**Map 2-4**) of acid grassland species listed in **Table 1** show marked concentrations of records of acid grassland species on the south west coast. Here these are presumably associated sand dunes. The restriction of lowland acid grassland species to dunes appears to be a feature of the north and west of England.

Habitat surveys

The Grassland Inventory includes many upland fringe grasslands. The Heathland Inventory records only a tiny area of dry heath, reflecting the historic rarity of lowland heathland in the county. A Phase 1 survey has been completed for the county (Kirby & Harwood 1993) from which all records of acid grassland within the lowlands (below 160m) have been extracted. This indicates about 50ha of acid grassland, mostly in fields and occasionally as relics of enclosure. It appears to be frequently associated with neutral grasslands.

Moist acid grassland (U4) is probably the main grassland present but *Nardus* (U5) and *Deschampsia flexuosa* (U2) grasslands are also frequently recorded. Acid grassland is found in steep-sided valleys, which also often have characteristic neutral grassland, as at Syd Brook Valley (SD544140). A different type of grassland is found on the inland Shirdley wind blown sand deposits at Mere Brow (SD480178). This site has been quarried, but around the lakes there is a herb-rich acid grassland with *Carex arenaria, Festuca ovina, Aira praecox, Rumex acetosella, Erodium cicutarium* and *Lotus*

corniculatus. This is clearly a stand of Festuca-Agrostis-Rumex grassland Anthoxanthum-Lotus sub-community (U1d), representing a combination of species more typical of the south east of the country.

The biological survey of common land (Crowther & Aitchison, 1993) covered mostly upland commons but three lowland commons are recorded, with 7.4ha of acid grassland belonging to the grassland communities U2, U4 and U5.

Summary of consultations with Local Team Conservation Officers

In Lancashire, English Nature use an elevation of 160m as the cut-off point for defining lowland grassland. This definition does not therefore consider the many 18th century or later enclosures of common moorland which occupy the margins of the upland areas of the Pennines and the Forest of Bowland. With one exception, areas of drained raised mire have also been excluded. Most, if not all, lowland acid grassland defined this way is confined to the Lancashire Plain and Valleys Natural Area (NA13).

For the most part, the 28 sites identified by the Phase 1 survey of the county (Kelly & Harwood 1993) occur in areas which are either located on the Shirdley wind blow sands of West Lancashire, the Sherwood Sandstones which outcrop on the coast at Heysham, the peaty soils of drained raised mires of Silverdale, the sand dunes of the Fylde Coast or the glacial deposits around Houghton in the Ribble Valley. The total recorded area is approximately 50ha but this figure includes some semi-improved grassland.

23.4 Summary of resource

Extent and composition

The site at Mere Brow indicates that parched acid grasslands (U1) do occur in the south west, and more would be expected on the inland side on the dune systems . The Sand Dune Vegetation Survey (Radley, 1994) did not record any acid grasslands form dune systems but this may be due to urban and golf course development. It is thought that there are likely to be some acid grasslands on areas such as Fleetwood Golf Course.

This sort of grassland, whether acid grassland or Carex arenaria-Cornicularia aculeata dune community (SD11) is likely to harbour the surviving predominantly southern acid grassland species. Much more of this type of habitat survives in Merseyside.

Inland, in unimproved grassland sites, acid grasslands mainly occur as mixtures of U4, U2 and U5 with southern acid grassland species lacking. They mostly occur as small stands in individual fields, often with other grassland types.

Conservation value

Any stands of parched acid grassland (U1), especially where associated with Sand Sedge *Carex arenaria*, have considerable intrinsic interest and are like to harbour a specialist flora and fauna. Beyond these sand grasslands the acid U4/U2/U5 grassland are probably best assessed by their contribution to the habitat mosaic in which they occur. In particular they could be regarded as a feature enhancing the interest of sites with neutral grassland.

23.5 Future requirements for survey and conservation

Survey

The small areas of lowland acid grassland in Lancashire mean that a Phase 2 survey would be relatively easy. This, however, should be regarded as part of a general lowland grassland survey rather than an acid grassland survey. Any survey should also ensure that any sandy grasslands not covered by coastal dune surveys are also surveyed.

Conservation

The grasslands away from the blown sand areas are probably only of priority where associated with neutral grassland. Relic grasslands on blown sand are of greater priority and the potential for creating new areas could be investigated.

23.6 References

CROWTHER, K.A. & AITCHISON, J.W. 1993b. *Biological survey of common land No 26: Lancashire*. Peterborough: English Nature.

KELLY, P.G. & HARWOOD, T.R. 1993. Wildlife habitats in Lancashire: report of the Phase 1 habitat survey of Lancashire 1988-1992. Preston: Lancashire County Council and English Nature.

RADLEY, G.P. 1994. *National sand dune vegetation survey of Great Britain: a national Inventory. Part 1: England*. Peterborough: Joint Nature Conservation Committee.

Lancashire acid grassland surveys

Survey Name	GR	Date	Landscape Types	Comments	No Sites	Site Area	Gr Area	AG Area	H Area	LHA
Grassland Inventory		1986-93	Field, Enclosure relic	Mostly in upland fringes	42	520.0	85.9	NI		
Heathland Inventory		1985-92	Dune Heath, Enc. relic, Waste	Small areas, many in quarries or drained bogs	26	550.0			5.4	
Phase 1 survey		1990's	Field, Enclosure relic, Coastal, Mire	Phase 1 survey	28			50.0		
Common Land Survey		1993	Grass heath & Common	Few lowland commons	3	38.7		7.4		
Estimates, classes		1996		Jon Hickling, English Nature				B		

Survey Name	U1	U1a	U1b	U1c	U1d	U1e	U1f	U2	U2a	U2b	U3	U4	U4a	U4b	U4c	U4d	U4e	U5	U6	SD10	SD11	U20r
Grassland Inv.																						
Heathland Inv.																						
Phase 1 survey	A							A				A										
Common Land								+										+				
Estimates, class	A							A				A						A				

Key

Column headings
GR = Grid reference if relevant
No Sites = Number of sites
Site Area = Area of sites
GR Area = Area of grassland
A G Area = Area of acid grassland
H Area = Area of dry heath
LHA = Area of lichen heath
NI = No information
NA = Natural Area
U1-U20r = NVC communities/sub-communities

Area estimates
A = Less than 50 ha
B = 50-100 ha
C = 100-500 ha
D = 500-1,000 ha,
E = 1,000-5,000 ha
F = 5,000-10,000 ha
G = Greater than 10,000 ha
+ = Present but no area given
? = Possibly present

24. Leicestershire

24.1 Physical

Geology

The county is dominated by New Red Sandstone to the north west, with Jurassic Lias clays to the south east. Inliers of Carboniferous Coal Measures and Precambrian rocks outcrop in the far north west and Charnwood Forest respectively, giving rise to higher ground, reaching to just under 280m in Charnwood. Dolerite intrusions cut through the New Red sandstone and drift covers significant areas.

Soils

Ground water gleys dominate much of the county including Charwood Forest. Only on the Carboniferous inlier to the north west does the soil map record soil associations dominated by brown sands (**Map 1c**).

24.2 Landscape history

19th Century

On the 1820 and 1830 1 inch OS maps , little unenclosed land is indicated. Charnwood Forest is clearly an area of late enclosure.

Current landscapes and Natural Areas

The Trent Valley and Rises Natural Area (NA33) covers most of the county. Within this Natural Area, the heavily farmed land is occasionally diversified by small areas of limestone and acid soil associated with Dolerite and Carboniferous sandstone.

The distinctive uplands of Charnwood Forest are separated as a Natural Area (NA39). Here relic heathland is a notable feature. To the south east the West Anglian Plain Natural Area (NA52) has only a limited potential for acid grassland.

24.3 Existing information

Flora

The coincidence maps (**Maps 2** to **4**) of acid grassland species listed in **Table 1** have been recorded not only in Charnwood Forest, but also to the south of Leicestershire, in National Grid square SP59.

A provisional list of characteristic lowland acid grassland species for Natural Areas NA33 and NA39 is given in **Table 6** and the relevant data is extracted below. This table suggests a considerable number of extinctions in both areas. The only significant acid grassland species mentioned in the Natural Area profile for Charnwood Forest is Moonwort *Botrychium lunaria*. The lichen flora of the rock outcrops is noted for harbouring local upland species at the edge of their range.

Habitat surveys

The Grassland Inventory includes many small fields in Charnwood Forest which are recorded as containing acid grassland, but these may not include acid grassland as it is defined for this report.

Both the Grassland and the Heathland Inventories indicate the survival of heathland with acid grassland in parkland and some of the larger enclosure relics in Charnwood Forest. Beyond the Forest, a scatter of acid grasslands are apparent in fields, parkland and on a common.

Summary of consultations with Local Team Conservation Officers

Charnwood Forest heathlands are dominated by Bracken with about 100-200ha of U20, which is to be reduced and replaced with more desirable communities. Wetter areas are dominated by *Molinia*. The main dry acid grassland is Deschampsia flexuosa grassland (U2) which covers less than 100ha. Parched acid grassland (U1b) is associated with rock outcrops and covers less than 10ha. Moist acid grassland (U4) is also limited in extent to less than 10ha. Most acid grasslands are part of larger heathland habitat complexes. The northern lichen *Icmadophila ericetorum* has an outlying locality in U2 grassland in Charnwood Forest

Beyond Charnwood Forest acid grasslands are scattered, but include Croft Pasture, a stand of 2ha of U1b around a rock outcrop, with *Moenchia erecta* (within the rich National Grid square SP59), Burbage Common (SP40) with less than 10ha of U2 and possibly some U4b, Croxton Park (SK82) with about 6ha of U4b, Twenty Acre Piece (SK62) with 3ha and Hardbyhill Wood with 0.5ha of U1b. On the Coal Measures there are some sites with U4b/MG5c transitions (<4ha) including Dimminsdale (SK32).

Burbage Common is mown, but many sites are grazed by cattle and/or sheep and a number of Countryside Stewardship agreements have been reached in Charnwood Forest. The restoration of heathland in an old quarry at Buddon Wood (Charnwood Forest) is proving successful, with both heath and acid grassland appearing.

24.4 Summary of resource

Extent and composition

Acid grassland is rather fragmented and dispersed across the county. The rather less diverse *Deschampsia* grass heath is the most extensive type with smaller areas of more species-rich U1 and U4.

Conservation value

The interest of Charnwood Forest mainly resides in its mixture of upland and lowland features, rather than in the intrinsic interest of its acid grasslands. Beyond this area, the scattered acid grasslands are clearly of some importance at a county level, but they are of lower significance at a national level. The important lichen flora of Charnwood Forest is mainly found on rock outcrops, which are a distinctive feature of the Forest.

24.5 Future requirements for survey and conservation

Survey

No high priorities for survey

Conservation

Restoring the quality of the existing heathland habitats and their extension within Charnwood Forest is the most obvious priority.

Extract from Table 6 for Leicestershire: occurrence of plant species generally faithful to lowland acid grassland

County: Leicestershire		
Natural Areas:	**39**	**33**
Chamaemelum nobile	0	0
Dianthus deltoides		0
Filago minima	1	1
Hypochaeris glabra	0	
Moenchia erecta	1	1
Ornithopus perpusillus	1	1
Potentilla argentea	1	1
Stellaria pallida	0	0
Teesdalia nudicaulis	0	0
Trifolium scabrum		0
Trifolium striatum	1	1
Trifolium subterraneum	0	0
Total no. of species extant	**5**	**5**
Total no. of species extinct	**5**	**6**
Total no. of species recorded	**10**	**11**

39 = Charnwood Forest
33 = Trent Valley and Rises

1 = Recent record
0 = Apparently extinct

Leicestershire acid grassland surveys

Survey Name	GR	Date	Landscape Types	Comments	No Sites	Site Area	Gr Area	AG Area	H Area	LHA
Grassland Inventory		1983-94	Fields, Park, Common	Mainly in Charnwood Forest (NA39)	24	229.9	31.7	21.5		
Heathland Inventory		1983-94	Park, Enclosure relic	Mainly in Charnwood Forest (NA39)	11	970.0			34.3	
Estimates, ha		1996		Ian Butterfield, EN				100+		
Estimates, classes				Ian Butterfield, EN				C		

Survey Name	U1	U1a	U1b	U1c	U1d	U1e	U1f	U2	U2a	U2b	U3	U4	U4a	U4b	U4c	U4d	U4e	U5	U6	SD10	SD11	U20r
Grassland Inv.																						
Heathland Inv.																						
Estimates, ha	<20		<20					c100	c100			<20		<20								
Estimates, class	A		A					C	C			A		A								

Key

Column headings
GR = Grid reference if relevant
No Sites = Number of sites
Site Area = Area of sites
GR Area = Area of grassland
A G Area = Area of acid grassland
H Area = Area of dry heath
LHA = Area of lichen heath
NI = No information
NA = Natural Area
U1-U20r = NVC communities/sub-communities

Area estimates
A = Less than 50 ha
B = 50-100 ha
C = 100-500 ha
D = 500-1,000 ha,
E = 1,000-5,000 ha
F = 5,000-10,000 ha
G = Greater than 10,000 ha
+ = Present but no area given
? = Possibly present

25. Lincolnshire

25.1 Physical

Geology

Lincolnshire lies on sediments ranging from New Red Sandstone to Upper Chalk, although much is buried by more recent sediments. The most significant in terms of acid grasslands are periglacial wind blown sand deposits and lacustrine sands and gravels. The Spilsby Sandstone, which lies below the Chalk, outcrops in the southern Wolds, and produces some very acid soils.

Soils

The sandy drift deposits give rise to large areas of brown sands and podzolic soils to the south of the River Humber, with smaller patches to the north. In the south of the Wolds the Spilsby Sandstone gives rise to brown sands along valley sides (**Map 1e**).

25.2 Landscape history

19th Century

Gibbons (1975) describes a vast extent of rough grazing as existing until the 18th century on both acid and base-rich soils. Most of this was rapidly enclosed in the late 18th century and early 19th century, but sizeable areas, especially on the droughty sandy soils, survived locally and are shown on the 1820's 1 inch OS maps. The northern-most areas are now outside the modern county but there were a large areas in the Scotton Common area, the Holton Warren area south of Caistor, Linwood Warren by Market Rasen, south east of Woodhall Spa, and very small areas elsewhere.

Current landscapes and Natural Areas

The main Natural Area of significance for acid grassland is the North Lincolnshire Coversands and Vales Natural Area (NA34). There is a small tongue of sandy soils extending into the Trent Valley and Rises Natural Area (NA33), which was included in the old Coversands Natural Area (old NA 16, Map 14). There is a little acid grassland in the Lincolnshire and Rutland Limestone Natural Area (NA38). In the 20th century, agriculture and plantations have destroyed much of what existed in the 1820's.

25.3 Existing information

Flora

The coincidence maps (**Maps 2** to **4**) of acid grassland species listd in **Table 1** pick out the importance of the Coversand as one of the last areas where a rich lowland acid grassland flora is found in the north east of England, along with the Northumberland Whin Sill. To the south of the Coversand area, the Woodhall Spa and the Sleaford areas also stand out. There have, however, been serious declines. The species recorded for the North Lincolnshire Coversands and Clay Vales Natural Area (NA34)and from blown sand on the Lincolnshire and Rutland Limestone Natural Area (NA38) are listed in **Table 6** (extract given below).

The Flora of Lincolnshire (Gibbons, 1975) gives a description of the distribution of acid grassland and it floristics before 1975. The heathlands are described as being predominantly grass heath. In the modern county, relics are mentioned at Laughton and Scotton Commons (SK89) with *Teesdalia*,

Ornithopus, *Hypochaeris glabra* and *Potentilla argentea*. In the Nettleton Moor area (TF09) acid grassland with *Filago minima* and *Aphanes inexspectata* survived.

Fragments existed in the Laughterton area (SK87), with *Carex arenaria*, while Woodhall Spa had *Deschampsia flexuosa* grass heath. To the south, sand over limestone at Ruaceby Warren included acid areas with calcicolous grasslands, and the flora included *Carex arenaria* and *Herniaria glabra*.

Habitat surveys

The Grassland and Heathland Inventories record a fairly similar distribution to that described by Gibbons (1975). There have been no systematic surveys of acid grasslands in Lincolnshire.

Summary of consultations with Local Team Conservation Officers

The Coversand and fen edge gravels support mixtures of parched acid grasslands (U1) *Deschampsia flexuosa* grass heath (U2) with Bracken and some heath. The SSSIs include Kirby Moor with 40ha of U2 and Bracken; Moor Farm with 26ha of U1, U2 and Bracken; Linwood Warren with 13ha of what was previously all dense U2, although sheep grazing has produced more open U1; Woodhall Spa Golf Course with about 5ha and Scotton Beck Fields with about 16ha of grazed U1, and Scottton Common with heath and about 5ha of U2. The latter site is being managed under WES. In total there is 105ha of acid grassland present in SSSIs, and outside SSSIs there is a total of approximately 100ha in scattered fragments.

More Coversand and gravels are found in the Trent Valley between Lincoln, Laughterton and Newark. This area contains mostly over-grown fragments of grassland in gravel pits, with approximately 80ha of acid grassland, whilst in Laughterton Forest acid grassland occurs on relic sand dunes. A mobile *Carex arenaria* dune associated with *Potentilla palustris* fen is known to have still survived in the recent past (Clive Chatters, pers. com. 1996).

To the south, blown sand occurs over limestone in the Ancaster area, including 5ha of acid grassland in a mosaic with calcicolous grassland. There may still be up to 50ha of other acid grasslands on the edge of arable fields in this area. The fauna of the Coversand heaths is thought to be of great value and there is an unconfirmed report of the occurrence of the Ladybird Spider (*Eresus cinnaberinus*). About 40ha of species-poor, secondary, parched acid grassland also exists in gravel pits in the Fens but is of limited interest.

Finally the acid soils over the Spilsby Sandstone support approximately 500ha of grassland of unknown type, associated with valleys in the southern Wolds, and along the western edge of the Wolds. It is not clear how much of this is acid grassland in the sense of the NVC. Species of interest such as *Saxifraga granulata* mentioned as occurring do not suggest acid grassland, but the only SSSI on the Spilsby Sandstone, Haiton Sheepwalk, does support Festuca-Agrostis-Rumex grassland Potentilla-Galium sub-community (U1f).

25.4 Summary of resource

Extent and composition

The grass heaths fall into the 100-500ha range in their extent and can be assumed to consist of a similar Breckland-type mix to that found in Humberside. These heathlands still have a well developed lowland acid grassland flora.

The Spilsby Sandstone grassland is something of an unknown quantity. The sandstone outcrops support a bryophyte flora of local interest including *Racomitrium* spp which are rare in the East of

England (Tim Smith, pers. com. 1996) but there is no reference to acid grassland in published sources. It is not included in the acid grassland statistics for the county.

Conservation value

The Coversand and gravel grass heath sites of the county are much fragmented, although they are nationally significant, as relics of a once extensive heathland ecosystem unique to eastern England. They should be considered together with relics in neighbouring counties. The value of the Spilsby Sandstone based on the current limited data suggests it may be of county significance.

25.5 Future requirements for survey and conservation

Survey

The English Nature Local Team considers that there is a need to survey the Spilsby Sandstone grasslands but EPR feels that a small trial survey would be appropriate in the first instance, to ascertain the likely importance of the grasslands at a county or higher level. The present level of detail on the Coversand vegetation is not high and a Phase 2 survey would be ideal for monitoring and assessment of the current resource, although few new sites are likely to be found.

Conservation

Much of what survives of the Coversand grass heath is protected and managed and the main requirement is to extend the habitat. Any opportunities for restoration of large blocks of habitat should be pursued with vigour.

25.6 References

GIBBONS, E.L. 1975. *The flora of Lincolnshire.* Lincoln: Lincolnshire Naturalists' Union, Lincolnshire Nature History Brochure No. 6.

Extract from Table 6 for Lincolnshire: occurrence of plant species generally faithful to lowland acid grassland

County: Lincolnshire			
Natural Areas:	**34 + 33**	**34**	**38**
Grasses			
Apera interrupta	1		
Festuca longifolia	1		
Other Vascular Plants			
Crassula tillaea	1		
Dianthus deltoides		0	
Filago minima	1	1	1
Herniaria glabra			1
Hypochaeris glabra	1	0	0
Moenchia erecta	0		
Ornithopus perpusillus	1	1	1
Potentilla argentea	1	1	1
Stellaria pallida	1		0
Teesdalia nudicaulis	1	1	
Trifolium ornithopodioides			0
Trifolium scabrum			1
Trifolium striatum	1	1	1
Trifolium subterraneum	1		
Vicia lathyroides	1	1	
Total no. of species extant	**12**	**6**	**6**
Total no. of species extinct	**1**	**2**	**3**
Total no. of species recorded	**13**	**8**	**9**

34 + 33 = Coversands part of NA34 plus part of NA33 (was in old NA 16). Includes records from other counties
34 = Lincolnshire Clay Vales part of NA34 (old NA21)
38 = Lincolnshire Limestone

1 = Recent record
0 = Apparently extinct

Lincolnshire acid grassland surveys

Survey Name	GR	Date	Landscape Types	Comments	No Sites	Site Area	Gr Area	AG Area	H Area	LHA
Grassland Inventory		1983-89	Enclosure relic, Field	Mainly in NA34 Fragments in NA38 & 35	12	228.6	NI	NI		
Heathland Inventory		1985-95	Enclosure relic	Mainly in NA34	13	573.0			84.7	0.1
Estimates, classes		1996		John Shackles, English Nature				C		

Survey Name	U1	U1a	U1b	U1c	U1d	U1e	U1f	U2	U2a	U2b	U3	U4	U4a	U4b	U4c	U4d	U4e	U5	U6	SD10	SD11	U20r
Grassland Inv.																						
Heathland Inv.																						
Estimates, class	C	+	+		+	+		B	+											+	+	

Key

Column headings
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