Breeding Bird Survey of the Peak District Moorlands 2004

Moors for the Future Report No 1

Geoff Carr & Peter Middleton

Moors for the Future is supported by the National Heritage Lottery Fund
The Partners are: English Nature, National Trust, Peak District National Park Authority, United Utilities, Severn Trent Water, Yorkshire Water, Sheffield City Council, Peak Park Moorland Owners and Tenants Association, defra, Country Land and Business Association, National Farmers Union

Project Research Manager: Aletta Bonn

Moors for the Future
Castleton Visitor Centre
Buxton Road
Castleton
Derbyshire S33 8WP
Tel/Fax: 01433 621656
email: moors@peakdistrict.org.uk
website: www.moorsforthefuture.org.uk

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF MAPS

APPENDIX

SUMMARY

The Moors for the Future bird survey 2004 is a repeat of the Brown and Shepherd breeding bird survey of the South Pennine Moors 1990. The area surveyed is defined as the unenclosed uplands between Edale and Marsden, the Staffordshire Moors and the Eastern Moors. The report describes the distribution and numbers of breeding birds found on these moors during a systematic survey conducted between 1st April and 30th June 2004. A total area of 503 km^2 in 578 OS km^2 squares was visited twice where there was unrestricted access. This is only the second time such a comprehensive survey of this area has been conducted, and it is therefore of great importance for the Peak District National Park and also unique in its spatial extent and resolution for UK uplands in general.

Data has been gathered concerning the distribution and numbers of thirty-nine species of breeding birds. In the 1990 survey, data was presented for twenty-seven species. Within this report each species account gives a brief history of the past numbers of the species in the study area together with reports on present distribution, numbers and densities. Most importantly, the data gathered in 2004 is compared with that of 1990. Each species account is accompanied by a map that shows the distribution of species in the study area.

Similar to the 1990 report, ten typical and important moorland birds have been selected to assess changes in abundance and distribution over time. Maps have been produced and included in the report that show changes in species distribution since 1990. The Peak District Moors are clearly of national significance and whilst the area is perhaps under much greater visitor pressure than other UK upland regions, the area supports the southern-most viable populations of many moorland breeding birds in the UK. Indeed, the density of Golden Plover in the study area is relatively high compared to other regions, and other species in significant numbers include Merlin, Short-eared Owl and Dunlin. Densities of Red Grouse of the race *Lagopus lagopus scoticus* are found nowhere in the world in such abundance as on the eastern area of the Dark Peak.

Regarding distribution changes, evidence provided in this report suggests that there have been increases in the range and numbers of Peregrine, Merlin and Short-eared Owl. Furthermore, Raven has colonised the area since 1990 and Hen Harrier is perhaps attempting to colonise. Waders have also faired reasonably well whilst Dunlins are slightly down in both range and numbers resulting from loss of suitable habitat. The Golden Plover population has remained stable and Curlew, Lapwing and Snipe have all increased in numbers.

There is no real evidence to suggest that the status of Ring Ouzel has changed since 1990, whilst Whinchat, Stonechat, Reed Bunting and Dipper have all increased in both range and numbers. There is little change for both Skylark and Meadow Pipit, and the Red Grouse population in 2004 is far greater than in 1990. The decline in certain species are less evident but nonetheless very significant. Most notable, Twite has suffered a catastrophic reduction in both range and numbers, and Wheatear is similarly much reduced in 2004.

1. INTRODUCTION

The moors of the Peak District National Park present a diversity of breeding bird habitats of national importance. The vast blanket bogs of the plateau areas support breeding Golden Plover and Dunlin, whilst on the better-drained slopes, Curlew, Red Grouse and Short-eared Owl appear to breed. The peripheral areas of acid grassland and *Juncus* flushes hold good populations of Curlew, Snipe and sometimes Lapwing, and the cloughs, tors and gritstone edges with their associated rock litter and bracken are characterised by breeding Ring Ouzels, Whinchats and Stonechats. The rivers and reservoir shores hold species like Common Sandpiper, Oystercatcher, Dipper and Grey Wagtail.

The Peak District moorland has suffered significant losses and degradation of these habitats through fringe agricultural improvement, and on some sites past poor management of burning and grazing regimes and plantation afforestation. Surrounded on all sides by the heavy industry of northern England, the vegetation of the Peak District has also been severely degraded by atmospheric pollution. Furthermore, the area is within close proximity to large urban areas that leads to enormous visitor pressure. The designation as Britain's first National Park, rights of access to large areas of wilderness through open access agreements and the increase in car ownership has resulted in high numbers of visitors engaging in an array of activities throughout the year. Nevertheless, the Peak District retains the most southerly viable populations of typical moorland breeding birds in England. For a number of species, particularly Golden Plover, the Peak District may hold the most southerly viable breeding population in the world.

The moors of the Peak District National Park support nationally important numbers of Golden Plover, Dunlin, Curlew, Merlin, Ring Ouzel and Whinchat (see Tab. 4). In 1990, a complete survey of the upland breeding birds was conducted by Brown and Shepherd (1990) in this area. Since then, various sample surveys have been conducted by the RSPB, the National Trust, the Peak District National Park Authority and English Nature, but it is 14 years since the whole area has been surveyed for upland breeding birds.

This 2004 Moorland Breeding Bird Survey is a direct repeat of the 1990 Brown and Shepherd Breeding Bird survey of the South Pennine Moors. It forms an essential part of the Moorland Sustainability Baseline for the Moors for the Future partnership project. The sustainability baseline aims to establish current patterns and processes on moorlands to identify efficient conservation and recreational management planning for sustainable moorlands in the future. The data from this survey is stored in a GIS (Geographic Information System) and in Excel tables. Data and maps are available for non-commercial use from the Moors for the Future office.

As bird populations are important indicators of habitat quality, the survey data will contribute to the detection of both positive and negative changes in the habitat and species of the moorland areas over time. Specifically, the maps reproduced in this report of the distribution of moorland breeding birds will provide a definition of the whole moorland breeding bird population as recorded in 2004. Furthermore, it provides important data for analyses of the overall population trends and changes in spatial distribution of moorland breeding bird species between 1990-2004.

2. THE STUDY AREA

The survey covers the unenclosed upland area of the Peak District National Park and excluded the enclosed reservoirs. It was therefore mainly concentrated within the SSSIs of the Dark Peak (between Edale in the South and Marsden in the North), the Eastern Moors and the South-West Peak (Staffordshire moors between Buxton and Leek). The 1990 census covered the Dark Peak and South Pennines as far north as Ilkley. To analyse the population trends and spatial distribution of breeding birds it was necessary to deduct the data from the northern section north of Marsden from the 1990 survey.

The Southern Pennines contain a mosaic of upland habitats including heather Moorland, blanket bog, acid grassland and rush pasture. The inbye land was not generally surveyed, however, the precise boundary of the moor is often arbitrary, especially on the Staffordshire moors. In this study, the term moorland refers to the unenclosed upland. Non-moorland within survey squares was not surveyed (e.g. plantation, improved pastures, reservoirs). Map 1 shows the study area with the extent of this 2004 survey and the 1990 survey area is also indicated.

Table 1: Moorland bird species recorded during this survey (Bold type indicate species for which no data was reported in the 1990 report.)

Canada Goose	*Brant Canadensis*
Teal	*Anas crecca*
Mallard	*Anus platyrhynchos*
Hen Harrier	*Circus cyaneus*
Buzzard	*Buteo buteo*
Kestrel	*Falco tinnunculus*
Merlin	*Falco clombarius*
Peregrine	*Falco peregrinus*
Red Grouse	*Lagopus lagopus scoticus*
Pheasant	*Phasianus colchicus*
Oystercatcher	*Haematopus ostralegus*
Little Ringed Plover	*Charadrius dubius*
Golden Plover	*Pluvialis apricaria*
Lapwing	*Vanellus vanellus*
Dunlin	*Calidris alpina*
Snipe	*Gallinago gallinago*
Woodcock	*Scolopax rusticola*
Curlew	*Numenius arquata*
Redshank	*Tringa totanus*
Common Sandpiper	*Actitus hypoleucos*
Cuckoo	*Cuculus canorus*
Short-eared Owl	*Asio flammeus*
Skylark	*Alauda arvensis*
Meadow Pipit	*Anthus pratensis*
Grey Wagtail	*Motacilla cinerea*
Dipper	*Cinclus cinclus*
Wren	*Troglodytes troglodytes*
Redstart	*Phoenicurus phoenicurus*
Whinchat	*Saxicola rubetra*
Stonechat	*Saxicola torquata*
Northern Wheatear	*Oenanthe oenanthe*
Ring Ouzel	*Turdus torquatus*
Mistle Thrush	*Turdus viscivorus*
Willow Warbler	*Phylloscopus trochilus*
Carrion Crow	*Corvus corone*
Raven	*Corvus corax*
Linnet	*Carduelis cannabina*
Twite	*Carduelis flavirostris*
Reed Bunting	*Emberiza schoeniclus*

For all other species recorded during the 2004 survey that are not typical of moorlands and are considered ubiquitous, see Appendix 2.

3. THE PHYSICAL BACKGROUND

Most of the survey area overlies the carboniferous mudstones, shale, sandstones and millstone grit which in-turn overly carboniferous limestone, the oldest of the rocks underlying this region. The carboniferous limestone is evident and emerges on the southern boundary of the survey area to the south of Edale while the upper strata are evident within the cloughs and the tors of the high ground. The Millstone grit area forms a large plateau at around 500-600 meters and is dissected in places by rivers or has weathered to form tors and boulder strewn edges. These edges are characteristic of the Peak District moors.

The area reaches a maximum altitude of 636 meters on the Kinder Scout plateau that produces its own local climate, often resulting in adverse weather conditions that can last well into spring time. This gritstone area is very porous and following rainfall the water surfaces at the junction of the sandstone, shale and mudstone strata form springs and waterfalls before continuing as rivers to the reservoir catchments. Most of the high gritstone area is covered by blanket peat that was formed over thousands of years, and reaches a depth of many meters in places. The blanket peat was formed at a time when precipitation exceeded both run-off and evaporation resulting in peat forming *Sphagnum* mosses. The Kinder plateau receives around 160cm of rainfall a year and in past colder climates this would have fallen as snow during the winter months. More recently, the proportion of days experiencing snowfall has reduced, and possible threats of climate change will certainly impact on the ecology of the area.

During the past formation of the blanket peat there is evidence that there was an earlier period when dense woodland developed containing Scots Pine *Pinus sylvestris*, Silver Birch *Betula pendula* and Juniper *Juniperus communis* on parts of the high moor. This landscape would have perhaps been characteristic of the Caledonian pine forests in Scotland.

Atmospheric pollution is thought to have created local problems as far back as the Roman times when lead smelting emitted sulphur dioxide. However, these impacts were minor in comparison with the vast quantities emitted from the towns and cities during the industrial revolution (Lee, Tallis and Woodin 1988). The fragile vegetation cover over the acidic peat receives many nutrients from the atmosphere, increasing acidity and resulting in a diminished ground flora. This has subsequently created bare areas of peat that has led to rapid erosion that is all to evident today on Bleaklow and Kinder Scout plateaux. Although the emission of sulphurous oxides and associated air pollutants has sharply decreased over the last 20 years, the concentration of pollutants within the peat combined with high acidity prevents the natural re-generation of many plant species, in particular *Sphagnum* species. Furthermore, accidental and deliberate fires have been and continue to be a major source of severe damage.

Therefore, the Moors for the Future project is currently restoring 3.5km^2 of bare peat by active re-vegetation and gully blocking. For more information please visit the website www.moorsforthefuture.org.uk.

4. VEGETATION AND BIRD ASSOCIATIONS

The vegetation of the Peak District moors can broadly be described in terms of five vegetation types, each associated with particular facets of topography or management. The vegetation in many parts is severely degraded and many of the SSSIs have been designated as being in unfavourable vegetation condition by English Nature.

On upland plateaus, where the depth of peat can exceed four metres, the vegetation is dominated by Cottongrass *Eriophorum vaginatum*. Relatively large expanses of this vegetation exist on the moorlands (see Map 5d) and it is particularly characteristic of the South Pennines blanket bog (Ratcliff 1997, Brown and Shepherd 1991). *Eriophorum angustifolium* can be abundant along the edges of pools and where the peat is eroded. Typical associates are Heather *Calluna vulgaris*, Crowberry *Empetrum nigrum*, Bilberry *Vaccinium myrtillus* and Cloudberry *Rubus chamaemorus*. Although these blanket bogs are amongst the most species poor floras in Britain they are unique and support high densities of Golden Plover and nationally important numbers of Dunlin. High densities of both these species are found on Cottongrass bog that contains abundant Crowberry and Cloudberry. The latter is certainly characteristic of moorlands that support high densities of these waders. In contrast, there are extensive areas devoid of vegetation that are seriously eroding and in these areas birds are at very low densities or absent. The present extent of peat occurred some 4000 years ago and severe erosion is perhaps part of a natural cycle due to climate change. However, this process has been accelerated by un-natural events such as moorland fires, overgrazing, increased public access, atmospheric pollution and particularly acid precipitation (Anderson et al 1998). The latter is thought to be responsible for the loss of peat-forming Sphagnum mosses in the mid-eighteenth century. Once peat is exposed, it is particularly vulnerable to erosion and oxidisation that prevents colonisation of plants, thus it remains bare and the process accelerates.

Away from the plateaus, Heather mostly dominates the vegetation of the moorland slopes, and these areas are often managed for Red Grouse (Map 4a-c, 5d). As a consequence, the Heather moors are burned at regular intervals to provide nutritious young shoots for the Grouse to forage. Crowberry and Bilberry are common associates and the latter is often present in relative abundance. According to Anderson and Yalden (1981) areas dominated by pure Heather in the northern part of the Peak District appear to have declined by some 35% since 1913. These losses are thought to have resulted from past overgrazing and poor burning management. Peak District bird surveys in recent years have revealed that these pure Heather moorlands or monocultures attract only small assemblages of moorland birds, often only Red Grouse and Meadow Pipit are present in such areas (see Figs. 1-7). However, recent heather burns, particularly on wet moors with regenerating *Eriophorum vaginatum*, often attract breeding Golden Plover. Regarding these differences in land management may affect breeding bird densities (Sim et al, in press).

Much of the Heather moorland has been replaced by some form of acid grassland. These areas of grassland are particularly favoured by Skylarks, Curlew (Map 7d) and Meadow Pipits, the latter often found in local abundance. Acid grassland is therefore an underestimated resource. Purple Moorgrass *Molinia caerulea* is often dominant on gentle, wetter slopes where it usually forms a species poor, tussocky sward. Mat Grass *Nardus stricta* also forms smaller but similar tussocks and this type has spread

most in recent times as a consequence of heavy grazing but is unpalatable to sheep. The most interesting and species rich acid grassland type found in the Peak District is Wavy Hair Grass *Deschampsia flexuosa* habitats. These often occur on the steeper ground and it is particularly palatable to sheep, which may be the reason why this grassland type is not more abundant in the study area.

Rush *Juncus* is another important vegetation type that is common in all areas of the Peak District where water is abundant at the surface. *J.conglomerates* and *J.acutifloris* may occur in damp places particularly where there is a marked change in slope. Variable sized areas of *Juncus* also occur alongside streams. Two species of bird are associated with this habitat, Snipe and Reed Bunting.

Cloughs, tors and gritstone edges, with their associated rock litter are often dominated by Bracken *Pteridium aquilinum* which may overlay Heather or acid grassland. This vegetation type is a very important habitat for typical moorland birds such as Wheatear, Whinchat, Stonechat and Ring Ouzel. Whinchats are never found away from this vegetation type and Twite also seem to have a strong association with it.

Clough woodlands containing Oak *Quercus*, Silver birch *Betula pendula* and Rowan *Sorbus aucuparia* occur in the Peak District but they have often been considered by conservationists as a threat to the important moorland habitats. Nevertheless, natural regeneration of managed and fenced areas has occurred in some cloughs and as a consequence, an assemblage of birds have colonised these areas. Lone trees high in cloughs have been found to attract breeding Willow Warblers; Chaffinches and Tit species are also attracted to such locations. The survey has also revealed that Woodcock and Redstart breed in the wooded cloughs and as these trees mature they may attract Wood Warbler and Pied Flycatcher.

5. METHODOLOGY

5.1 Bird survey census

The purpose of the breeding bird survey was to record the distribution and abundance of breeding moorland birds in the Peak District. Unlike the previous survey conducted in 1990, all breeding birds on the moorland were recorded. Table 1 lists the species for which information on breeding or other moorland usage was recorded.

The Brown and Shepherd (1990) method for censusing upland breeding wader populations was applied. This method is generally used to census upland breeding waders, principally Golden Plover, Dunlin, Oystercatcher, Lapwing, Curlew and Redshank. Whilst this method was primarily designed for surveying waders, other birds were also recorded. Red Grouse, Skylark and Meadow Pipit were however, not registered with individual sightings on the maps, but tallied per km^2 square on the first visit only. However, for the latter two species, this is not the best method of determining breeding pairs.

There are two main information outputs of this survey, these are a) the estimation of the number of breeding pairs and b) final visit maps showing registrations and the boundary of the areas covered. Two visits were made to most areas between 1st April and 30th June. The first visit was conducted early April to mid May, the second visit from mid-May to late June. Visits were made between 8.30-18,00 BST only on days when the weather was favourable, avoiding high winds (greater than Beaufort force 5) and poor visibility. In order to avoid sampling bias, in most cases the second visit was completed by a different observer.

Surveys of upland waders and other birds were carried out by observers with experience of their behaviour, calls and songs. Nine field workers conducted the survey. They were supplied with 1 km square 1:25000 Ordnance Survey maps, a handheld geo-positioning system (GPS) and field recording forms. A pre-determined route or adapted pre-determined route was walked through each square and efforts were made to cover as much ground as possible. A constant search effort was employed and most areas were covered to within 200m. At regular intervals the surveyors would stop and scan in every direction in an attempt to find all the birds present. All birds located were recorded together with their behaviour and registered on to maps using standard BTO Common Bird census codes. GPS locations of birds are of approx. +/-100m accuracy, as surveyors did not walk to each bird sighting location but marked it on the recording maps. Birds were considered to be breeding if any of the following were observed:

- **S** Single bird in suitable habitat
- **P** Pair in suitable habitat
- **T** Territorial behaviour
- **C** Courtship/display
- **A** Alarm calling
- **D** Distraction display
- **N** Nest found
- **Y** Downy young
- **F** Fledged young

All data collected was transferred to summary recording forms and a six-figure grid reference was given for each registration. Where several individuals were present in a large area and it was impossible to determine the number of pairs they represented in the field, individuals were judged as representative of different pairs if the distance between them was 500m (200m for dunlin and passerines). Where two individuals were considered to constitute a pair of birds, one of the two individual locations was chosen.

In assessing these records for population estimates and in producing the maps, both visit maps were considered together to determine a pair or a territory. Breeding pairs were considered to be separate from one-another only if they were 1000m apart on the different visit maps (500m for Dunlin, 200m for passerines). Where pairs were judged to be the same, their locations were taken from one or the other of the mapped observations. This method of analysis minimises multiple recording of breeding pairs. Therefore, some breeding pairs may have also been observed during the second visit in squares adjacent to those mapped on the final visit maps. Separate maps for full data sets of both the first and second visit separately are available from the Moors for the Future office but have not been included in this report.

During the survey period the weather was exceptionally dry in May and early June and it appears that many Golden Plover dispersed with their young away from the Cotton Grass breeding areas to the wetter *Juncus* gullies on the slopes. This was encountered during the second part of the survey and therefore careful consideration of this was given during the summary evaluation to prevent over recording.

Where access to the moorlands was difficult to negotiate in time, only one survey was completed. Only the second visit was undertaken in late June on part of the Staffordshire moors in order not to disturb nesting grouse. Where access was not possible for the second visit, some areas were surveyed from public rights of way only.

For some estates access was not possible. Some surveying was achieved from public rights of way (See App. 1 and Map App.1).

5.2 Accuracy of survey methods

The accuracy of any survey depends upon a number of factors.

- methodology adopted
- consistency of the methodology
- knowledge and experience of the fieldworkers
- consistency of recording
- critical summary and evaluation

Perhaps the most difficult aspect of any survey is the assessment of the survey methods for a) how accurately the presence or absence of a species in a particular area is determined and b) how accurately or consistently the number of breeding pairs is calculated. The method for determining breeding birds is defined in section 5.1 of this report. There is often scope for error as the accurate determination of the breeding distribution of some species is made more difficult by non-breeding individuals that are feeding, roosting or loafing. This is especially the case for Curlew as this species is the most difficult of the waders to census. Unforeseen factors can also complicate and skew the data. For example, during the 2004 survey the weather remained dry throughout April and May and the first substantial rain was not until the 18th June. As a consequence, Golden Plover and their young moved from their breeding areas down slope to feed in wet *Juncus* areas.

The Brown and Shepherd methodology used in this survey is designed primarily for upland breeding waders. The uplands of Britain cover large areas, therefore this survey technique is designed to locate upland breeding birds in a fairly fast and effective way. The technique works well for surveying most wading birds, notably Golden Plover, Curlew and Lapwing. However, it is perhaps inadequate for monitoring Dunlin because these birds are more cryptic and covering areas to within a 200m radius is not sufficient. The method is also unsuitable for providing a census of Snipe, whose presence is located effectively by visiting sites at dawn and dusk, something that would be extremely difficult to achieve in the uplands. The methodology is perhaps not sufficiently thorough for censusing the moorland passerines as some birds may remain undetected.

In most parts of the study area, the amount of effort expended in detecting and recording birds in each part of the study area was equal. For areas where the amount of effort expended was not equal, see App. I. The results for each part of the survey area with unlimited access are therefore directly comparable in terms of species composition and relative abundance. Most importantly the 2004 survey is a direct repeat of the Brown and Shepherd survey of 1990 and although the survey method has its limitations, a ‘like for like’ comparison can be made and the data is invaluable.

In assessing the records for population estimates, the Brown and Shepherd methodology was rigidly adhered too. Consequently, the final numbers of Golden Plover and Curlew are perhaps somewhat conservative.

5.3 Accuracy of GIS records

All data have been digitised and transferred to GIS files. While breeding pairs are indicated on the map by point locations, these locations should be considered to be accurate within a 100m radius.

For sightings, most surveyors marked the location of birds in the field on paper copy maps and took a subsequent 8 digit reference reading later on, which gives a resolution of 100m. The point location is set on the bottom left hand corner of each $100m^2$ square. Using the Brown & Shepherd rapid assessment methodology, it is not considered possible to arrive at a greater than 100m accuracy, as exact bird locations are not approached (all areas were assessed within 200m, see above), and orientation as well as distance estimation on moorlands can be difficult.

Therefore each reading is regarded to be accurate +/- 100m, relating to a $200m^2$ resolution. Checks of approximately 10% of the map readings of all surveyors on different dates and sites indicate a reference reading error rate of less than 5% of all records. Therefore readings are accurate with 95% confidence.

It is important to note that record locations indicate sightings of birds in their territory not nest sites. As territories may be extensive, e.g. for the Curlew, nest locations may be outside the 100m radius (see also 5.2).

5.4 Data storage

2004 Data

The data for this report is saved in several formats and can be made available on request for non-commercial use against printing and postage charge:

- paper copy maps
- digital GIS maps (MapInfo)
- Excel tables

These exist for data from the 1rst and 2nd visit separately and for the combined visits. The latter are presented in this report.

1990 Data

For this report, the following sources of information for the 1990 survey data have been used:

- Final numbers of 1990 breeding pairs have been derived from digitised copies of the original report paper copy maps. These records relate to the total estimated number of breeding pairs using the Brown & Shepherd methodology, combining both survey visits.

Further records for the 1990 survey are available from English Nature, but have not been employed within this report:

- GIS tables for the 1rst and 2nd survey visit separately of individual sightings with behaviour codes
- Excel spreadsheet (spa_birds.xls) for the estimated maximum number of pairs per km squares per visit (not final numbers of combined visits), derived from 1992 Paradox files by Stilman & Brown (1992)

6. RESULTS

6.1 Introduction

This section presents the results of the survey concerning the distribution and abundance of each species, together with a summary of the following information:

- The number of pairs or individuals recorded together with a brief account of the distribution and abundance of the species in the study area.
- The distribution of pairs throughout the study area represented on a map by a single symbol.
- The average density of each species in the study area.
- Comparisons with the Brown and Shepherd survey of the South Pennines 1990.
- Comparisons with other recent surveys in the study area.
- Information on the relationship between the birds and their habitat including habitat maps for some species.
- Historic to recent changes in the bird status in the study area.
- Points, observations and comments of particular note for each species in the Peak District.

A more detailed appraisal of long-term change for 10 selected moorland species is presented in section 8 of this report.

6.2. Species accounts

6.2.1 Canada Goose

A total of at least 59 pairs of this introduced species were found breeding during the survey, three pairs were on the Staffordshire moors (Map 2a-c). An additional 58 non-breeding birds in groups were also present in the survey area. Not surprisingly, many birds were found in the vicinity of upland reservoirs where many more individuals were present but not recorded as they were outside the recording area.

This species breeds in a great diversity of habitats throughout Britain including park lakes, reservoirs and gravel pits, rural and suburban canal and river banks (Gibbons et al 1993). There has been a remarkable expansion of this species since the first atlas of breeding birds was produced (1968-72) (Gibbons et al 1993). However, it was not until 1983 that evidence of the first successful upland breeding site in the Sheffield area was found at Redmires reservoir, South Yorkshire (Hornbuckle and Herringshaw 1985). It is now not unusual to encounter this species high up on the moors and breeding often occurs well away from the reservoirs.

During the 1990 survey only three breeding pairs of Canada Goose were found in the survey area of the Dark Peak. Therefore the area has seen a dramatic increase in breeding pairs. This species also grazes the uplands and if their population continues to increase there could perhaps be an added grazing pressure upon the upland vegetation. This species was most numerous in the Saddleworth moor area (Map 2a). Their average density was 1.51 pairs per km^2.

6.2.2 Teal

Teal is an Amber Listed Species of medium conservation concern as the UK population is of international importance. Three pairs of Teal were found at different locations within the Dark Peak area during the first visit only and breeding was not confirmed (Map 2a-c). Teal nest in a variety of wetland habitats but they are sparingly distributed at very low densities throughout the British moorlands. They are very difficult to detect unless flushed off the nest or until broods are seen on moorland pools. The number of pairs may have been underestimated because of this. Nevertheless, Teal are known to be rare breeders in the counties within which the survey area lies. Historically, they have always been scarce breeders (Whitlock 1893) and there were no confirmed breeding records for the Peak District in 2002 (Derbyshire Bird Report 2002).

Only one pair of Teal was found breeding on the moors during the survey in 1990, this was outside the 2004 study area adjacent to Cupwith reservoir, West Yorkshire. Therefore the possible breeding population in the study area has increased from none to three pairs.

6.2.3 Mallard

Some 23 pairs of possible breeding Mallard were found in the study area that excluded the reservoir banks (Map 2a-c). The species breeds in a wide variety of habitats throughout Britain, and moorland nest sites have probably increased since the construction of the reservoirs. It remains the most common species of duck in the Peak District.

Only two pairs were found to be breeding in the Peak District during the survey in 1990 compared to 23 pairs in 2004. Therefore, the area has seen a substantial increase in population over that period.

6.2.4 Hen Harrier

Hen Harrier is a Red Listed Species of conservation concern due to the historical decline in breeding population. The species was recorded at three locations within the study area (Map 3a,b). A male was present during the first visit in the vicinity of Ronkesley Moor north of Derwent Reservoir and two records exist of a male and female that may well have constituted a pair at Goyt's Moss on the Staffordshire moors, again during the first visit.

This species is confined in the breeding season to the north and west of Britain, the Isle of Man and Ireland and they are particularly widespread in Scotland. The last nest in Derbyshire is reported to have been in the late 1800's (Frost 1978). It was not until after 1963 that Hen Harriers became an annual occurrence in the Peak District. New areas have been colonised since 1972 (Gibbon et al 1993) and the first breeding attempt in the Peak District was in 1976 (Hornbuckle and Herringshaw 1985). Hen Harrier successfully bred in the Peak District in 1997 and again attempted to breed in 2002-3.

No data was collected during the survey in 1990 because of the Hen Harriers absence from the area. The species is however attempting to colonise the Peak District and whilst there are an abundance of prime nesting habitats in the study area, there still remains little breeding success.

6.2.5 Buzzard

Buzzard was recorded in 18 km² squares of which two were on the Staffordshire moors (Map 3a,b). Two pairs were confirmed possible breeding.

This species was reduced to a relict distribution in the west of England, Wales and Scotland through persecution up to the early 20th century (Gibbons et al 1993). Since then, a gradual colonisation of eastern counties has taken place and they are becoming an increasingly common resident in the lowlands of Derbyshire (Derbyshire Bird Report 2002). However, it still remains a somewhat scarce breeder in the Peak District.

Only one Buzzard was recorded during the survey in 1990 emphasising their apparent rarity in the region. However, the long-term trend of this species in the UK is +318%, therefore it is perhaps not surprising that the birds have become fairly common in the west and east of the Pennines, and we would expect the Buzzards to be more common in the Peak District as suitable habitat exists.

6.2.6 Kestrel

Kestrel is an Amber Listed Species of moderate conservation concern due to its recent breeding population decline and the conservation status of this species in a European context. The Kestrel is by far the most frequently encountered raptor in the study area and it is a widespread and common raptor throughout Britain except for the north west of Scotland and parts of Ireland, SW Wales and SW England.

Kestrels were observed at 120 locations within the study area and an estimated 89 pairs possibly nest on the moorlands however, only five nest sites were confirmed during the survey (Map 3a,b). The exact number of breeding pairs is difficult to establish as some registrations may account for birds previously recorded, as they are prone to hunting over large areas. The moorland crags provide this species with suitable nesting opportunities and without visiting all of these sites it is difficult to correctly census the breeding population.

64 kestrels were recorded during the survey in 1990 compared to a possible 89 pairs in 2004. This possible increase in population in the study area is in contrast to the long-term trend of –36% in the UK between 1970-2001.

6.2.7 Merlin

Merlin is an Amber Listed Species of medium conservation concern because of its historical decline in breeding population. 31 possible breeding pairs of this species were found in the study area, three of which were on the Staffordshire moors (Map 3a,b). However, from the survey only two nest sites were confirmed. Information supplied from the Raptor Watch Group confirmed the breeding of a further four pairs but the year was considered poor for Merlin. It should be noted that Merlins could be easily overlooked due to their quiet behaviour, especially during incubation.

There is no real evidence that proves that the Merlin has been anything other than a scarce or rare raptor. Writers have documented their 19th and 20th century rarity: Whitlock (1893) describes ‘a few pairs in the high peak’ and Frost (1978) estimated the Derbyshire population at under 5 pairs. It is however, quite possible that Merlin were overlooked especially during the 19th century and it seems likely that the true status of the Merlin was that they were thinly and widely distributed in the study area.

Seven breeding pairs of Merlin were found during the survey of the Peak District in 1990 together with eight unconfirmed breeders, although additional information supplied by raptor-watch groups revealed that this figure was perhaps only 45% of the true breeding population. For the 2004 survey, 31 possible territories were found in the study area, but only six pairs were confirmed. The data suggests a possible

increase in their population over that period that is in direct contrast to the significant decrease found by Sim et al (in press) for the South Pennines. Territories of this species are predominantly on heather moorland.

6.2.8 Peregrine

Peregrine is an Amber Listed Species of medium conservation concern due to its conservation status in a European context.
A possible 25 pairs of Peregrine were recorded during the survey (Map 3a,b). However, only five pairs were confirmed as breeding. This species nest on crags on the moorland edge, and their presence is easily detected by their persistent alarm calling when an observer or other perceived danger nears the nest. In spite of the area being rich in prime habitat for this species, Peregrine has, for at least the last hundred years, remained a rare breeding bird. Whitlock (1893) and Smith (1930-39) failed to give any evidence of breeding in Derbyshire or Staffordshire respectively, but considered it a former breeder. Frost (1978) told of the first record of breeding in the former county in 1919, thereafter the species remained heavily persecuted. It was perhaps not until the eighties that a painfully slow start to recovery began.

In 1990, seven pairs of Peregrine were found in the study area; three were confirmed breeding, compared to approximately 25 in 2004. This data shows a healthy increase in their population during that period that mirrors the significant increase reported by Sim et al (in press). No territories were found for this species on the Staffordshire moors. Peregrine nest on a variety of rock faces in the study area but these are often no more than small outcrops.

6.2.9 Red Grouse

A total of 5598 individual Red grouse were recorded during the survey (Map 4a-c). The species is synonymous with Heather (*Caluna vulgaris*) moorland, and whilst densities are highest in this habitat, populations also occur on blanket bog and especially on *Vaccinium* and *Eriophorum* heaths (Fig.1). Management of the moors appears to be the key to the species range and abundance over time. Yalden (1979) suggested that a combination of reduced management and keepering of the moors coupled with overgrazing by sheep has led to a contraction in range and a decrease in overall numbers. Numbers can vary significantly from year to year resulting from a variety of factors, in particular intestine parasites (gamekeeper pers. comment).

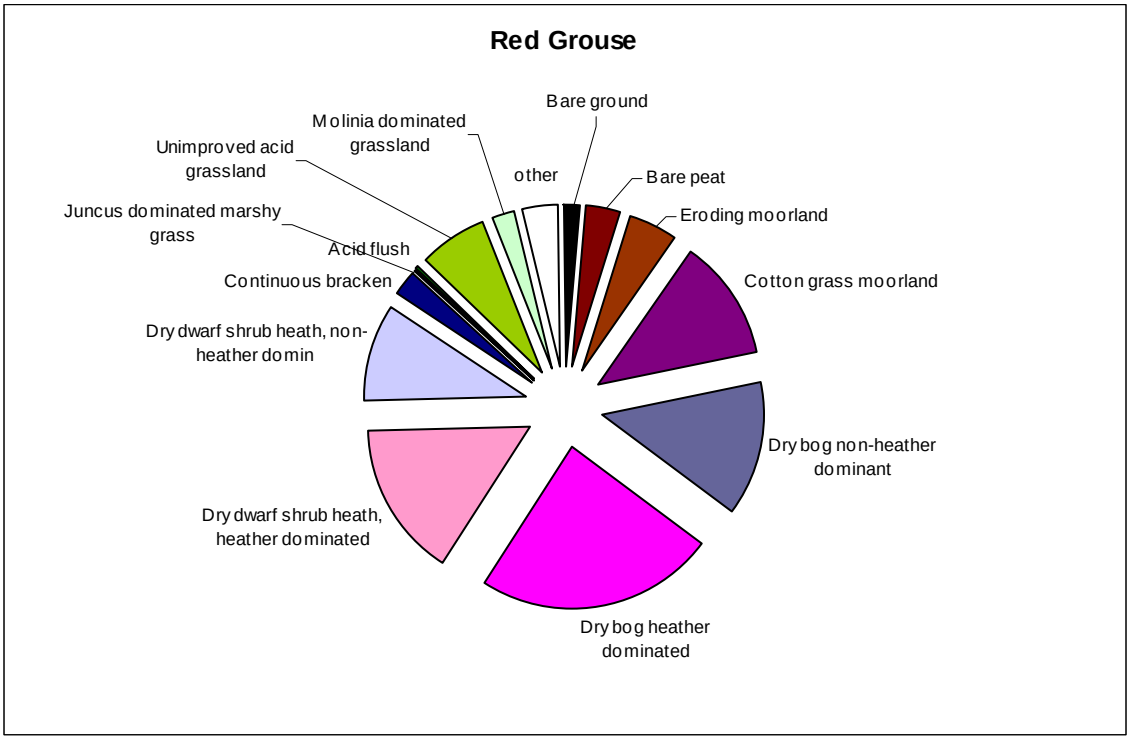

Figure 1: Distribution of Red Grouse across surveyed habitats (Habitat information for Figures 1-7 derived from ESA habitat maps and related to point locations of bird sightings during this survey.)

A total of 2337 individuals were recorded in the study area during the survey in 1990 compared to 5416 individuals in 2004 on overlapping survey squares (Tab. 3, Map App. III). The increase in population is dramatic and may reflect the intensive management that occurs on keepered estates. Burning is much more evident than a number of years ago and appears to be better managed as smaller burning strips create a more diverse mosaic and bring more benefit to a wider range of wildlife species.

Numbers of Red Grouse may have increased also due to the reduction of Carrion Crows on the moors. Although Red Grouse were found throughout the study area, the stronghold appears to be in the main moorland massif of the Dark Peak moorlands. Some of the intensively managed moors of the private estates were not surveyed, however a survey of selected squares by the RSPB in 2002 revealed that the Broomhead estate supported the highest densities of Red Grouse in the region and indeed the world. Densities are also very high on Ronkesley Moor (Map 4a). The average density in the study area was 12.16 individuals/km^2.

6.2.10 Pheasant

Seventy territorial birds were found in the study area and many were located high on the moors (Map 17a-c). Many more are present around the plantations of the area and on in-bye land.

Pheasants were first introduced into Great Britain by either the Normans or the Romans (Gibbons et al 1993); they now breed almost everywhere. There are large populations of wild Pheasants especially in the south and eastern parts of Britain and

in autumn numbers are greatly increased by the release of hand-reared birds (Gibbons et al 1993).

Although the Pheasant is capable of supporting itself in a "wild" state, around the fringe of the Peak District there is no doubt that the species is encouraged and managed to perhaps produce numbers that are artificially high.

No data was collected for this species during the survey in 1990, so no comparison can be given.

6.2.11 Oystercatcher

Two pairs of Oystercatcher were found in the study area in 2004 at Winscar Reservoir SE1502 and Upper Windledon Reservoir SE1501 (Map 6a-c). Oystercatchers are familiar birds of coastlines and along many river systems in northern Britain, nowadays however they occupy diverse inland habitats.

There has been a vast population and range expansion of this species in recent times and the population in the 1960's was between 19,000- 30,000 pairs (Gibbons et al 1993). The population reached an estimated 33,000-43,000 pairs by the mid 1980's (Stone et al 1997), thereafter the species continued to increase in both numbers and range.

In the study area, these birds nest on shingle banks of the upland reservoirs that result from reduced water levels in summer. No data was collected for this species during the survey in 1990, and because the remit of the 2004 survey did not include reservoirs, these records are purely incidental.

6.2.12 Little Ringed Plover

Only one breeding pair of Little Ringed Plovers was found in the study area in 2004 at Winscar Reservoir (SE1503, Map 6a). However, it is possible that many more pairs are present on the upland reservoirs but most were outside the study zone and beyond the reservoir enclosure wall (enclosed reservoirs were not surveyed). The survey was primarily concerned with moorland birds and did not concentrate on those that inhabit the shingle areas of reservoir edges.

The Little Ringed Plover is a Schedule 1 Species of the Wildlife and Countryside Act 1981. The arrival and subsequent spread of this species began at Tring in 1938, since which the national population has grown to a current figure in the region of 600-800 pairs (Gibbons et al 1993). Originally, Little Ringed Plovers frequented gravel banks on rivers and lake margins, but increasingly they have come to rely on man-made nesting areas and these have become their most favoured habitats in Britain (Gibbons et al 1993). Reservoirs, spoil heaps, waste dumps and sewage works have accounted for 91% of all records in recent times (Parrinder 1989). The reservoir habitat here is typical, and their occurrence on the moors is therefore incidental.

In 1990, two pairs of Little Ringed Plover bred at Blackstone Reservoir, which is outside of the 2004 study area. There is no change in the population of this species in the Peak District and occurrences therefore remain incidental.

6.2.13 Golden Plover

A total of 424 pairs of Golden plover were recorded in the study area (Map 5a-c), of which 27 were on the Staffordshire moors. The birds were common throughout the study area in areas above 400m and where the vegetation is dominated by Cottongrass *Eriophorum vaginatum*. Birds were also found nesting on areas of recently burnt *Caluna vulgaris* moorland.

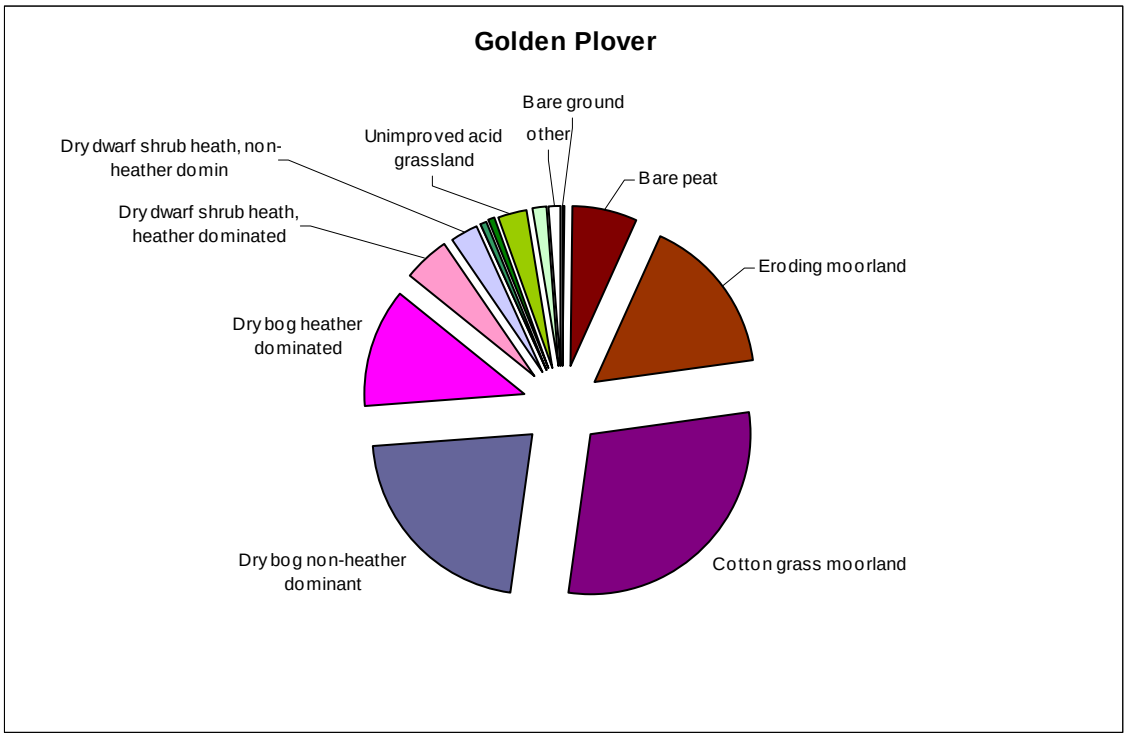

Figure 2: Distribution of Golden Plover across surveyed habitats (no annotation for habitats with less than 5% of total distribution.)

The Golden Plover is distributed throughout the mountains and moorlands of Britain but numbers and densities vary greatly throughout this range. The South Pennines population is of particular importance because it is probably the southernmost viable population in the world (Brown and Shepherd 1991). Furthermore, densities in parts of the Peak District are among the highest in Britain (Pearce Higgins pers. comm.). Golden Plover have long been known to breed 'not uncommonly on all the high moorlands' (Whitlock 1893); other writers also document similar observations. In contrast, they appear to have always been scarce on the Staffordshire moorlands (Smith 1930-38).

A total of 436 breeding pairs of Golden Plover were recorded during the survey in 1990, compared to 419 in 2004 in overlapping survey squares (Tab. 3, Map App. III). The data suggests that the population has remained stable and Sim et al (in press) also found no significant change in the South Pennine population between 1900-2000. Numbers and densities were greatest north of the Longdendale valley and this was

also the case in 1990. The habitat map indicates a paucity of records in the east of the Dark Peak where Heather dominates, therefore the species may have a westerly bias. The average density of this species in the study area was 1.90 pairs/km^2. The highest densities of this species were found mostly in areas of Cottongrass/Crowberry *Empetrum nigrum* blanket bog containing abundant Cloudberry *Rubus chamaemorus* (Fig. 2); e.g. the Snake Pass summit road SK0993 is one such area. A study by Percival and Smith (1992) revealed similar preferences; in the absence of Crowberry in the study areas, the most favoured habitat was Heather/Cottongrass moor.

6.2.14 Lapwing

The Lapwing is an Amber Listed Species of moderate conservation concern due to its recent breeding population decline. The Lapwing is also a Peak Park Biodiversity Action Plan species. 176 Pairs of Lapwing were found in the study area, 31 pairs of which were found on the Staffordshire moors (Map 7a-c).

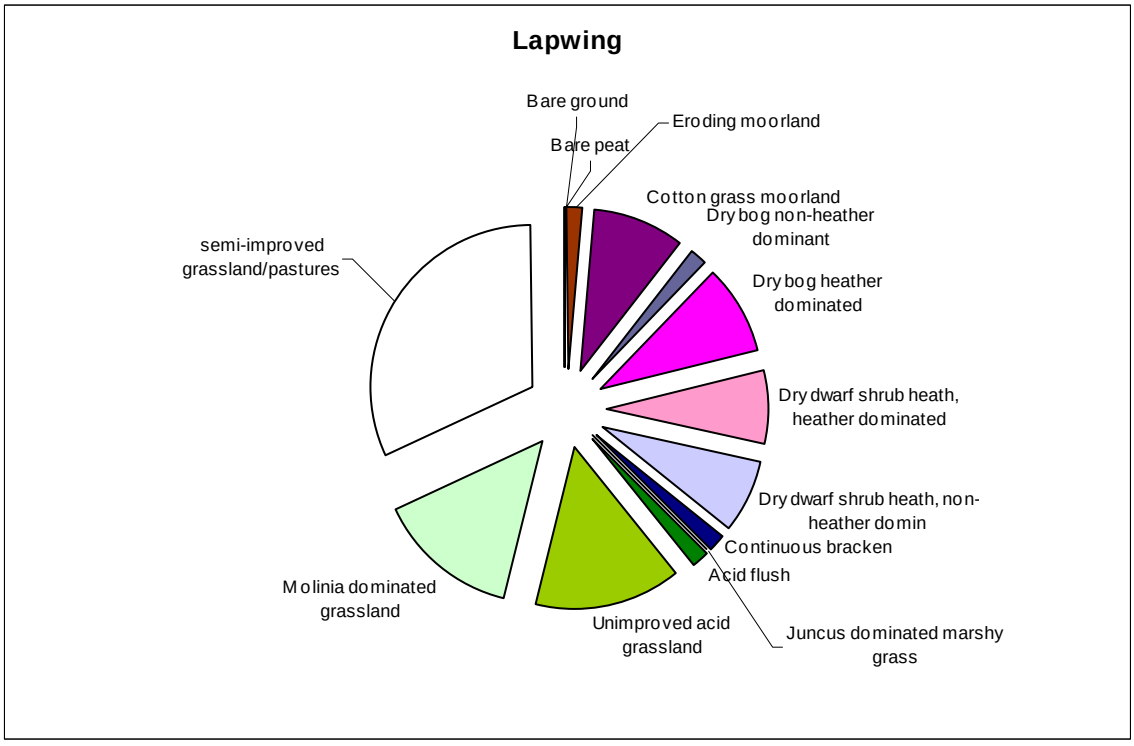

Figure 3: Distribution of Lapwing across surveyed habitats.

The Lapwing is found as a breeding bird throughout the British Isles in variable densities and in many different habitats. Moorland populations have a clear association with in-bye land and there is a marked paucity of records from the main core of the moorlands. An exception to this is where moorland areas dominated by *Molinia* have been burnt and sprayed (pers. obs.), where they occur in moderate numbers. There has been a marked decline in the breeding population in England in recent years. As Lapwings are fairly abundant on the hill farmland of upland areas the association with the moorland fringe is not unexpected. The status of this bird now is much different to the 19th century when Whitlock (1893) described it as being a very common resident.

A total of 61 pairs of Lapwing were recorded during the survey in 1990, compared to 131 in 2004 in overlapping squares (Tab. 3), which may reflect *Molinia* management in some areas or heather burns near wet areas (Fig.3). This doubling in species numbers is in contrast to the national long-term trend of this species of – 41% and also to a study conducted by Sim et al (in press) for the South Pennines. The average density of this species in the study area was 2.05 pairs/km^2. Interestingly, a survey of the Peak District including the inbye land conducted by the RSPB in 2002, gave a total of 1213 breeding pairs (Sugrue 2002).

6.2.15 Dunlin

Dunlin is an Amber Listed Species of moderate conservation concern due to the species population being confined to a small number of sites that face a greater threat from chance events. 67 pairs of Dunlin were located in the study area (Map 5a). None were found on the Staffordshire moors during this survey or previous surveys and according to Harrison et al (1982), Dunlin have never been found breeding in Staffordshire.

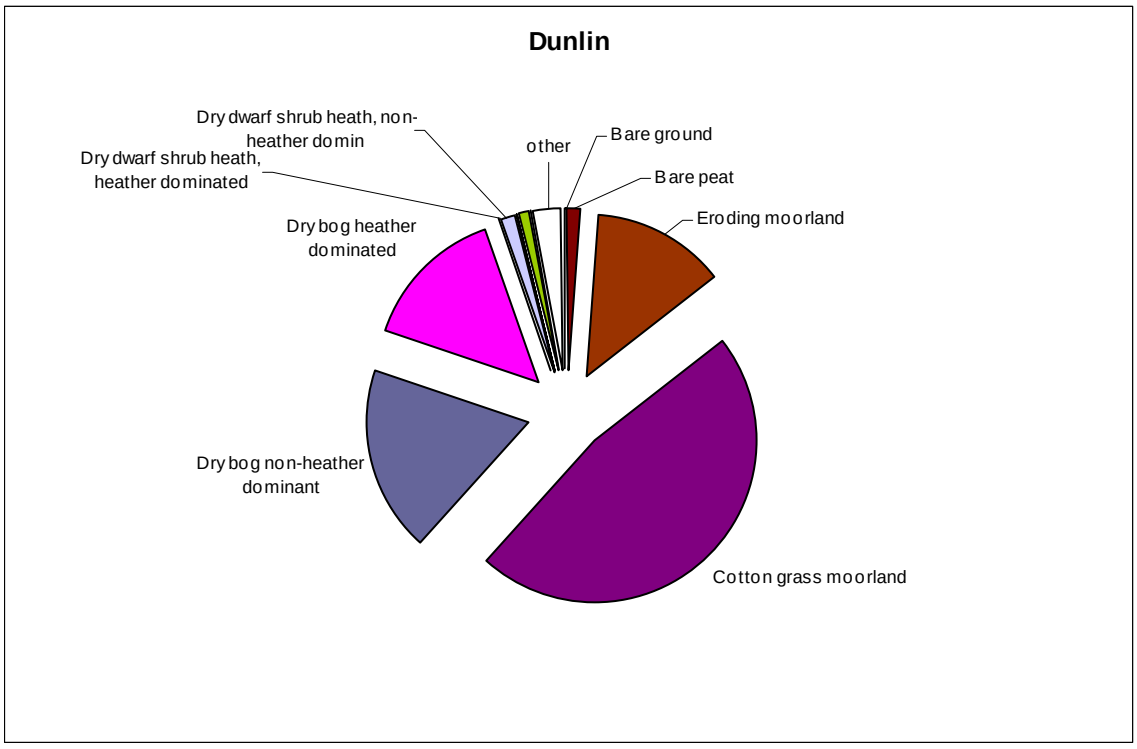

Figure 4: Distribution of Dunlin across surveyed habitats.

The breeding of Dunlin in Derbyshire was not proven until the 1930's (Frost 1978). However, Nelson (1907) reports breeding pairs 'sparingly over the Yorkshire moors'. Considering the dearth of documented evidence of breeding throughout the 20th century, it is perhaps safe to assume that the species has never been anything other than a scarce and localised breeder in the region. This is probably a consequence of the paucity of suitable breeding habitats in the study area. The distribution of the species does to a certain degree appear to match that of the Golden Plover, but the Dunlin has a much stronger preference for wet bogs with pool complexes.

A total of 91 pairs of Dunlin were recorded during the survey in 1990 compared to 67 in the same area in 2004 (Tab. 3). The data suggests that there has been a reduction in the breeding population of the Dunlin in the study area of 25% over the period. However, Sim et al (in press) found a significant decrease in the South Pennine population in excess of 50% between 1990 and 2000. This species is almost exclusively found on wet blanket bog (Fig.4). The highest densities of Dunlin were found on Outer Edge SK1897, Featherbed Moss SK0892 and SE4006, and Blackhill SE0704 all of which are extensive blanket bog areas. The Dunlin was absent from areas of eroding moorland and bare peat (see 9.2.5, Map 5d). The average density throughout the study area was 2.27 pairs/km^2 and the highest density was 4.2 pairs/km^2.

6.2.16 Snipe

The Snipe is an Amber Listed Species of moderate conservation concern due to its recent breeding population decline in the UK. 169 pairs of Snipe were found in the study area, (Map 7a-c) of which 29 were found on the Staffordshire moors. The total figure is derived from 'chipping' males holding territories, which are often in close proximity to one another. Therefore, the Brown and Shepherd methodology of evaluating breeding pairs was not applied to this species.

The Snipe breeds throughout Britain in both lowland and wetland areas and densities are thought to be higher in the former in spite of a national trend of –62%. The Snipe is however, a common nesting bird of the moors (pers. obs.) and densities are perhaps far greater than previous surveys suggest. Hornbuckle and Herringshaw (1985) state that 'the bird is probably the most numerous wader of the gritstone' a belief that this data fails to support. This may largely be a consequence of poor survey methodology for this species in upland areas (pers. comment). The Brown and Shepherd method of survey is not adequate for this species, therefore only a small percentage of the birds are detected. The species is cryptic in the extreme and when nesting, the birds are impossible to flush. Therefore, the only way to census this species, is to visit the site at dawn and dusk when the birds are engaged in aerial display flights, something that is impossible to do on such large tracts of moorland. The upland population of Snipe may well have become more important in recent years given the loss of a huge percentage of the lowland population (Smith 1983). The upland inbye land also holds important numbers of Snipe and a RSPB survey of mostly inbye land in the Peak District during 2002 revealed a population of 138 pairs (Sugrue 2002). Again, this is perhaps only a fraction of the total population on inbye land.

A total of 56 pairs of Snipe were recorded during the survey in 1990, compared to 135 in 2004 in the same area (Tab.3). Although, as previously mentioned, this is perhaps a small percentage of the breeding population, the data suggests a significant increase in their population since 1990. The birds are largely absent from the high plateaus of Kinder Scout, Bleaklow and Blackhill where *Juncus* is scarce or absent. The birds are thought to nest exclusively in areas of *Juncus*. However, on one occasion during the survey, a bird was observed in aerial song flight above heather moorland to which it was seen returning. Moscar Moor SK2287 and Derwent Moor SK2188 were found to be particularly good areas and densities here perhaps exceeded 3 pairs/km^2. Other

good areas for this species included squares SK2974 on the Eastern Moors and the area around and including SK0163 on the South-west Moors. The average density in the study area was 1.64 pairs/km^2.

6.2.17 Woodcock

The Woodcock is an Amber Listed Species of moderate conservation concern due to its considerable breeding population decline in the last 25 years.

One pair of Woodcock was recorded in the study area at a fairly high altitude in a narrow wooded clough (SK192898, Map 6a). This species is primarily a lowland species that can be found at high altitudes if suitable habitat exists – more or less extensive woodland (Gibbons et al 1993). Moist damp woodlands are favoured and the species is therefore a breeding resident in the plantations of the Peak District. These birds were recorded however, not from extensive woodland, but from a steep and narrow tree-clad clough; such records are not unusual on the Derbyshire moors. Furthermore, in Scotland, Woodcocks have been known to nest on open moor up to 500m away from woodland (pers. obs.).

No data was collected for this species during the survey in 1990, but the national population is thought to be stable. A national survey conducted in 2003 suggests a distribution similar to that found in the 1988-91 Breeding Birds Atlas.

6.2.18 Curlew

The Curlew is an Amber Listed Species of moderate conservation concern due to the British population's international importance during the breeding season. The Curlew is also a Peak Park BAP species. 514 pairs were found in the study area (Map 7a-c), of which 125 were recorded on the Staffordshire moors. Curlews have an obvious tendency towards the periphery of the moors and they are largely absent from the central massifs of the Kinder and Bleaklow areas. This close association with the inbye land of the moorlands is clearly evident and most territories are in relative close proximity. The Curlew does most of its foraging on inbye land as do many other moorland birds. An RSPB survey of mainly inbye land in the Peak District during 2002 revealed an estimated breeding population of Curlew in the region of 264 pairs (Sugrue 2002).

Curlew breed throughout much of Britain and it is now a common bird in the Peak District and indeed all upland areas. However, this has not always been the case, and Whitlock (1893) reported them as being found on all the high moors but they were not numerous anywhere else. Recent writers have documented the spread of the species away from the hills following a decline in the 60s and 70s, and Mather (1984) stated that he had little doubt that it is now more numerous than formerly.

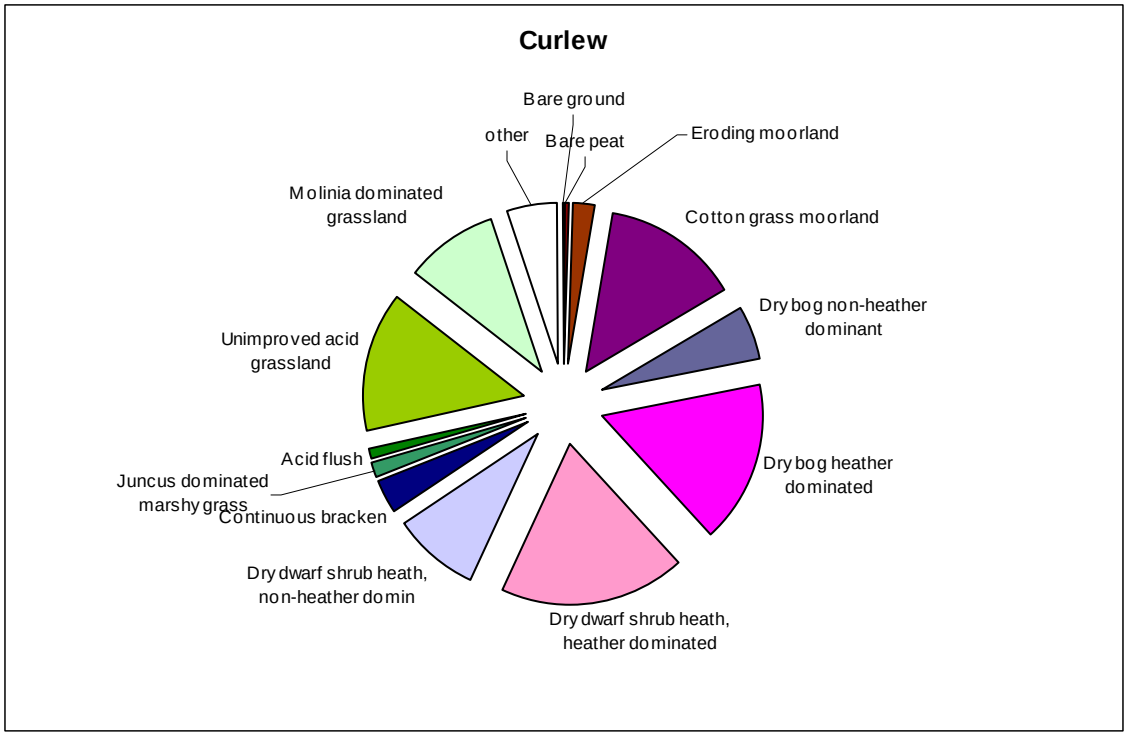

Figure 5: Distribution of Curlew across surveyed habitats.

A total of 259 pairs were recorded in the study area in 1990 compared to 453 pairs in 2004 in the same area (Tab. 3), the data suggests that the Curlews population has enjoyed a significant increase since 1990 that is similar to that found by Sim et al (in press). There appears to be no obvious preference of nesting habitat and the species is therefore evenly distributed throughout the study area (Fig. 5), the only requirement of habitat, is its proximity to inbye land. The average density of Curlew in 2004 was 1.54 pairs/km$^{2.}$

6.2.19 Redshank

The Redshank is an Amber Listed Species of moderate conservation concern due to its recent breeding population decline together with its conservation status in a European context. Six pairs of Redshank were found in the study area, none of which were on the Staffordshire moors.

There is little evidence to suggest that the Redshank has been anything other than a rare breeder in the Peak District or indeed the surrounding lowlands. Hornbuckle and Herringshaw (1985) were the first to report the breeding of perhaps 10 pairs in the uplands of the Sheffield area. It is difficult to imagine that the Redshank could be overlooked, as it is a prominent bird when displaying or noisily defending its territory and brood.

A total of 46 pairs were recorded during the Southern Pennines survey in 1990 but all except two were found north of the Longdendale valley; only seven pairs were found in the present 2004 study area. Therefore, no change is evident in the study area. However, a significant change has occurred to this species on the Staffordshire moors. Five pairs bred on these moors in 1985, but surveys in 1992, 1996 and 2004 failed to

record any breeding birds (McKnight et al 1996). Interestingly, a survey conducted by the RSPB in 2002 of the Peak District, including the inbye land, resulted in only three breeding pairs being recorded (Sugrue 2002).

7.20 Common Sandpiper

Although the Common Sandpiper is found throughout upland mainland Britain, the South Pennines hold the southern-most viable population in England. 28 pairs of this species were found in the study area, one of which was on the Staffordshire moors (Map 6a-c).

A survey of Common Sandpipers was conducted in the southern section of the South Pennines by Holland, Robson and Yalden (1982). They estimated a Peak District population of 190-210 pairs, 60% of which were associated with upland reservoirs. Apparently, they have always been common in the upland region; Whitlock (1993) stated that it nested freely in several localities in the Peak District.

14 pairs of Common Sandpipers were found along river systems in the study area during the survey in 1990, compared to 28 pairs in 2004. Sim et al (in press) found 11 pairs in the South Pennines in 2000 suggesting no change in their population in the study area. This is perhaps a fraction of the true population because upland reservoirs were not surveyed. All records are incidental and it is therefore inadvisable to estimate the species present day status in the Peak District from this census.

6.2.21 Cuckoo

The Cuckoo is an Amber Listed Species of medium conservation concern due to its breeding population decline during the last 25 years. It still however, remains a fairly common bird throughout Britain, especially in the south east of England. One of its preferred hosts is the Meadow Pipit, which is widespread and abundant on all types of moorland.

A total of 19 singing males were found in the study area, of which three were on the Staffordshire moors (Map 17a-c). It is not possible to give an estimate of the number of breeding pairs because it is not known how this relates to singing males. Most birds were found on the moorland fringe where a greater diversity of both habitats and hosts exist.

49 singing males were found in the study area during the survey in 1990 compared to 15 in 2004 in the same area (Tab.3). This shows a substantial decline in excess of 50% during that period, a trend that has occurred throughout the UK.

6.2.22 Short-eared Owl

The Short-eared Owl is an Amber Listed Species of moderate conservation concern due to the conservation status of the species in a European context. Birds were recorded in 28 km^2 squares in the study area (Map 3a,b), five of which were on the Staffordshire moors. It is difficult to estimate the number of breeding pairs, as one

cannot be sure whether several registrations account for one individual as Short-eared Owl are known to hunt over large areas. Nevertheless, analysis of registrations on maps perhaps suggests that the breeding population in the study area consists of at least 18 pairs, four of which were found on the Staffordshire moors.

Essentially a bird of open country, it is found breeding on areas of moorland, coastal dunes and salt marsh. Historically, the species appears to have never been abundant in the area. Whitlock (1893) reported that 'a few pairs breed annually on the moors of the Peak' and referred to a constant persecution of the species. Nelson (1907) suggested the bird to be more common but the moors were too remote for proper study. However, Frost (1979) also described them as a rare breeder and there is no documented evidence to suggest that it has been anything other than a rare breeder in the area (Brown and Shepherd 1991).

A total of five breeding pairs were found in the study area in 1990 compared to at least 18 pairs found in the same area in 2004 (Tab. 3). The data suggests a healthy increase in the breeding population and the species is widely distributed throughout the study area. However, this species is well known for considerable fluctuations of breeding pairs that can occur from one year to the next.

6.2.23 Skylark

The Skylark is a Red Listed Species of conservation concern due to its drastic breeding population decline in the UK together with its conservation status in a European context. The species is also a UK BAP species. 1238 individuals were recorded in the study area in 2004 (Map 8a-c).

The Skylark is a widespread breeding species in the study area, referred to as an abundant or common resident in the counties avifaunas. The species nest in a variety of habitats, however, densities appear to be greater on acid grassland. No attempt has been made to estimate the number of pairs for this species as the Brown and Shepherd methodology used during this survey was inadequate for monitoring Skylarks.

A total of 1153 individuals were recorded in the study area during the survey in 1990 compared to 1069 in 2004 in the same area (Tab. 3). However, no records were obtained for many squares in the main moorland massive in the Peak Park in 1990. It is difficult therefore, to calculate any change in the breeding population, if any has occurred. The birds are predominantly found nesting in acid grassland (Fig. 6). The average density of Skylarks in 2004 was 3.46 birds/km^2 compared to 6 birds/km^2 in 1990. The long-term trend of this species in the UK is –54%.

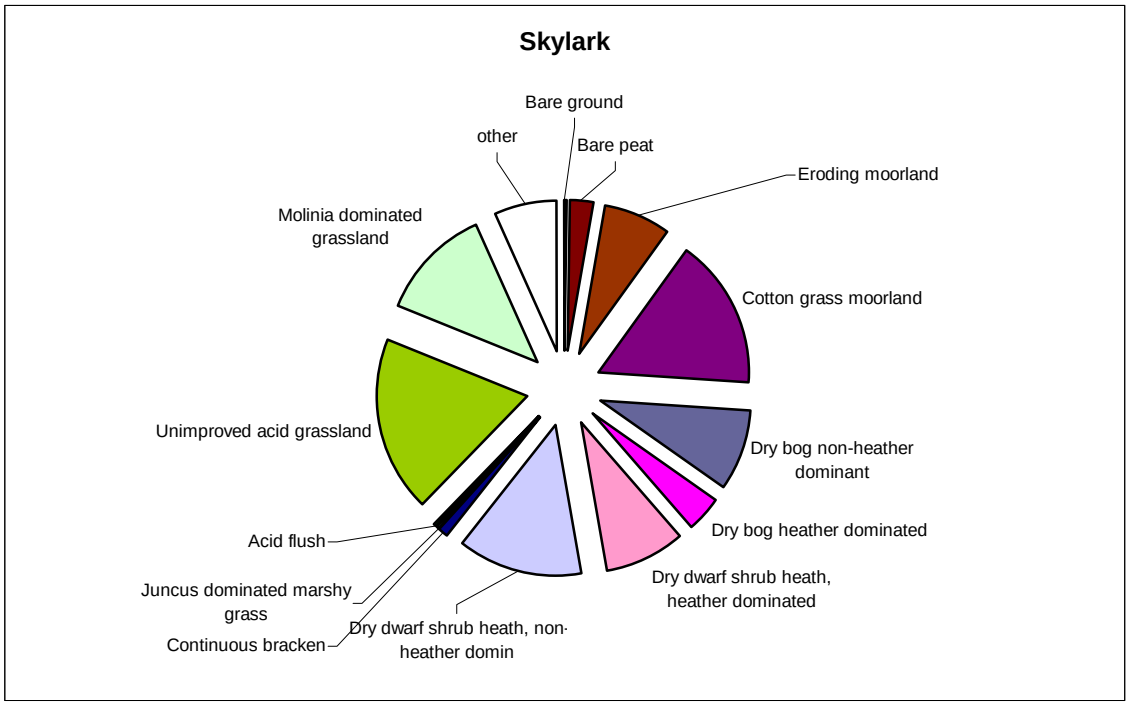

Figure 6: Distribution of Skylark across surveyed habitats.

6.2.24 Meadow Pipit

The Meadow Pipit is an Amber Listed Species of moderate conservation concern due to its recent population decline in the UK. 9231 individual birds were recorded in the study area. For the same reasons given for Skylark, no attempt has been made to estimate the breeding population.

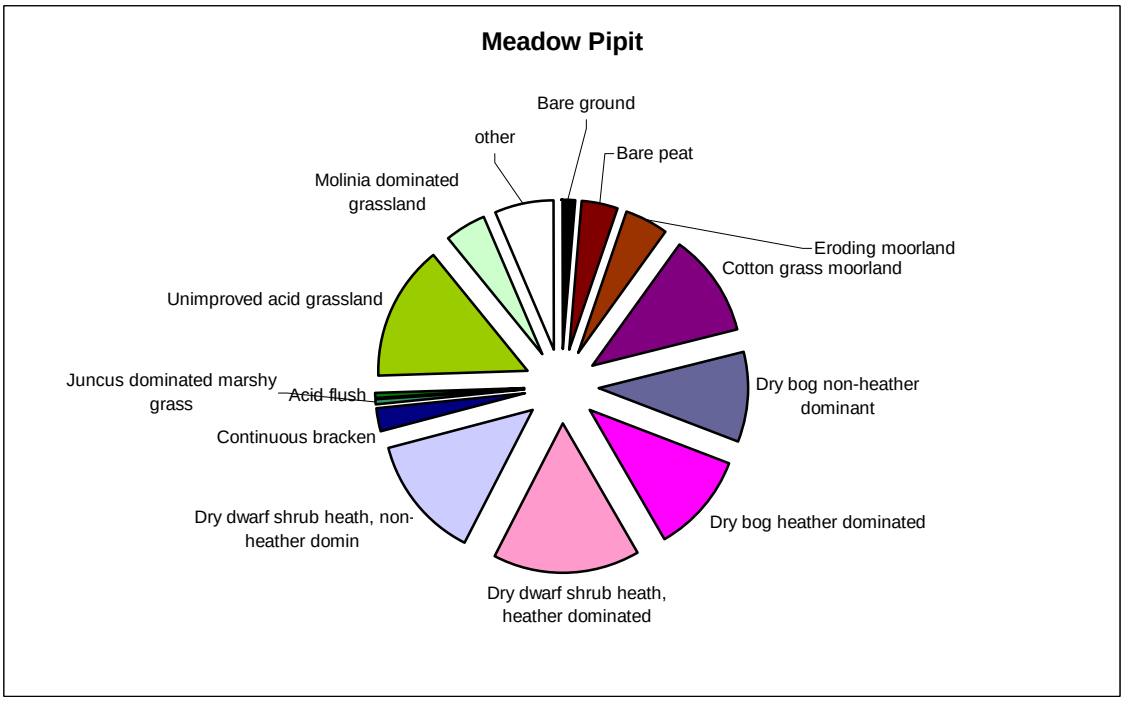

Figure 7: Distribution of Meadow Pipit across surveyed habitats.

The Meadow Pipit is by far the most common bird found in the study area, it appears to be ubiquitous in all habitats of the Peak District and is found in nearly all upland areas. The species appeared to be evenly distributed throughout the study area with no clear habitat preference evident. Variation in Meadow Pipit abundance is however evident, with some areas supporting much higher densities

A total of 10410 individual Meadow Pipits were recorded in the study area during the survey in 1990 compared to 8432 in 2004 in the same area (Tab. 3). The data therefore suggests a decrease in the population by 20%. Due to the nature of the recording methodology this data may not be absolutely accurate and the decline may be less apparent. The birds were found nesting on all moorland habitats in the study area (Fig. 7) with perhaps highest densities where a heather/grassland mosaic with tall rushes exists (Pearce-Higgins & Grant 2002). The average density in 2004 was 16.88 birds/km^2 compared to 16.7 birds/km^2 in 1990. The long-term trend of this species in the UK between 1997-2001, is –31%.

7.25 Grey Wagtail

Grey Wagtail is an Amber Listed Species of moderate conservation concern due to their decline in breeding population in the last 25 years. 48 pairs of the species were found in the study area, seven of which were on the Staffordshire moors (Map 10a-c).

The Grey Wagtail is widely distributed in mainland Britain, preferring fast-flowing watercourses bordered by broad-leaved trees, where there are rocks, riffles and shingle. Hence, it is more numerous in upland Britain than the lowlands. Densities recorded during moorland bird surveys are thought to be consistently low (Brown and Shepherd 1992), as many birds breed just beyond the moorland fringe.

A total of 26 pairs of Grey Wagtail were recorded in the study area during the survey in 1990 compared to 46 pairs in the same area in 2004 (Tab. 3). The breeding population of this species has therefore increased in the study area by almost 100%.

6.2.26 Dipper

Dippers are thinly distributed in the study area where they inhabit the fast flowing upland streams and rivers. 22 pairs of the species were found in the study area (Map 10a-c), none of which were on the Staffordshire moors. Many pairs in the area will have gone unrecorded largely because land surrounding the larger rivers likely to hold Dippers are partly afforested and the rivers therefore fell outside the survey area.

Dippers are found throughout mainland upland Britain and there has been no significant change in their numbers or distribution in the UK until the 68-72 atlas, other than local declines resulting from industrialisation and pollution (Holloway 1996). The species is believed to be very vulnerable to the acidification of upland watercourses that results in the loss of invertebrates and fish communities (Ormerod and Tyler 1987).

A total of 12 pairs of Dipper were found in the study area in 1990 compared to 21 in 2004, a decrease in the breeding population by almost 100%. The national long-term trend of this species is –13% and Sim et al (in press) also found a significant decrease in the population in the South Pennines during a study in 2000.

6.2.27 Wren

A total of 1218 pairs of Wren were found in the study area with the exception of the Meadow Pipit, it is the most common species found on the moors (Map 11a-c). The Wren is in fact one of the most widespread and abundant species throughout Britain. They nest at sea level on salt marsh and also near the summits of high mountains. Winter temperature is the most important determinant of breeding numbers the following summer (Gibbons et al 1993) and the succession of mild winters in recent times have given rise to their present abundance.

They are numerous on heather moorland and most territories can be found in cloughs, especially along stream sides where vegetation is dense. They are not absent from the higher ground but are more thinly distributed, occurring where dwarf shrubs dominate.

Unfortunately, no data was collected for Wren during the survey in 1990.

6.2.28 Redstart

Redstart is an Amber Listed Species of moderate conservation concern due to its conservation status in a European context. 16 pairs of this species were found primarily in clough woodlands in the study area in 2004 (Map12a-c).

Redstarts are woodland birds and although their distribution is widespread they are mostly restricted to the uplands and are uncommon or absent from the lowlands (Gibbons et al 1993). There appears to be some ambiguity and conflict between studies regarding their population change in the last 25 years and the implications are that they are increasing in those parts of their range where they are more abundant, but decreasing at the periphery of their range, i.e. the lowlands.

The species is fairly common in the plantations and woodlands adjoining the survey area (pers. comment) and only a fraction of the true population have been found recorded. The records relate to the remnant clough woodlands within the survey area which often form a valuable mosaic to the uplands. The population of this species in the cloughs may well be more as the Brown and Shepherd method of survey is designed primarily for upland waders. Therefore, these records are perhaps incidental registrations.

No data was collected for this species during the survey in 1990.

6.2.29 Whinchat

The Whinchat is a relatively common summer visitor to the moors where suitable habitat exists. They generally favour the bracken covered lower slopes of the moorland fringe where they can be easily detected by their loud characteristic song that is delivered from a prominent perch. 103 pairs of the species were found in the study area, six of which were on the Staffordshire moors (Map 12a-c).

The Whinchats distribution has changed somewhat during the 20th century. They once bred in a variety of open habitats, from dunes and salt marshes at the coast to inland heaths and moors. Whitlock (1893) described them as being 'an abundant visitor to Derbyshire, gradually decreasing in abundance as the hills are approached'. Today, the Whinchat has almost vanished as a breeding bird from the lowlands of the UK and as the species has declined in these areas, the upland population has increased in importance.

During the 1990 survey, 59 pairs were found in the study area, compared to 97 pairs in the same area in 2004 (Tab. 3). This is an increase in the breeding population of more than 60%. Sim et al (in press) also found a significant increase in the South Pennine population between 1990 and 2000. The species was at its most abundant near the A57 east of Ladybower Reservoir (SK2188). The distribution of the species in the overall area has changed somewhat and there is a significant increase in numbers. In the study area, the birds nest exclusively in bracken on the lower slopes of the moors. The average density in the study area was 1.48 pairs/km^2.

6.2.30 Stonechat

Stonechat is an Amber Listed Species of moderate conservation concern due to the conservation status of this species in a European context. 91 pairs of the species were found in the study area during the survey in 2004 (Map 12a-c).

Stonechats are birds associated with coastal gorse, upland heather and lowland heath and their distribution in Britain has a somewhat westerly bias. Historically, Stonechat has been absent as a breeding bird only residing on the islands at the extremes of Britain at the end of the 19th century and its population was considered stable throughout that period in spite of accelerating agricultural changes (Holloway 1996). A slow decline began during the early part of the 20th century particularly in counties that experienced the greatest agricultural change. The species suffered dramatically from the severe winters of the 1940s and this coincided with the war effort to plough up more agricultural land (Holloway 1996). Since that time the decline has continued and Gibbons et al (1993) describe a dramatic retreat from eastern Britain since the first atlas in 1972. Interestingly, the 1992 atlas shows their virtual absence in the Peak District. Only 3 pairs were recorded during the survey in 1990 (although not on overlapping squares with the 2004 data, see Map App. III), which indicates a dramatic increase in numbers in the Peak District. The short-term trend for this species since 1994 is an increase in the UK population by 153%. Sim et al (in press) believe this large and widespread increase in Stonechat numbers is likely to reflect the recent series of mild winters.

Stonechats were evenly distributed throughout the study area with densities greater at three locations, Goyt's Moss (SK0273), Arnfield/Swineshaw Moors (SK0299) and Burbage Moor (SK2681). The habitat preferences for this species are similar to that of Whinchats; they are often found nesting in the vicinity of Bracken, but at higher altitudes. The average density of this species in the study area was 1.31 pairs /km^2.

6.2.31 Northern Wheatear

128 individuals were recorded during the two visits in 2004. However, only 51 pairs are believed to have bred in the study area (Map 12a-c). The number of breeding pairs has been derived from the number of territorial pairs present during the first visit and additional birds present during the second visit. This method of evaluating the correct number of breeding pairs has been adopted for this survey as passage migrants mostly account for the individuals present during the first visit. During the 1990 survey, 164 pairs were recorded on the first visit and 126 pairs on the second visit, therefore the final data (111 pairs) produced by the Brown and Shepherd report is most likely the true figure of breeding pairs for 1990.

The Wheatear is perhaps one of the most characteristic birds of the uplands, inhabiting the whole of the upland area. Whitlock (1893) suggested that the Wheatear was not numerous in the High Peak, whilst later county avifaunas suggested an increase in this species on the gritstone moors and it was considered common in the upland district (Frost 1978).

During the 1990 survey, 109 pairs were found in the study area, compared to 45 pairs in the same area in 2004 (Tab.3), a significant decline of more than 50%. Sim et al (in press) also found a significant decrease in the South Pennine population between 1990 and 2000 of almost 50%. Interestingly, a survey of the Staffordshire moors in 1992 (Mc Knight et al 1996) produced an estimated 96 pairs. These figures could however, be incorrect if passage migrants had previously been recorded as breeding birds. This species is not considered to be in decline and affords no conservation status listing. The birds are often associated with rocky areas of moorland. The average density of Wheatear in the study area in 2004 was 1.21 pairs/km^2.

6.2.32 Ring Ouzel

Ring Ouzel is a Red Listed Species of conservation concern due to its serious breeding population and range decline over the last 25 years. 83 pairs of the species were found in the study area, three pairs of which were on the Staffordshire moors (Map 13a,b).

Throughout its range the Ring Ouzel is a bird exclusively of mountains and moorland, where the species inhabits cliffs, crags and cloughs, and bracken areas are particularly favoured. Whitlock (1893) regarded the bird as a being 'especially numerous on the moorlands of the High Peak' whilst Nelson (1907) assesses it as 'locally distributed'. The range of this species was thought to have 'undoubtedly contracted by the time of the Sheffield Atlas' (Hornbuckle and Herringshawn 1985) whilst Mather (1984) felt that it was doubtful that the status had changed during this period. The true historical

status of the bird is therefore in doubt, probably as a consequence of the species inhabiting areas rarely visited by observers.

Within the study area the Ring Ouzel has a strong association with cloughs, outcrops and Bracken areas, and an important feature of any nesting area is the presence of short grazed grass for foraging (pers. obs.). During the 1990 survey, 98 pairs were found in the study area compared to 83 in 2004 in the same area (Tab. 3), indicating a slight decline. However, two to three pairs are known to breed on an estate that was not surveyed in 2004. This species was most abundant on the Derwent and Burbage edges. The average density of Ring Ouzel in the study area was 1.25 pairs/km^2. In contrats, Sim et al (in press) in a study in 2000 found a significant decrease in the South Pennine population of 63%.

6.2.33 Mistle Thrush

Mistle Thrush is an Amber Listed Species of moderate conservation concern due to the declining breeding population over the last 25 years. 41 pairs of the species were found in the study area during the survey in 2004 (Map 13a,b).

A bird not usually associated with moorland, the Mistle thrush is a species of open woodland and most territories contain mature trees, which provide song posts and nest sites, and extensive areas of grassland where the birds can forage (Cramp and Perrins 1994). Moorland clough woodland therefore provides an ideal habitat. The Mistle Thrush often replaces its relative the Ring ouzel in cloughs where natural succession occurs and tree cover becomes established (pers. obs.).

The Mistle Thrush has a scattered occurrence within the study area. No data was collected for the Mistle Thrush during the survey in 1990.

6.2.34 Willow Warbler

Willow Warbler is an Amber Listed Species of moderate conservation concern due its considerable breeding population decline in the last 25 years. It is a species found in young woods, scrub and woodland edges (Gibbons et al 1993), therefore regenerating moorland clough woodlands perhaps provide prime habitat.

A total of 182 singing male Willow Warblers were found in the study area, excluding plantations where many more were present (Map 13a,b). During the survey, numbers of this species appeared very high and indeed the breeding population appeared to have more than recovered from the previous year, when numbers in the region were very low (pers. obs.). Lone trees at high altitudes attracted singing males, on a few occasions birds were observed singing from heather and bracken, behaviour not witnessed by surveyors previously.

No data was collected for this species during the previous survey in 1990.

6.2.35 Carrion Crow

The Carrion Crow is one of the most widespread species of birds in England; nevertheless it has perhaps become a rare breeder but frequent visitor to the Peak District. 13 Carrion Crows were found in 12 grid squares of the study area of which one individual was on the Staffordshire moors. Three pairs were confirmed as breeding in the area (Map 14a-c).

The Carrion crow is an important predator of ground nesting birds, therefore it has been heavily persecuted throughout history. Whitlock (1893) stated that 'though subject to incessant persecution, it still manages to exist in most parts of Derbyshire'.

There has been a substantial reduction in numbers since 1990. In 1990, 117 individuals were recorded in the study area, compared to 11 individuals in 2004 in the same area (Tab. 3). This species was more numerous in the area in 2002 during a RSPB survey of selected squares (pers. comment). The data collected may be indicative of a more efficient persecution of this species or a potential disease.

6.2.36 Raven

During the survey in 2004, hunting Ravens were a common site throughout the area. 146 registrations were made and the estimated population is in the region of 65 pairs (Map 14a-c). However, only 18 pairs were confirmed as breeding in the study area, because all likely nest sites were not visited.

At the time of the 1990 survey of the South Pennines, Ravens were only very rare vagrants to the area. In the early part of the 19th century the species bred in almost every county in Britain. Thereafter, the Raven withdrew from lowland haunts and their breeding ranged gradually moved to the rugged coasts and mountain districts of the north and west. Fluctuations in numbers and distribution of this species have occurred throughout the 20th century (Holloway 1996).

Colonisation of the Peak District moors began shortly after the 1990 survey when Brown and Shepherd stated that 'there seems little immediate prospect of the return of this species'. There has been a gradual increase in their population since the first confirmed breeding in the area in 1992 (Derbyshire Bird Report). The species appears to be less abundant on the Staffordshire moors than elsewhere in the study area. The birds nest on crags throughout the study area.

6.2.37 Linnet

Linnet is a Red Listed Species of conservation concern due to its serious decline in breeding population in the last 25 years. The bird is also a UK BAP species. 144 pairs of Linnet were found in the study area during the survey in 2004 (Map 15a-c). However, the population may well be more; strictly adhering to the Brown and Shepherd methodology for this species may have resulted in an underestimation of the breeding population, as linnets nest in loose colonies (pers. obs.).

The Linnets presence on the moors is most interesting because like its close relative the Twite, its main food source is weed seeds. In the case of the linnet, their preference is for the seeds of *Cruciferae* and *Chenopodiaciae,* notably Fat hen and Chickweed which are arable weeds (Gibbons et al 1993). The importance of invertebrates in their nestling diet is unclear but it is thought that they take fewer invertebrates than any other west Palaearctic finch apart from Crossbills *Loxia* or Twite *C. flavirostris* (Cramp and Perrins 1994). The inbye hay meadows are therefore very important to the upland population of Linnet, providing a food source not only throughout the breeding season, but also for the post breeding flocks.

Unfortunately, no data was collected for this species during the survey of the South Pennines in 1990 therefore, a direct correlation with the decline of the Twite in the same study area cannot be made. The species has nevertheless declined considerably in the UK and the long-term trend between 1970-2001 is –51%. However, the species is not now thought to be in decline. The habitat preference for this species on the moors is where bracken dominates. The average density of the linnet in the study area was 1.76 pairs/km^2.

6.2.38 Twite

The Twite is a Red Data Book Species (Batten et al 1990) and a Red Listed Species of conservation concern due to its historical decline in breeding population in the UK; the species is also a Peak Park BAP species. 24 individuals or at least 11 pairs of Twite were found in the study area, one pair was found on the Staffordshire Moors (Map 15a,c).

The Twite is a fascinating species whose disjunct world distribution has two centres separated by over 2500km; European birds becoming isolated following the last glaciation (Cramp and Perrins 1994). The species is therefore considered to breed in internationally important numbers here in Britain (McGhie et al 1994). Twite have disappeared from many former haunts throughout the 20th century including Scotland, Lancashire, Cumbria, and Britain's southerly breeding population in Devon. However, the population in the South Pennines has changed little between 1972 and 1990 (Gibbons et al 1993).

In 1990, 131 pairs of Twite were found in the study area during the survey in 1990, compared to 10 pairs in the same area in 2004 (Tab.3). The species was found at three localities within the study area: Wessenden and Meltham moors (SE0609), Edale (SK0985) and the Combs Moss area (SK0678). Twite breed in colonies, therefore it is unlikely that these small numbers reflect the true breeding population, nevertheless, the decline in the breeding population has been catastrophic. Anecdotal evidence does exist of a substantially greater population in Staffordshire than the data suggest. Furthermore, small populations were known at two other localities in the northeast of the study area in 2003: Winscar (SE1503) and Black Hill (SE0805) (pers. obs.).

The decline of the British breeding population has been attributed to the deterioration in quality and quantity of the inbye land, in particular the seed rich hay meadows in which the species feed in summer (Brown et al 1997). However, the explanation is perhaps more complex: a small English Nature study conducted in 2003 revealed that

the species preferred to feed in semi-improved pasture with a higher nutrient level resulting in an abundance of sorrel (*Rumex acetosa*) (Middleton 2003). The fact remains that this species has vanished from areas that appear to provide prime habitat (pers. obs.). This species has a strong preference for nesting in bracken and there are in fact many bracken-covered areas of moorland adjacent to seed rich hay meadows in the study area but these no longer support breeding Twite.

6.2.39 Reed Bunting

The Reed Bunting is a Red Listed Species of conservation concern due to its serious recent breeding population decline; as a consequence, it is a UK BAP Species. 173 pairs of the species were found in the study area, of which 25 were on the Staffordshire moors (Map 15a-c).

Although typically associated with marshland and wetlands, Reed Buntings breed in a great diversity of habitats, including forestry plantations and in rape fields. Sharrock (1972) referred to the 20th century expansion in the types of habitat used by this species but it still remains generally absent from higher upland areas (Gibbon et al 1993). The overall widespread pattern of Reed Bunting distribution revealed by the *88-91 Atlas* remained little changed from that of the *68-72 Atlas,* however, around the mid seventies when the species was at a relatively high stable level, a decline began that resulted in a decrease in the breeding population of more than 50% (Gibbon et al 1993).

During the 1990 survey, 16 pairs of Reed Bunting were found in the study area, compared to 143 in the same area in 2004 (Tab.3). The data reveals a considerable colonisation of the area by this species since 1990 and an increase in the population in excess of +700%. This is indeed in direct contrast to the long-term trend of –51% and the short-term trend from 1994-2002 shows an increase of 3%.

The Reed Buntings found during the survey were always associated with areas of *Juncus*, the map reveals that they are largely absent from the central massive of the Peak District around the Bleaklow area where *Juncus* is sparse or absent. The average density of this species in the study area was 1.47 pairs/km^2.

6.3 Summary statistics

Table 2 shows for all moorland species, the number of pairs, their occupancy and their average density per km2 square for the whole survey area (Section 3 Moorlands). For Red Grouse, Meadow Pipit and Skylark counts of individuals are presented

Table 2: Number of recorded pairs and average density of species in occupied squares for 2004 in the whole study area

species	**no of pairs**	**no of km² squares**	**mean density** (pairs/occ. km^2)
Canada Goose	59	39	1.51
Teal	3	3	1.00
Mallard	23	20	1.15
Hen Harrier	3	2	1.50
Buzzard[a]	18(2)	18	1.00
Kestrel[a]	89(5)	81	1.10
Merlin[a]	31(6)	30	1.03
Peregrine[a]	25(5)	25	1.00
Red Grouse[b]	5598	460	12.16
Pheasant	70	55	1.27
Oystercatcher	2	2	1.00
Little R Plover	1	1	1.00
Golden Plover	424	223	1.90
Lapwing	176	85	2.06
Dunlin	67	33	2.27
Snipe	169	101	1.67
Woodcock	1	1	1.00
Curlew	514	333	1.54
Redshank	6	4	1.50
Com Sandpiper	28	20	1.40
Cuckoo	19	18	1.06
Short-eared Owl[a]	28(18)	28	1.00
Skylark[b]	1238	356	3.46
Meadow Pipit[b]	9231	551	16.75
Grey Wagtail	48	45	1.12
Dipper	22	21	1.05
Wren	1219	359	3.40
Redstart	16	14	1.14
Whinchat	103	69	1.48
Stonechat	91	70	1.31
Wheatear	51	42	1.21
Ring Ouzel	83	65	1.25
Mistle Thrush	41	36	1.03
Willow Warbler	182	92	1.98
Carrion Crow	13	12	1.08
Raven	18	18	1.00
Linnet	144	82	1.76
Twite	11	8	1.38
Reed Bunting	173	116	1.47

[a] sightings (in brackets confirmed breeding pairs)
[b] individuals, not pairs

An overview of change in population size of species from 1990-2004 is presented in Table 3 (detailed accounts in section 6.2). Here only totals from 489 km^2 squares surveyed in both periods 1990 and 2004 are presented, for which digital data were available. For a map of comparison km^2 grid squares, see Map App. III.

Table 3: Comparison of 1990 and 2004 data based on 489 km² squares surveyed in both periods (grey marks decline)

species	breeding pairs		occupied km^2 squares		percentage change	
	1990[a]	2004[a]	1990[a]	2004[a]	abundance	occupancy
Buzzard[b]	**1**	**18(2)**	1	18	1700%	1700%
Canada Goose	**3**	**57**	4	37	1800%	825%
Carrion Crow	**117**	**11**	67	11	-91%	-84%
Common Sandpiper[d]	**14**	**28**	10	20	100%	100%
Cuckoo	**49**	**15**	48	14	-69%	-71%
Curlew	**259**	**453**	189	288	75%	52%
Dipper	**12**	**21**	12	20	75%	67%
Dunlin	**91**	**67**	54	33	-26%	-39%
Golden Plover	**436**	**419**	225	218	-4%	-3%
Goshawk[b]	**3**	**2**	3	2	-33%	-33%
Grey Wagtail	**26**	**46**	24	41	77%	71%
Kestrel[b]	**68**	**84(5)**	68	77	24%	13%
Lapwing	**61**	**131**	44	65	115%	48%
Meadow Pipit[c]	**10410**	**8432**	476	472	-19%	-1%
Merlin[b]	**21(9)**	**31(6)**	21	30	48(50)%	43%
Peregrine[b]	**7(3)**	**25(5)**	7	25	286(40)%	257%
Red Grouse[c]	**2337**	**5416**	324	422	132%	30%
Redshank	**9**	**6**	8	4	-33%	-50%
Reed Bunting	**16**	**143**	13	91	794%	600%
Ring Ouzel	**98**	**83**	69	65	-15%	-6%
Short-eared Owl[b]	**18(5)**	**27(18)**	18	27	50(260)%	50%
Skylark[c]	**1153**	**1069**	311	306	-7%	-2%
Snipe	**56**	**135**	42	82	141%	95%
Sparrowhawk[b]	**14**	**13**	14	13	-7%	-7%
Stonechat		**83**		64		
Twite	**131**	**10**	88	7	-92%	-92%
Wheatear	**109**	**45**	65	37	-59%	-43%
Whinchat	**59**	**97**	37	64	64%	73%

[a] data for those 489 km^2 grid squares surveyed in both periods

[b] raptor sightings (in brackets confirmed breeding pairs)

[c] number of individuals, not pairs (1990 counts in broad classes, 2004 actual counts, thus not directly comparable)

[d] indication of change not reliable, as species associated with reservoirs not included in surveys

Many species of national importance have remained in high densities, such as Golden Plover (see also Tab. 4), or have even increased in range and numbers such as Peregrine, Merlin and Short-eared Owl.

Densities of Red Grouse of the race *Lagopus lagopus scoticus* are found nowhere in the world in such abundance as on the eastern area of the Dark Peak and appear to have doubled over the past 14 years.

Furthermore, Raven has colonised the area since 1990 and Hen Harrier is perhaps attempting to colonise. Waders have also faired reasonably well. Curlew, Lapwing

and Snipe have all increased in numbers. Dunlins are slightly down in both range and numbers resulting potentially from loss of suitable habitat.

Regarding distribution changes, there is no real evidence to suggest that the status of Ring Ouzel has changed since 1990, whilst Whinchat, Stonechat, Reed Bunting and Dipper have all increased in both range and numbers. There is perhaps little change for both Skylark and Meadow Pipit, especially as these species were not recorded in the same detail as other species.

The declines are less evident but nonetheless very significant. Cuckoo and Wheatear are much reduced in 2004, and most notable, twite has suffered a catastrophic reduction in both range and numbers in 2004.

A more detailed discussion of these results for selected species is in 7.2.

7. DISCUSSION

7.1 National and international importance of breeding populations in the Peak District

The South Pennine Peak District National Park populations of moorland breeding birds have a very important regional, national and international significance. Many of these species have the most southerly breeding range within the UK and more importantly within the world and unlike other areas they are visually accessible to a vast number of people from the conurbations of Sheffield, Manchester and other towns. Additionally, Golden Plover is found in the study area in significantly high densities compared with other areas in the UK or indeed other parts of the world (Tab. 4).

Table 4: Ten important selected moorland species in relation to national totals

	number breeding pairs		
species	**Peak District[a]**	**Great Britain[b]**	**% of total**
Merlin[c]	31(6)	1,300	**2.38(0.46)**
Peregrine[c]	25(5)	1,185	**2.11(0.42)**
Golden Plover	424	22,600	**1.88**
Red Grouse	5598	250,000	**2.24**
Dunlin	67	9150	**0.73**
Curlew	514	33,000	**1.56**
Short-eared Owl[c]	28(18)	1,000	**2.80(1.80)**
Wheatear	51	55,000	**0.09**
Ring Ouzel	83	5,500	**1.51**
Twite	11	10,000	**0.11**

[a] data for whole 2004 survey area
[b] National figures obtained from Stone et al (1997), for twite see Langston et al (in press)
[c] raptor sightings (in brackets confirmed breeding pairs)

7.2 Long-term change in distribution and abundance of selected species

A very valuable source of information is derived from a detailed survey of a particular area of land, relating to a single species or a whole range of species. This information is even more important when it can be compared with previous surveys over the same area, using the same methodology and contains comparable species. The distribution and abundance of species from the 2004 Moors for the Future survey is therefore compared in this section with the Brown and Shepherd 1990 survey.

As with the Brown and Shepherd 1990 survey report, ten breeding species have been selected to identify and assess changes in distribution and abundance over time. These species are – Merlin, Peregrine, Red Grouse, Golden Plover, Dunlin, Curlew, Short-eared Owl, Wheatear, Ring Ouzel and Twite. Seven of these species are typical moorland breeding birds that very rarely breed on the bordering enclosed land. However, two species, Curlew and Wheatear, have an overlap of breeding habitat both on the moor and the enclosed land but are nevertheless included in the assessment.
Within this section there are comparisons with other surveys, as mentioned above, with the distribution change of each breeding species within km^2 grid squares, identification of areas of high densities, and evaluation with notes on reasons for possible change. Comparisons are based on those $489km^2$ squares that were surveyed in both periods 1990 and 2004 (Tab. 3, Map App.III).

7.2.1 Merlin

A total of 31 Merlin territories were located during 2004 with breeding in 30 km^2 squares. During the 1990 survey, 21 Merlin territories were found with breeding in 21 km^2 squares (Map 19). The distribution of Merlin therefore appears to have increased considerably over the intervening period.

The Merlin population of the South Pennines crashed during the 1950s and was paralleled with the decline of the Peregrine and Sparrowhawk; these declines are well documented and are associated with organochlorine poisoning. Only 4-5 territories were in use between 1978 and 1980 (Brown and Shepherd 1991), since then there has been a slow recovery of their population and distribution in the study area.

7.2.2 Peregrine

During the survey in 1990 the presence of breeding Peregrine occurred in 7 km^2 squares. In 2004 the survey revealed the presence of 25 pairs in the study area occupying 25 km^2 squares (Map 20).

During the time of the 1968-1972 Atlas, breeding Peregrine probably bred in only a single 10-kilometer square within the study area. Therefore, the dramatic increase in their population and distribution has followed the cessation of much of the pesticide usage originally responsible for their population crash.

7.2.3 Red Grouse

Red Grouse is most abundant on Heather moorland but the species is also found in other upland habitats, albeit in much lower numbers. The birds were found in 432 km^2 squares in 2004 compared to 334 in 1990 (Map 21a,c). Brown and Shepherd found little change in 1990 compared to the 1968-72 Atlas (Sharrock 1976). Yalden (1972) also surveyed the distribution of the Red Grouse in the Peak District National Park and found no significant change.

Numbers have increased significantly since 1990, which may have been a bad season. Furthermore, it is perhaps safe to suggest that 2004 was probably a good season. Nowhere in the world are Red Grouse found in more abundance than on the eastern Dark Peak and on some private estates it is not unusual to find breeding pairs in excess of 50 per km^2 (RUBS 2000).

The overall distribution of this species is directly correlated with the presence of Heather, and as the distribution on Map 4c clearly indicates, densities are much higher south of the Longdendale valley where many of the moors are managed specifically for this species.

7.2.4 Golden Plover

The Peak District is one of the few areas for which a continuous series of Golden Plover data has been collected. Yalden (1974) conducted a detailed survey of both distribution and abundance of Golden Plover in the Peak District National Park in 1970-73 and from this he estimated a total population of 380-400 pairs in thirteen 10-kilometer squares and 214 km² squares respectively. In 1990, Brown and Shepherd found 435 pairs in fourteen 10-kilometer squares and this indicated that there had been a spread of the species into the Eastern Moors.

Little change was evident between the distribution of Golden Plover at a 10-kilometer level in 1972 compared to 1990, and the same can be said for their presence or absence in the 10-kilometer squares in 2004. At a 1-kilometer level there is a slight difference in their distribution, and during the 1990 survey Golden Plover were found breeding in 225 km^2 squares compared to 218 km^2 squares in 2004 (Map 22, Tab. 3).

In 2004 the Golden Plover appeared to be less evenly distributed in the Dark Peak area, being found predominantly on the high ground where blanket bog is abundant. The maps 5a,d shows a marked concentration of the birds in these areas compared to 1990.

It is important to note that a part of the moors in the east of the study area were not surveyed in 2004 because of restricted access on the private estates. However, the high ground, mainly blanket bog, was surveyed from footpaths.

In summary, there is perhaps no real evidence to suggest a major change in the distribution or numbers of Golden Plover breeding in the Peak District since 1990, or indeed over the last 30 years.

7.2.5 Dunlin

The Dunlin distribution in the Peak District may have been in decline since the first Atlas in 1972. The species was recorded as breeding or probability breeding in 21 10km squares in 1968-72 (Sharrock 1976), compared to 17 in 1990 (Brown and Shepherd 1991). Although one has to take into consideration the fact that the older data was collected over more than one season, there is perhaps little evidence for any major change in the distribution of Dunlin during this period. However, at a 1-kilometer level between the surveys of 1990 and 2004 there has been a marked change in their distribution in the study area. Dunlin were found in 54 km^2 squares in 1990 compared to 33 km^2 squares in 2004.

Furthermore, the change in Dunlin distribution in the study area is considerable (Map 23). In 2004 the birds were noticeably absent from former haunts and the distribution map for this species reveals that the birds are now absent from the Bleaklow area. Loss of, and deterioration of suitable habitat may be the reason for their decline from this area (pers. comment).

Dunlin are much more difficult to census than Golden Plover therefore, the Brown and Shepherd methodology is perhaps a little inadequate for this species. Dunlin are extremely cryptic during the breeding season and the birds are easily overlooked if not engaged in territorial song. Many registrations are therefore chance findings and this means that any apparent change in both distribution and numbers should be treated with some caution.

7.2.6 Curlew

Curlew were confirmed or suspected of breeding in 189 moorland km^2 squares in 1990 compared to 288 in 2004 (Tab. 3). Numbers do indeed fluctuate year-to-year, and Brown and Shepherd (1991) considered 1990 to be a good season for Curlew. Nevertheless, an increase in numbers has occurred in the study area between the surveys and this demonstrates that the upward trend noted in the county avifaunas has continued.

The distribution of the Curlew has not changed much since 1990 (Map 24), the species is largely distributed around the periphery of the moors close to the inbye land where many more pairs breed (Map 7d). Curlew forage on inbye land therefore they rarely breed far from it. Other moorland birds, notably Golden Plover and Twite, share this behaviour. This must surely emphasise the importance of the inbye to many moorland birds because the two are inextricably linked.

Whilst the Curlew is largely absent from the central massifs of the Kinder and Bleaklow areas, the distribution change map shows an increase in records for this species in those areas in 2004. Strangely, there are a number of areas throughout the study area where Curlew was found to be absent during both surveys and there is no clear explanation for this.

7.2.7 Short-eared Owl

The Short-eared Owl is a species whose numbers and distribution change from year to year; therefore it is difficult to determine any long-term change in the study area. The species is also very secretive and many of the records for 2004 were of birds flushed from vegetation whilst surveying. This perhaps indicates that the species is considerably under-recorded (pers. comment).

2004 was probably a good year for this species being found in 27 km^2 squares compared to 18 km^2 squares in 1990 (Map 25). Interestingly, there appears to be a marked paucity of records for both 1990 and 2004 from the western side of the Dark Peak area, otherwise it is fairly evenly distributed. In some cases it has been difficult to assess the numbers of breeding pairs and one assumes that registrations in close proximity automatically account for double recording. However, this is not always the case because for some birds found in adjacent squares, breeding was proven. Between 14 and 22 pairs bred in the Dark Peak area compared to five confirmed pairs in 1990.

The data suggests a considerable increase in numbers and distribution since the Brown and Shepherd survey of 1990.

7.2.8 Wheatear

The Wheatear is a difficult species to census because first visit registrations mostly account for passage migrants; therefore numbers on the second visit are much reduced. Consequently, it is perhaps wise to only include the second visit data as proof of territories. Wheatear was considered to be breeding in 64 km^2 squares of the study area in 1990 compared to 37 km^2 squares in 2004 (Map 26, Table 3).

This species breeds on inbye land as much as they do on moorland, therefore apparent declines cannot be assessed. Furthermore, as with all passage migrant passerines, numbers fluctuate from year to year. Indeed, Brown and Shepherd (1991) explained the contrasting increases and declines within different parts of the study area. Considering the above, it is reasonable to conclude that there has been no significant change in the population and distribution of Wheatear in the study area since 1990. Nevertheless, the birds were found to be largely absent from edges of the Kinder Scout plateaux in both 2004, supported by a survey conducted by the RSPB in 2002. This is in direct contrast to 1990, when they were present in this area in fairly high densities.

7.2.9 Ring Ouzel

Breeding was confirmed or probable for this species in 69 km^2 squares in 1990 compared to 65 km^2 squares in 2004, three of which were in Staffordshire. The birds were fairly evenly distributed throughout the study area only being absent from the southernmost parts of the Eastern and Staffordshire moors.

The distribution of this species has changed a little and in 1990 Ring Ouzels were notably absent from the Eastern moors, but this was not the case in 2004 (Map 27). This is perhaps not significant, as the birds take up territories wherever the opportunity arises as they do not appear to be site faithful. This was probably proven during the foot and mouth outbreak in 2002 when many pairs bred on Stanage Edge when access was denied for recreational use. This species is especially vulnerable to disturbance, therefore they do not usually nest in areas frequented by recreational users.

There is a small decline in the Ring Ouzels population in the Peak District and no breeding birds were found in 2004 in the Wessenden Valley, which is a traditional site. However, although county avifaunas suggest a probable decline in the area, there is no real evidence that proves that there has been any long-term change of this species in the study area.

7.2.10 Twite

Twite were found in only 8 km^2 squares during the 2004 survey. The species is however, known to breed in a few other localities within the study area. Nevertheless,

Twite have vanished from former haunts and their range contraction is dramatic. In 1990 the species bred in 14 tetrads in the Sheffield area and ten years previous to this they nested in 26 tetrads. The decline has continued and they are literally 'hanging on' in a few localities in the south of the study area. A breeding population exists on the North Staffordshire moors together with an isolated small population at Edale. Moving north in the study area, the nearest colony is probably near Winscar reservoir SE1403 and Black Hill SE0805; further north still and out of the study area, densities tend to increase.

Brown and Shepherd (1991) stated the Twite were thinly distributed throughout the study area following the survey in 1990, furthermore, although they had declined in the Sheffield area, there was no evidence in 2004 to suggest any marked change in the distribution of Twite in the study area. The birds were said to be more thinly distributed south of the line between Stalybridge and Holmfirth and it is interesting to note that south of this line is where they have declined most in the intervening period. Considering that the species are colony nesters, could it be possible that sites are abandoned once the minimum critical level is reached? There is perhaps little evidence to support this hypothesis at present, but is perhaps worthy of further study.

Following the survey in 1990, Brown and Shepherd (1991) estimated the total South Pennines population at around 415 pairs. This was however, an underestimation of the true breeding population at that time. Interestingly, the population at present is estimated between 200 and 500 pairs (RSPB 2001), so if Brown and Shepherd (1991) were accurate in their estimation, perhaps the species have not suffered a population decline but a pronounced contraction in range (pers. comment). English Nature conducted a small study in 2003 that revealed that the species was indeed abundant in certain parts of the Pennines and that there was a 'hot spot' for this species in the circle of moorland between Marsden, Halifax, Todmorden and Rochdale (Middleton 2003). Radiating away from this area the birds become more thinly distributed. Considering that Brown and Shepherd (1991) stated that the birds were thinly distributed throughout the study area, it is worth considering that the Twite's overall population in the South Pennines may have remained stable, and it is just their distribution that has changed. Indeed, they have vanished from areas that provide prime habitat, therefore their foraging requirements are perhaps not the main reason for their decline. A study by Batty, Langston and Gregory (1999) provided evidence for considerable distribution change since the 1990 Brown and Shepherd survey. Whilst Twite were found in only 20% of the squares in 1990, they were found in 18% of their sample squares in 1999. This might suggest that the species has undergone some redistribution. Most important however, is the finding that the increase in densities in occupied squares has increased from 2.91 to 5.75. This again, is evidence that may suggest the species has undergone a range contraction and perhaps not a decline in population.

8. CONCLUSIONS

Providing evidence of increases in the distribution and numbers of many moorland breeding birds in the Peak District is an important outcome from the survey that is in direct contrast to the decline of many lowland farmland birds in the UK. Indeed, many of the moorland birds in the study area have remained stable or have increased. The only species to have declined significantly are Twite and Wheatear; the former has suffered a drastic reduction in both range and numbers in the Peak District.

The evidence provided in this report suggests that there have been increases in the range and numbers of Peregrine, Merlin and Short-eared Owl. Furthermore, Raven has colonised the area since 1990 and Hen Harrier is perhaps attempting to colonise. Waders have also faired reasonably well. Dunlins are slightly down in both range and numbers resulting from loss of suitable habitat, such as eroding moorland after fire incidents on the Bleaklow plateau. However, Golden Plover, Curlew, Lapwing and Snipe have all increased in numbers.

There is no real evidence to suggest that the status of Ring Ouzel has changed since 1990, whilst Whinchat, Stonechat, Reed Bunting and Dipper have all increased in both range and numbers. There is perhaps little change for both Skylark and Meadow Pipit, and the Red Grouse population in 2004 is far greater than in 1990.

A detailed analysis of the breeding bird data will be conducted in 2005. Please visit the Moors for the Future website for updates www.moorsforthefuture.org.uk.

9. ACKNOWLEDGEMENTS

The authors are grateful for the cooperation and support given by the Moors for the Future team and English Nature throughout the survey. We thank David Orchard for digitising the 1990 data. Jon Ward, Cass Worman, Charlie Horsford and Andrew Jones assisted with the report map production. However, a special thanks is given to Aletta Bonn for the constructive comments given on earlier drafts of this report. Thanks also to Geoff Eyre and Tricia Rice for helpful comments.

We are also grateful to the many landowners who gave us access to their land, particularly the private landowners who kindly let us survey at a difficult time when grouse were nesting.

Finally, many thanks to all surveyors, Dave Little, Jack Street, Brian Foster, John Beaumont, Andy Cockroft and the South Peak Raptor Group.

10. REFERENCES

Anderson, P., J.H. Tallis and D.W. Yalden (1998). *Moorland Management Project phase III report.* Peak District Moorland Management Project.

Anderson, P. and D.W. Yalden (1981). Increased sheep numbers and the loss of heather moorland in the Peak District, England. Biological Conservation, 20, 195-213

Batty, R., R.H.W Langston and R.D Gregory (1999). *South Pennines Twite survey 1999.* RSPB.

Brown, A.F. and K.B. Shepherd (1991). *Breeding birds of the South Pennine Moors.* JNCC.

Brown, A.F., R.A. Stilman and K.B. Shepherd (1992). *Bird-habitat associations in the South Pennines of England.* JNCC Report No.102.

Cramp, S. and C.M. Perrins (1994). The Birds of the Western Palaearctic. Oxford University Press. Oxford.

Derbyshire Ornithological Society (2002). *Derbyshire Bird Report.*

Frost, R.A. (1978). *Birds of Derbyshire.* Moorland, Buxton.

Gibbons, D.W., J.B. Ried and R.A. Chapman (1993). *The new atlas of breeding birds in Britain and Ireland: 1988-1991*. Poyser. London.

Gregory et al (2002). The population status of birds in the United Kingdom, Channel Islands and Isle of Man: an analysis of conservation concern 2002-2007. British Birds 95: 410-450

Holland, P. K., J.A. Robson. and D.W. Yalden (1982). The status and distribution of the common sandpiper (*Actitis hypoleucos*) in the Peak District. Naturalist, 107, 77-86.

Holloway, S. (1996). *The historical atlas of breeding birds in Britain and Ireland 1875-1900.* Poyser. London.

Langston, R. H., T. Smith, T., A.F. Brown and R.D. Gregory (in press). The status of breeding twite *Carduela flavirostris* in the UK. Bird Study.

McGhie, H.A., A.F. Brown, S. Reed and S.M. Bates (1994). *Aspects of the breeding ecology of twite in the South Pennines.* English Nature research report No 118.

Lee, J.A., J.H. Tallis, S.J. Woodin (1988). Acidic deposition and British upland vegetation. **In** M.B. Usher and D.B.A Thompson (eds). *Ecological change in the uplands.* Blackwell, Oxford.

McKnight, A.K., M. O'Brien, M. Waterhouse and S. Reed (1996). *Breeding birds of the North Staffordshire moors.* English Nature/RSPB survey report.

Middleton, P. (2003). *Survey of moorland fringe wading birds and twite around the South Pennine moors SSSI/SPA/cSAC.* English Nature survey report.

Nelson, T.H. (1907). *The birds of Yorkshire.* A. Brown & Sons.

Ormerod, S. J. and S.J. Tyler (1985). Is the breeding distribution of Dippers influenced by stream acidity. Bird Study, 32, 32-39.

Pearce-Higgins, J.W. and M.C. Grant (2002). The effects of grazing-related variation in habitat on the distribution of moorland skylarks and meadow pipits. Aspects of Applied Biology 67, 155-164.

Percival, S. and C. Smith (1992). *Habitat requirements of golden plover.* English Nature research report No 1.

Ratcliffe, D.A. (1997). *A nature conservation review.* Cambridge University Press.

RSPB (2000). *Repeat Upland Bird Survey (RUBS).*

RSPB (2001). *Twite inventory, Peak District to M62*.

RSPB, WWT, BTO (2003). *The state of the UK's birds 2003.*

Sharrock, J.T.R. (ed.) (1996). Atlas of breeding birds in Britain and Ireland. British Trust for Ornithology, Tring.

Sim, I.M., R.D. Gregory, H.M. Hancock and M.H. Brown, A.F. (in press). Recent changes in the abundance of British upland breeding birds.

Smith, T. (1939) The birds of Staffordshire. Appendices 1-9 of volume 64072 of the Transactions and Annual report of the North Staffordshire Field Club.

Smith, K.W. (1983) The status and distribution of waders and breeding on wet lowland grasslands in England and Wales. Bird Study, 30, 177-192.

Stone, B.H., J. Sears, R.D. Cranswick, D. Gregory, D.W. Gibbons, M.M. Rehfisch, N.J. Aebischer and B. Ried (1997). Population estimates of birds in the United Kingdom. British Birds, 92, 1-22.

Sugrue, A. (2002). *Lapwing and Wader Survey 2002.* RSPB Report.

Whitlock, F.B. (1893). *The birds of Derbyshire.* London.

Yalden, D.W. (1972). The red grouse in the Peak District. Naturalist, 922, 89-102.

Yalden, D.W. (1974). The status of golden plover and dunlin in the Peak District. Naturalist, 924, 81-91

MAPS