

NORTH PENNINE MOORS SPA

BREEDING BIRD SURVEY 2005-07

A report presented to *Natural England* from



Consultant Ornithologist

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Appendix 1

Summary

Natural England is committed to delivering targets set by the Department for the Environment, Food and Rural Affairs (Defra) to ensure that 95% of all Sites of Special Scientific Interest (SSSIs) in England are in favourable condition by 2010. An essential part of this process is the regular monitoring of site condition. For sites that qualify for features of ornithological interest, in particular aggregations of given bird species, it is necessary to monitor numbers and locations of birds present. Such information is not only important in terms of assessing site condition. It also assists site-specific management decisions and assessments of proposals that might affect the site.

The North Pennine Moors Special Protection Area (SPA), a large upland area comprised of seventeen component SSSIs and designated under the EU Birds Directive for its important populations of upland breeding birds, was surveyed during 2005-07. Scarce raptors, black grouse, grey partridge, all waders except common sandpiper, short-eared owl, yellow wagtail, whinchat, ring ouzel and twite were surveyed in scattered areas around the periphery of the SPA in 2005 as part of a separate exercise undertaken primarily to monitor breeding waders on selected moorland fringe and in-bye habitats. All bird species potentially nesting in open moorland habitats with the exception of merlin¹, peregrine and hen harrier² were surveyed in the remainder of the SPA during 2006-07.

A total of 26551 territories of 48 breeding species were located and totals of 9002 red grouse, 502 male and 459 female black grouse, 4596 skylarks, 27939 meadow pipits and 572 carrion crows were counted. The precise locations of all birds found (almost 70,000 records!) have been stored electronically in Excel spreadsheets suitable for export to GIS tables. Numbers and densities of all species found in the SPA and in each of the seventeen component SSSIs are tabulated in this report. Species accounts describe distribution in the SPA and across Britain in relation to habitat requirements and preferences.

Three of the species found breeding (golden plover, dunlin and short-eared owl) are listed on Annex I of the EC Birds Directive, seven (black grouse, grey partridge, skylark, ring ouzel, grasshopper warbler, linnet and reed bunting) on the current Birds of Conservation Concern (BoCC) red list.

The SPA populations of sixteen species were found to exceed 1% of national (Great Britain) populations; greylag goose (1.2%), wigeon (3.2 - 20.3%), teal (0.9 - 6.7%), red grouse (2.9%), black grouse (7.7%), golden plover (18.5%), lapwing (2.9%), dunlin (1.9 - 2.0%), snipe (3.4%), curlew (5.2%), redshank (1.4%), black-headed gull (2.4%), short-eared owl (0.9 - 3.1%), stonechat (1.6 - 4.3%), wheatear (1.1%) and ring ouzel (3.4 - 4.2%).

¹ Scientific names of species mentioned are given in Appendix 1.

² These three species are monitored by local ornithological groups.

1. INTRODUCTION

Natural England (NE) is committed to delivering targets set by the Department for the Environment, Food and Rural Affairs (Defra) to ensure that 95% of all Sites of Special Scientific Interest (SSSIs) in England are in favourable condition by 2010. An essential part of this process is the regular monitoring of site condition. In accordance with the recently produced Common Standards Monitoring (CSM) guidance (JNCC 2004), the statutory nature conservation agencies are required to assess the condition of all SSSIs every six years. Sites that have been selected for features of ornithological interest are assessed by comparing the current status of key bird species with that at the time of designation. Therefore, for sites that qualify for an aggregation of a particular species it is necessary to estimate, as reliably as possible, the numbers present on the site.

The North Pennine Moors Special Protection Area (SPA) is designated under the EU Birds Directive for its internationally important populations of upland breeding birds. It encompasses a large upland area (c.1470 km²) of blanket bog and heather moorland in Cumbria, County Durham, Northumberland and North Yorkshire. The SPA supports important breeding populations of merlin, peregrine, hen harrier, golden plover, curlew and dunlin as well as a range of other typical moorland breeding bird species. The populations of merlin, peregrine and hen harrier are regularly monitored by local raptor groups, but the other species are not. It was therefore necessary to estimate the numbers of all other moorland species breeding in the SPA and to map their distribution. Such information is not only important in terms of assessing site condition. It also assists site-specific management decisions and assessments of proposals that might affect the SPA.

The SPA is comprised of seventeen component SSSIs:

- Geltsdale and Glendue Fells SSSI
- Whitfield Moor, Plenmeller and Ashholme Commons SSSI
- Allendale Moors SSSI
- Hexhamshire Moors SSSI
- Muggleswick, Stanhope, Edmundbyers Commons and Blanchland Moor SSSI
- Moorhouse and Cross Fell SSSI
- Appleby Fells SSSI
- Upper Teesdale SSSI
- Lune Forest SSSI
- Bollilhope, Pikestone, Eggleston and Woodland Fells SSSI
- Cotherstone Moor SSSI
- Bowes Moor SSSI
- Mallerstang – Swaledale Head SSSI
- Arkengarthdale, Gunnerside and Reeth Moors SSSI
- Lovely Seat – Stainton Moor SSSI
- East Nidderdale Moors SSSI
- West Nidderdale, Barden and Blubberhouses Moors SSSI.

In subsequent text, these will be referred to as Geltsdale, Whitfield, Allendale, Hexhamshire, Muggleswick, Moorhouse, Appleby Fells, Upper Teesdale, Lune Forest, Bollilhope, Cotherstone, Bowes Moor, Mallerstang, Arkengarthdale, Lovely Seat, East Nidderdale and West Nidderdale SSSIs respectively.

Scattered areas around the periphery of four of these SSSIs (Whitfield, Allendale, Hexhamshire and Muggleswick) were surveyed in 2005 as part of a separate exercise undertaken primarily to monitor breeding waders on selected moorland fringe and in-bye habitats (Shepherd 2005). The remainder of the SPA was surveyed during 2006-07.

2. METHODS

2.1 The survey team

The SPA was surveyed by a team of 22 surveyors; [REDACTED]

[REDACTED] and [REDACTED] assisted and supervised by [REDACTED]. The surveyors were all first class, highly experienced field ornithologists. Nevertheless, extensive training was provided both prior to and during survey, irrespective of previous experience. Aspects covered included navigation, application of the survey methods, techniques to minimise fieldworker effects on bird detection, and recognition of birds and bird behaviour. Emphasis was placed on the importance of carrying out the surveys in a systematic, standardised way to enable collection of rigorous survey data and direct comparison of data from different areas and survey periods.

2.2 Bird survey methods 2005

Different survey methods were employed in 2005 and 2006-07. In 2005, methods followed the standard methods employed during the RSPB/SOC Survey of Breeding Waders on Agricultural Land in Scotland and Northern England (O'Brien 1993), except that only two visits (the first two visits) were undertaken instead of three³. Two visits were made to all areas surveyed; the first during 16 April – 8 May 2005, the second during 9-29 May 2005.

Survey work was carried out during daylight periods when breeding waders are generally most active i.e. within five hours of sunrise and within three hours of sunset.

Work was not carried out in precipitation, thick fog (visibility < 300m) or windy conditions (winds of Beaufort Scale Force 5 and above). 1:10,000 scale maps were used and individual fields, individually numbered, were used as recording units. Walk-routes passed within 100m of every part of each field, ensuring that all parts were visible. Each field was surveyed quickly by steadily walking through, pausing to scan any open areas ahead. No time was spent searching particular areas or habitats more intensively. Birds often vacate fields quickly and unobtrusively, so emphasis was placed on constantly looking ahead for rising birds rather than looking down. Minimal time was therefore spent noting records. Swarovski 10x42EL binoculars were used to assist with bird location and identification.

³ The main function of the third visit is to record numbers of pairs of waders with young and hence to obtain a measure of productivity. A negligible number of breeding pairs are discovered on the third visit that have not already been found on the first two visits. A third visit is therefore not required to quantify breeding populations.

The survey was primarily a breeding wader survey and the following was recorded for each field:

- for **Lapwing** and **Redshank** - the total number of birds seen (excluding flocks)
- for **Snipe** - the total number of drumming and chipping birds (including flushed birds that then proceeded to drum or chip)
- for **Oystercatcher**, **Golden Plover** and **Curlew** - the total number of pairs (where "pairs" = paired birds, displaying birds, nests or broods and single birds not in flocks).

Common Sandpiper was not surveyed.

For the smaller fields, it was most efficient to record summary data (eg 6L, 3RK, 2SN) within c.50m of leaving the field (rather than on leaving the field and entering a new field; when it was important to keep looking ahead for rising birds rather than looking down recording data). For larger fields holding larger numbers of birds, summary data were recorded at intervals, then final summary data were recorded within c.50m of leaving the field.

In addition to the breeding waders, the 2005 survey recorded the following for each field:

- For all **scarce raptors (raptors other than sparrowhawk, kestrel and buzzard)**⁴, **short-eared owl** and **twite**⁵ - details of all sightings
- For **black grouse** - the total number of males and the total number of females
- For **grey partridge** – the total number of pairs (indicated by the total number of single adults + adult pairs)
- For **yellow wagtail**, **whinchat** and **ring ouzel** - the total number of breeding territories (breeding indicated by song/display, bird engaged in territorial behaviour/territorial dispute, bird carrying nest material, bird carrying food to nearby nest, location of nest or young, bird repetitively alarm-calling or engaged in distraction display).

No other species were surveyed.

For each area surveyed, wader census results were related to numbers of breeding pairs as follows:

For **Oystercatcher**, **golden plover** and **curlew** - the maximum number of pairs on any one visit was considered to be the total number of pairs (Smith 1983).

For **Lapwing** - both members of a pair are present at the nest site during the late stages of incubation (Barrett & Barrett 1984). The maximum number of birds recorded during the two visits was therefore halved to estimate the total number of breeding pairs.

For **Redshank** - the mean density of individual birds (excluding flocks) counted between mid April and late May is correlated with peak nest density (Green 1986, Cadbury *et al* 1987). The mean number of birds recorded during the two visits was therefore used to estimate the total number of breeding pairs.

⁴ Only merlin was observed.

⁵ There were no sightings of twite.

For **Snipe** - the number of breeding pairs was estimated by multiplying the maximum number of drumming plus chipping birds on any one visit by 1.74 (Green 1985 & 1986).

2.3 Bird survey methods 2006-07

The survey method employed was that of Brown and Shepherd (1993). All open moorland habitats within the SSSI were surveyed. Forest, woodland, copses, hedgerows and extensive areas of scrub were not surveyed (isolated or small groups of bushes and trees were surveyed). All bird species potentially nesting in open moorland habitats within the SSSI were surveyed. Species nesting only in other habitats were not surveyed. The nest sites of merlin, peregrine and hen harrier in the SPA are generally well known by local ornithologists and raptor study groups who monitor the important populations of these species in the area. No effort was therefore made to survey merlin, peregrine or hen harrier. Instead, miscellaneous sightings were passed on to relevant local recorders.

To allow for differences in detection rates between early and late breeding species, two visits were made to all areas surveyed; the first during 1 April – 17 May, the second during 18 May - 27 June. Fieldwork was undertaken between 0800-1800 hrs only in good visibility (>500m), light winds (Beaufort Scale force 0-4) and dry weather.

The survey covered ground systematically with a constant search effort. Walk routes generally followed raised ground to ensure all areas were clearly visible, all points approached to within 125m. Between 20-25 minutes was spent within each half km-square (500m x 500m), proportionately less in boundary part squares. Surveyors paused at regular intervals to scan and listen for calling and singing birds.

For red grouse, skylark, meadow pipit and carrion crow the total number of individuals encountered within each 1km grid-square was recorded on the first visit only. For all other species, the location and activity of birds were recorded on to 1:25,000 scale maps using standard British Trust for Ornithology (BTO) codes (Marchant 1983). Careful attention was given to recording behaviour indicative of breeding (see below).

When individuals or pairs of birds were encountered, efforts were made to establish whether birds were different from those previously encountered. This involved careful attention to the whereabouts and movements of birds, together with birds' sex and plumage characteristics. Where necessary, surveyors retraced steps in order to check the continued presence of previously recorded birds.

Movements of birds were not recorded. Instead, a point location was given for all registrations, recorded at the first point the bird was detected or, if breeding behaviour was observed, at the first point breeding behaviour was observed. Birds merely flying over and showing no signs of breeding behaviour or attachment to the area were ignored.

At the end of each visit, a summary map was compiled showing the location of each identified territory or breeding pair. The following observations of breeding behaviour were considered diagnostic:

- song, courtship or territorial display
- territorial dispute
- nest building and hole excavation
- agitated behaviour by adult bird(s) indicating the presence of a nearby nest or young (e.g. repetitive alarm calling, distraction display)
- adult(s) carrying food
- presence of newly fledged young
- adult(s) removing a faecal sac.

For red-legged partridge and grey partridge, the mere presence of a single or pair of adults in suitable breeding habitat was considered to be indicative of breeding. For reed bunting, the mere presence of a single or pair of adults in suitable breeding habitat was considered to be indicative of probable breeding. For all duck species, the mere presence of a single or pair of adults in suitable breeding habitat was considered to be indicative of possible breeding.

Where a number of breeding individuals were present and it was not possible to determine the number of breeding pairs, registrations of individual birds were deemed to represent discrete breeding territories/pairs if the distance between them was more than 500m (200m in the case of dunlin and passerines). Whilst it is recognised that these distances are arbitrary and that territory size varies both inter- and intra-specifically, this approach produces a standardised index of abundance based on the distance that members of a breeding pair are likely to move during each visit. In cases where two individuals were considered to constitute a pair of birds, the location of the pair was placed centrally by convention.

Population estimates were derived by comparing the summary maps for the two visits. Territories plotted during each visit were considered to be separate from one another if they were located more than 1km apart (500m for dunlin, 200m for passerines). Again, these distances were chosen arbitrarily to reflect the distances birds could plausibly move between visits. The location of territories mapped in both visits was plotted centrally by convention.

3. RESULTS

Total numbers of all species found in areas surveyed in 2005 are given in Table 1. Total numbers of all species found in each SSSI and throughout the SPA during 2005-07 are given in Table 2. Precise locations of all birds found (almost 70,000 records!) have been stored electronically in Excel spreadsheets suitable for export to GIS tables.

4. DISCUSSION

This section presents accounts for all moorland breeding bird species found in the SPA. Each account includes details of the following:

- The number of individuals or pairs found in the SPA during 2005-07 (such information is summarised for all species in Table 2)
- Breeding distribution in the SPA and across Britain, in relation to habitat requirements and preferences
- The conservation importance of the species⁶ and of the SPA's breeding population⁷ (such information is summarised for all species in Table 3).

Note that, apart from some mention of where the highest breeding densities are generally found, attention is rarely drawn to comparisons of densities between component SSSIs. This is because expressions of densities within SSSIs largely result merely from proportions of suitable breeding habitat within arbitrary SSSI boundaries. Assessing 'condition' of SSSIs, indicated by given breeding bird densities within given SSSIs, should therefore be made with caution. Instead, emphasis is placed in the species accounts on careful description of habitat requirements and preferences (where highest densities are likely to be found). If breeding bird densities are to be used to assess site 'condition', these should be measured within given habitats. Such an exercise would involve detailed further work however, since 'habitats' are difficult to determine (relative to bird utilisation), describe, further identify and delineate.

As ever, references to the conservation importance of SPA populations, indicated by proportions of national populations breeding in the SPA, should also be treated with caution. As with almost all bird survey techniques currently employed in Britain, the extent to which the survey methods have underestimated populations is unknown⁸. Furthermore, national population estimates, derived from a variety of sources and survey techniques, may be of limited accuracy and may greatly underestimate true numbers breeding.

4.1 Little grebe

Breeding little grebes frequent still or slow moving freshwaters; large (where more sheltered and shallower bays or channels are favoured) or small (often less than 0.25ha). Both submerged and emergent vegetation is required to provide adequate food and cover (Cramp & Simmons 1977), so the species is essentially a lowland breeding species, where it is common and widespread throughout much of Britain (Gibbons *et al* 1993). It is very scarce in the British uplands (Gibbons *et al* 1993) and only two pairs were found breeding in the SPA; on water bodies at NY 692592 on Whitfield SSSI and at Roundhill Quarry (NZ 012382) on Muggleswick SSSI.

⁶ Mention is made if the species is listed on Annex I of EC Directive 79/409/EEC on the Conservation of Wild Birds 1979, on Schedule 1 of the Wildlife and Countryside Act 1981 or on the current Birds of Conservation Concern (BoCC) red list (Gregory *et al* 2002).

⁷ Mention is made if the SPA's breeding population exceeds 1% of the national (Great Britain) population.

⁸ Sites where true numbers of birds breeding are known are almost non-existent in Britain, hence survey methods cannot be tested.

4.2 Mute swan

Like little grebes, mute swans rarely visit unvegetated, oligotrophic waters, breeding traditionally on larger open freshwaters with extensive shallows and much floating, bottom, and emergent vegetation. In western Europe, the species has switched extensively from natural to humanly influenced habitats and patterns of living however, where populations may include feral, introduced, and domesticated stocks. Consequently many British birds are largely conditioned to more or less close human presence, and frequently become dependent on artificial habitats and food where even regulated rivers, streams, canals, ditches, channels, ponds created by subsidence or for ornament, gravel-pits, reservoirs and wetlands are all utilised (Cramp & Simmons 1977). The species is therefore very scarce in the British uplands (Gibbons *et al* 1993) and only one pair was found breeding in the SPA; at Tindale Tarn (NY 6058) on Geltsdale SSSI.

4.3 Greylag goose

Breeding greylag geese require a combination of secure aquatic (mainly for safety) and open grassland (for feeding) habitats, with some cover for nesting (Cramp & Simmons 1977). A total of 233 pairs were found breeding in the SPA; nesting in taller vegetation (mainly heather *Calluna* or rushes *Juncus*) on relatively undisturbed open moorland before quickly leading newly hatched young to the safety of water bodies nearby. Highest numbers/densities were found on Bollilhope (36 pairs; 0.45 pairs/km²), East Nidderdale (52 pairs; 0.49 pairs/km²) and West Nidderdale SSIs (52 pairs; 0.39 pairs/km²).

The SPA population is likely to comprise a rapidly increasing population of recent colonists, for the species' recent rapid growth and expansion in many parts of England, including the north Pennines, is well known and documented (Owen & Salmon 1988, Gibbons *et al* 1993, Rehfish *et al* 2002, Baillie *et al* 2005).

Two breeding populations are considered to inhabit Britain. A truly native population in the far north of Scotland (part of a northern population breeding in Iceland, Scotland, and coastal Norway) is of considerable conservation importance and is listed on Schedule 1 (Part II)⁹ of the Wildlife and Countryside Act 1981. The many scattered populations elsewhere (Gibbons *et al* 1993) are often dismissed as being feral and introduced, having resulted mainly from a complex series of releases made in recent decades. Increasing importance is being afforded to them however, owing to the fact that many are effectively re-introduced birds, the former indigenous English populations eliminated following excessive hunting and drainage of the wetlands by the mid 19th century (Holloway 1996). The SPA population comprises 1.6% of the latter population, 1.2% of the overall British population.

4.4 Canada goose

British breeding Canada geese are found in habitats similar to greylags; in the vicinity of water bodies amply fringed by open tracts of herbage suitable for close grazing. They are common and widespread throughout much of England, though scarcer in Wales, northern England and Scotland (Sharrock 1976, Gibbons *et al* 1993). A total of 280 pairs were found breeding in the SPA; nesting on generally less disturbed open moorland before quickly leading newly hatched young to the

⁹ Species listed on Part II are protected by special penalties during the close season only (1 February to 31 August).

safety of water bodies nearby. Highest numbers/densities were found on Whitfield (42 pairs; 0.59 pairs/km²), Bowes Moor (23 pairs; 0.52 pairs/km²) and West Nidderdale SSSIs (111 pairs; 0.83 pairs/km²).

Like the previous species, the SPA population is likely to comprise recent colonists and likely to be increasing in line with well known and documented rapid increases and expansions of populations throughout England (Gibbons *et al* 1993, Rehfisch *et al* 2002, Pollitt *et al* 2003, Baillie *et al* 2005).

4.5 Wigeon

Breeding wigeons generally prefer shallow, open, broad, freshwaters of medium quality, neither strongly eutrophic nor oligotrophic, with ample submerged or floating vegetation but without dense, emergent or marginal stands. In treeless areas, dense and tall stands of heather, bracken, or similar cover are required for nesting (Cramp & Simmons 1977).

The precise breeding season requirements of the small British population are little understood and a variety of wetlands and water bodies, both large and small were frequented by the totals of 16 breeding and 45 possible breeding pairs found across the SPA. These were generally located on lower-altitude moorland however, hence were typically neither strongly eutrophic nor oligotrophic. In a study of selection of water body type for breeding in the Caithness and Sutherland flows, water acidity was found to be one of the most important controlling factors. Neutral or alkaline waters were much preferred, the species almost totally avoiding those where the pH was lower than 5.5 (Fox *et al* 1989).

A small, outlying population in the British uplands at the southernmost edge of the species' range (Cramp & Simmons 1977, Gibbons *et al* 1993), the British wigeon population is currently estimated at only 300-500 pairs (Baker *et al* 2006) of which between 3.2 - 20.3% breeds in the SPA.

4.6 Teal

Though some nest in the lowlands where a variety of well-vegetated wetland habitats are utilised, British breeding teal favour oligotrophic waters in upland areas, the bulk of the population found on moorland pools, bogs and patterned mires (Sharrock 1976, Gibbons *et al* 1993).

Totals of 23 breeding and 78 possible breeding pairs were found in such habitat in well-scattered locations across the SPA to estimate a total population of 23-101 pairs. The British teal population is currently estimated at 1,500-2,600 pairs (Baker *et al* 2006) of which between 0.9 - 6.7% breeds in the SPA.

4.7 Mallard

Breeding in the vicinity of freshwater bodies of all sizes in an extremely wide range of habitats, the mallard is common and widespread in all parts of Britain except the very highest and inhospitable of moorland and montane zones (Cramp & Simmons 1977, Gibbons *et al* 1993).

Totals of 36 breeding and 218 possible breeding pairs found on or near wetlands and water bodies in well-scattered locations estimated a total SPA population of 36-254 pairs.

4.8 Tufted duck

The tufted duck is almost universally a lowland species. Its capability for sustained diving to depths of 3–14 m enables use of deeper, more open fresh waters, frequently free of floating vegetation and not encroached on by emergent stands of reed *Phragmites* or similar marginal or shallow growth, though there is some preference for eutrophic waters (where open) and for moderate depths of 3–5 m. Quiet reaches of rivers are also sometimes occupied as well as nearly all types of man-made waters from reservoirs to gravel-pits and ornamental ponds, even within city parks. Activity on land is slight so breeding normally takes place close to the water's edge, islets being strongly favoured (Cramp & Simmons 1977, Gibbons *et al* 1993).

A small number of pairs (three breeding and eighteen possible breeding) were found on scattered, lower lying water bodies across the SPA.

4.9 Goosander

Though still and slow-moving waters may be occupied, the goosander is primarily a breeding bird of upland rivers (which support a suitably high productivity of fishes) in Britain. In common with other large hole-nesters, it is somewhat tied to breeding habitat which also includes mature trees (often broad-leaved) with suitable natural holes within easy reach of water, though rock crevices, cavities in steep slopes or artefacts such as nest-boxes and holes in walls are also used (Cramp & Simmons 1977, Gibbons *et al* 1993).

A small number of pairs (three breeding and eight possible breeding) were found on rivers in scattered locations across the SPA.

4.10 Buzzard

The buzzard's preference for hunting over open tracts of ground with low vegetation, and resting and nesting in trees and on crags links it strongly with varied landscapes across Britain. These include forest clearings and fringes, woodlands (amidst pasture, meadow, or arable land, or beside wetlands), cultivated landscapes with groves or tall isolated trees, and hilly slopes, ridges, or uplands with some or much tree cover. Food requirements (especially in the breeding season) can only be met however, where hunting ranges contain a fairly low proportion of dense tree cover and other unrewarding areas for hunting (such as reedbeds, cereal crops and water surfaces), although a wide dietary tolerance enables use of varied habitats in which some kind of ground prey is abundant and accessible (Cramp & Simmons 1980).

Though suitable nest sites are limited in some areas, it is widely believed that persecution continues to prevent the species from becoming common and widespread in the SPA and a pitiful total of only thirteen pairs were found breeding. Following much reduced persecution elsewhere, dramatic increases and expansions have occurred throughout England in recent years (Baillie *et al* 2005).

4.11 Kestrel

Kestrels utilise cliffs, crags, trees and buildings for nesting, where suitable densities of prey (mainly small rodents) are accessible in open country nearby (Cramp & Simmons 1980). The species is therefore widespread across much of

Britain, though scarcer in the bleaker uplands of SW England, Wales and NW Scotland and absent from some of the Scottish islands (Gibbons *et al* 1993).

Sixteen pairs were found in the SPA in scattered locations where the species is protected or tolerated. Many more would certainly breed were it not for continued persecution of the species in the area.

4.12 Red grouse

The red grouse is an upland species, feeding almost exclusively on heather *Calluna* (Cramp & Simmons 1980). Its British distribution is therefore restricted to heather moorland (Gibbons *et al* 1993). A total of 9002 adults (2.9% of the British population) were counted in the SPA, highest numbers and densities recorded on shooting estates where habitat was particularly well managed for the species.

Red grouse populations are ever-changing. In the short term, abundance varies in cycles (with periods that vary regionally) that are linked to the dynamics of infection by a nematode parasite (Dobson & Hudson 1992, Gibbons *et al* 1993). In the longer term, Game Conservancy Trust surveys have revealed overall declines in red grouse populations throughout Britain, apparently driven by moorland loss and degradation and increased predation from corvids and foxes (Hudson 1992, Baillie *et al* 2005). Population changes in the SPA are therefore likely to be complex and fluctuating.

4.13 Black grouse

Where more natural and semi-natural habitats are inhabited in the black grouse's main range across northern and central Europe, central and southern Siberia, the species is typically found in habitats transitional between forest or woodland and open heath, marginal cultivation, bog and fen, or steppe. The presence of trees is essential, but they must not be in dense stands or form a closed canopy, and should preferably be in scattered groups of no great height, and adjoin open glades, clearings, burnt patches or fringes in course of encroachment by natural regeneration (Cramp & Simmons 1980).

As in parts of the north Pennines, some British populations are also found in treeless areas. Nevertheless, the species' diverse requirements for availability of special food plants (particularly grasses *Gramineae* and dwarf shrubs such as heather *Calluna vulgaris* and bilberry *Vaccinium myrtillus* in the SPA), open bare or sparsely vegetated land for display (particularly short-grassed hills, hillocks or knolls in the SPA) and good shelter for roosting and nesting (in treeless areas, particularly tall sedges *Juncus* in the SPA) all close together still lead to concentrations on mixed terrain (Cramp & Simmons 1980, Gibbons *et al* 1993).

A total of 961 adults were recorded in the SPA; 502 males and 459 females. However, black grouse are best surveyed at dawn (Gilbert *et al* 1998) so these totals are likely to have underestimated true numbers present. A total of 6,500 male black grouse is currently estimated to be present in Britain (Baker *et al* 2006) of which at least 7.7% therefore reside in the SPA. Highest densities of males were found on Whitfield (21 males; 0.30 males/km²), Allendale (68 males; 1.29 males/km²), Hexhamshire (32 males; 0.34 males/km²), Upper Teesdale (111 males; 0.80 males/km²) and Bollihope (27 males; 0.34 males/km²) SSSIs.

Following its historical population decline in the UK during 1800-1995 and a further rapid (>50%) decline in its UK breeding population over the last 25 years, black grouse is currently included on the BoCC red list (Gregory *et al* 2002).

4.14 Red-legged partridge

The red-legged partridge was originally introduced in Britain in the 18th century and, following frequent releases in numerous areas to the present day, has gradually colonised to occupy much of southern and eastern England north to Yorkshire, with scattered outlying populations also found in SW England, Wales, northern England and Scotland (Gibbons *et al* 1993).

A total of 113 pairs were found in the SPA, the relatively high numbers found on Whitfield (18 pairs) and West Nidderdale (63 pairs) SSSIs presumably due to more recent releases having been made on or adjacent to these SSSIs.

In its native European range, the species is adaptable to a variety of soils and land uses, though generally prefers sunny, dry areas, light soils with some permanently bare surfaces (such as rocks or tracks), and suitably low or open vegetation to permit fast running and ample visibility against dangers (Cramp & Simmons 1980). Habitats in lowland England are clearly much preferred to upland (Gibbons *et al* 1993) and the species is likely to remain generally scarce in the SPA, its distribution and numbers likely to be largely dependent upon local releases in the future.

4.15 Grey partridge

Breeding grey partridges prefer generally low but continuous grass or herbage, flanked or interspersed with some taller and denser cover (affording concealment and nest-sites) such as hedgerows, woodland verges, or rough herbage and scrub. They also seek ready access to bare, preferably dusty ground. High rainfall is tolerated with difficulty, especially in the breeding season. Adults feed mainly on plant materials (particularly green leaves and seeds of grasses, weed seeds, cereals and clovers). Insect food is crucial for the survival of chicks, especially when young (Cramp & Simmons 1980).

Given these requirements, breeding pairs are scarce or absent throughout much of the British uplands (Gibbons *et al* 1993) and the majority of the total of 185 pairs found in the SPA were located on in-bye or moorland fringe habitats at lower altitudes.

Following a rapid (>50%) decline in its UK breeding population over the last 25 years, grey partridge is currently included on the BoCC red list (Gregory *et al* 2002).

4.16 Moorhen

Breeding moorhens require ready access to open fresh water with adequate plant cover, much preferring waters sheltered by woodland, tall emergent plants or dense cover. Wide-open waters are avoided, especially those exposed to wind and wave action (Cramp & Simmons 1980). Consequently the UK uplands hold very few moorhens, though the species is common and widespread in the lowlands (Gibbons *et al* 1993).

Seven pairs were found breeding on small, eutrophic, lower lying water bodies in the SPA.

4.17 Coot

Coots prefer fairly shallow freshwaters, with room to dive and with muddy bottoms well furnished with ample marginal, emergent, floating, or bottom vegetation. They require a minimum of open water and tolerate some exposure and wave action, but are not normally found far from banks or from emergent or floating vegetation when breeding (Cramp & Simmons 1980). The species is therefore essentially a lowland species in Britain (Gibbons *et al* 1993) and only three pairs were found breeding in the SPA; one pair on a small reservoir at NY 988348 on Bollilhope SSSI and two pairs at Locke Tarn (SE 002916) on Lovely Seat SSSI.

4.18 Oystercatcher

The distribution of breeding oystercatchers in Britain is governed largely by a varying reliance upon successful adaptation to feeding on hard-shelled marine lamellibranch and gastropod molluscs in intertidal shore zones, and a more generalised capacity for feeding on softer bodied invertebrates; terrestrial as well as marine. Consequently, the species is primarily tied to shorelines colonised by molluscs, marine worms and crustaceans that can be fed on at low tide, secondarily to lakesides, riversides, and a wide variety of terrestrial open ground where less specialised feeding techniques can be employed (Cramp & Simmons 1983). The interplay between these capacities leads to regional contrasts; for example between inland breeding along shingly, gently flowing rivers in eastern Scotland (rather than along the coast), as against almost exclusively coastal nesting in western Scotland (Baxter & Rintoul 1953, Gibbons *et al* 1993). Local distribution is also influenced by the availability of suitable nesting habitat in the form of open or short vegetated ground; in cultivated or uncultivated land, on cliff-tops or rocky outcrops of rock, in clearings in taller vegetation and even on flat shingle roofs (Sharrock 1976, Cramp & Simmons 1983, Gibbons *et al* 1993).

The ability to exploit inland habitats has advanced greatly in recent times, for oystercatchers formerly bred solely on the coast in Britain before beginning to spread inland during the 19th century, initially by steady colonisation up the main river valleys in NW England, SW and E Scotland (Holloway 1996). By the 1960s, birds were moving away from rivers on to agricultural, in-bye and moorland fringe habitats frequented by other waders (Buxton 1962, Dare 1966, Gibbons *et al* 1993). This radical expansion necessitated advancing the nesting season in order to utilise the earlier peak availability of terrestrial foods – chiefly earthworms and tipulid larvae (Heppleston 1972). Though numbers appear to have stabilised recently in Scotland, increases in England seem to be continuing unabated (Baillie *et al* 2005).

A total of 490 pairs were found breeding in the SPA. Nesting on bare or very short-vegetated, usually stony ground affording camouflage to nest and eggs, adjacent to open, short grassland providing ample food for both adults and young, the majority were found at lower altitudes along river valleys or around the periphery of the SPA. Highest numbers/densities were found on Whitfield (45 pairs; 0.63 pairs/km²), Allendale (34 pairs; 0.64 pairs/km²), Hexhamshire (48 pairs; 0.51 pairs/km²), Muggleswick (49 pairs; 0.54 pairs/km²), Upper Teesdale (84 pairs; 0.60 pairs/km²), Lune Forest (64 pairs; 1.01 pairs/km²) and East Nidderdale (44 pairs; 0.41 pairs/km²) SSSIs.

4.19 Ringed plover

Like the oystercatcher, the ringed plover is primarily a bird of sea coasts, but secondarily occupies suitable habitat inland - where estuaries, rivers, lakes, reservoirs, gravel beds and pits, sand-bars, grasslands of sparse and low growth, or other suitable well-drained terrain exists. It nests in exposed locations on sandy or stony ground (relying heavily on camouflage to protect incubating birds and unguarded eggs) and feeds on open, flat, unvegetated terrain, preferably with a moist or wet surface (Cramp & Simmons 1983).

Ringed plovers were recorded breeding away from the coast in several areas in the UK during the 19th century (Holloway 1996), but the main spread inland, particularly in England, has occurred in recent decades (Prater 1989, Gibbons *et al* 1993). Beach-nesting birds are vulnerable to ever-increasing disturbance and the large numbers nesting on the Western Isles have suffered greatly from predation by introduced hedgehogs (Jackson *et al* 2004). Whilst inland populations are increasing, those on the coast may therefore be struggling.

Three pairs were found breeding in the SPA; two pairs on the shores of Cow Green Reservoir on Upper Teesdale SSSI and one pair on disused workings at NY 998422 on Muggleswick SSSI.

4.20 Golden plover

In the Western Palearctic, breeding golden plovers are found mainly in higher latitudes in continental-arctic or arctic-alpine and boreal tundra conditions, but also secondarily on temperate, oceanic, unenclosed upland moors and peatlands (which share a similar cool, misty, often windy climate). In Britain, their distribution correlates with almost the full extent of montane tops, heather moor, blanket bog and acidic grassland. Flat or gently sloping ground (not exceeding 10°) is much preferred, where there are some raised places suitable as lookouts, and some blending of open patches with very sparse low vegetation with other areas providing partial cover (though still not tall enough to block a distant view). Accordingly, the species is often a temporary inhabitant of habitat in transition through ecological succession, or recovering from the effects of grazing, burning or surface disturbance, or stunted by prevailing winds or late snow cover, or locally saturated by impeded run-off of precipitation (Ratcliffe 1976, Sharrock 1976, Cramp & Simmons 1983, Gibbons *et al* 1993).

A total of 4171 pairs were found breeding in the SPA, their distribution illustrating the species' general preference for the higher, flatter ground. More localised factors determined precise distribution, especially vegetation height and the distribution of open areas with sparse, low vegetation. Both of these are heavily influenced by land management practices (especially stock levels and grouse moor management), which clearly play a major role in the fortunes of this species in the SPA. Were it not for grazing stock and heather burning, golden plovers would soon be restricted to the sparsely vegetated montane and semi-montane habitats and the more extensive, wetter blanket bogs dominated by low carpets of *Sphagnum* mosses and cottongrasses. Instead the species flourishes in heavily grazed areas and particularly on the most intensively managed grouse moors where, in places, safely removed from predation, pairs were observed tending young on every, or every other burnt patch. Highest overall densities were found on Allendale (198 pairs; 3.75 pairs/km²), Hexhamshire (351 pairs; 3.72 pairs/km²), Muggleswick (375 pairs; 4.11 pairs/km²), Upper Teesdale (602 pairs; 4.32

pairs/km²), Lune Forest (249 pairs; 3.93 pairs/km²) and Bollihope (362 pairs; 4.55 pairs/km²) SSSIs.

Listed on Annex I of EC Directive 79/409/EEC on the Conservation of Wild Birds 1979, the golden plover is a species of recognised international conservation importance.

The British golden plover population is currently estimated at 22,600 pairs (Baker *et al* 2006) of which 18.5% breeds in the SPA.

4.21 Lapwing

Lapwings breed on short or sparsely vegetated, open, flat or gently sloping terrain affording ready access to soil carrying prey in the form of an appreciable biomass of surface or subsurface organisms (Cramp & Simmons 1983). In Britain, most still breed on lowland agricultural land, though impressive densities are found on higher in-bye and marginal hill ground. Fewer breed on moorland and very few beyond 500m above sea level (Shrubb & Lack 1991, Gibbons *et al* 1993).

The total of 4389 pairs found breeding in the SPA were mainly associated with lower altitude, in-bye and moorland fringe habitats. Highest numbers/densities were found on Whitfield (520 pairs; 7.34 pairs/km²), Allendale (480 pairs; 9.09 pairs/km²), Hexhamshire (655 pairs; 6.94 pairs/km²), Muggleswick (449 pairs; 4.92 pairs/km²), Upper Teesdale (853 pairs; 6.12 pairs/km²) and Lune Forest (276 pairs; 4.36 pairs/km²) SSSIs.

The British lapwing population is currently estimated at 154,000 pairs (Baker *et al* 2006) of which 2.9% breeds in the SPA.

4.22 Dunlin

Dunlins breed on short or sparsely vegetated, moist, usually boggy ground, often interspersed with pools or other standing or flowing water (Cramp & Simmons 1983). In Britain, the majority inhabit acidic, peaty upland blanket mires, though substantial numbers are found on base-rich machair in the Hebrides. Small numbers breed on Dartmoor and in Wales, but the main distribution stretches from the South Pennines to the far north of Scotland (Gibbons *et al* 1993).

A total of 186 pairs were found breeding in the SPA, all on generally more extensive blanket mires at higher altitudes. Observations made during 2006-07 indicated that the suitability of many such mires for dunlin might currently be changing markedly from season to season however, perhaps having major effects on population levels both in the short and long terms. During very dry spells (such as during the whole of the 2006 spring and the early part of the 2007 spring) many such areas lacked moisture and surface water and habitats which otherwise looked ideal for breeding dunlin lacked birds or supported odd displaying males which seemed to be ranging widely in search of mates. When rains arrived after a prolonged dry spell in May 2007, birds seemed to colonise some areas very late in the spring and were observed at an apparently early stage of breeding (with much displaying and apparent territory establishment) when they would normally have been at the late stages of incubation or tending young. Such apparently opportunistic and/or nomadic behaviour could be quite normal. Alternatively, perhaps changing climatic conditions in recent decades is having effects on British

dunlin populations, for reductions were recorded in both numbers and range in many parts of Britain between 1968-72 and 1988-91 (Gibbons *et al* 1993).

Listed on Annex I of EC Directive 79/409/EEC on the Conservation of Wild Birds 1979, the dunlin is a species of recognised international conservation importance.

The British dunlin population is currently estimated at 9,150-9,900 pairs (Baker *et al* 2006) of which between 1.9 - 2.0% breeds in the SPA.

4.23 Snipe

Breeding snipe require soft, accessible organic soil, rich in food organisms just below the surface, with frequent clumps or patches of herbage or shrub cover for shelter and nesting, though these generally affording good visibility of approaching danger. Herbage too continuously dense to be readily walked through tends to be avoided, as do more unsheltered, open areas exposed to wind, heat, or heavy precipitation (Cramp & Simmons 1983). In-bye and moorland fringe habitats, as well as the more extensive tall sedge *Juncus* beds and flushes on moorlands provided such conditions in the SPA where a total of 1786 pairs were found. Highest numbers/densities were found on Whitfield (260 pairs; 3.67 pairs/km²), Allendale (226 pairs; 4.28 pairs/km²), Hexhamshire (348 pairs; 3.69 pairs/km²) and Muggleswick (237 pairs; 2.60 pairs/km²) SSSIs.

The British snipe population is currently estimated at 52,500 pairs (Baker *et al* 2006) of which 3.4% breeds in the SPA.

4.24 Curlew

The vast majority of British curlews breed in the uplands, with only small numbers found in scattered lowland areas (Gibbons *et al* 1993). A range of moist, poorly drained habitats in open landscapes with wide visibility are inhabited; typically heather *Calluna* moorland (either pure heather or heather mixed with grass, often with rushy boggy hollows or open recently burnt areas), extensive peatlands, rough grasslands (having dry nesting habitat with damp feeding areas nearby), damp pastures overgrown with rushes and even slopes with much bracken *Pteridium* (Cramp & Simmons 1983).

Accordingly, curlews breed throughout the SPA and a total of 5454 pairs were located; 5.2% of the British population which is currently estimated at 105,000 pairs (Baker *et al* 2006). Highest numbers/densities were found on Whitfield (473 pairs; 6.67 pairs/km²), Allendale (395 pairs; 7.48 pairs/km²), Hexhamshire (711 pairs; 7.54 pairs/km²), Cotharstone (188 pairs; 7.68 pairs/km²), Bowes Moor (224 pairs; 5.03 pairs/km²) and West Nidderdale (669 pairs; 5.01 pairs/km²) SSSIs.

The precise distribution of curlews across the SPA is much more difficult to explain, though height and density of vegetation, frequency and extent of bare damp or wet patches, nature and frequency of disturbance, and gradualness of change in traditionally occupied territories are likely to be significant determinants. The mobility and adaptability of the species to localised land management practices often results in a complex and confusing pattern of local increases, decreases, losses or relinquishment of previous habitats and invasions of new habitat (Cramp & Simmons 1983).

4.25 Redshank

Breeding redshanks are dependent upon a high water table and local saturation of ground; inhabiting wetlands free of tall, dense, aquatic vegetation or closed stands of shrubs or trees. The precise nature of vegetation and landscape is less important to breeding birds than the combination of openness, unobstructed look-out facilities, and ready access to ample wetland food resources (Cramp & Simmons 1983). The species is therefore found in both lowland and upland habitats in Britain which satisfy such criteria, including coastal saltings, estuarine marshes, damp (but not wet) marshland, grassy fields subject to partial flooding, water meadows, recently flooded gravel-pits, rushy fields, wet pastures and wetter areas on open moorland (Sharrock 1976, Gibbons *et al* 1993, Brindley *et al* 1998).

A total of 522 pairs were found breeding in the SPA. Though small numbers were found in the vicinity of peatland pools at higher elevations, the majority inhabited in-bye and moorland fringe habitats. Highest numbers/densities were found on Whitfield (81 pairs; 1.14 pairs/km²), Allendale (78 pairs; 1.48 pairs/km²), Hexhamshire (87 pairs; 0.92 pairs/km²), Upper Teesdale (96 pairs; 0.69 pairs/km²) and Lune Forest (36 pairs; 0.57 pairs/km²) SSSIs.

The British redshank population is currently estimated at 38,600 pairs (Baker *et al* 2006) of which 1.4% breeds in the SPA.

4.26 Common sandpiper

Common sandpipers are widespread in the UK uplands; breeding alongside lakes and reservoirs or fairly fast-flowing rivers or streams (Sharrock 1976, Gibbons *et al* 1993). Nests are placed in dry, often raised but hidden locations, immune from flooding, normally within 50m of water (Cramp & Simmons 1983).

The majority of the total of 115 pairs found in the SPA bred alongside rivers and streams. Highest densities were found within SSSIs holding more of such habitat, particularly those through which major rivers flowed.

4.27 Black-headed gull

The black-headed gull is mainly a lowland or lower upland breeding bird in Britain, nesting colonially near shallow, calm water (fresh, brackish, or saline), usually on islands or at the margins of ponds, lakes, lagoons or slow-flowing rivers (Cramp & Simmons 1983). Though absent from many parts of southern England and Wales, the species is fairly widely distributed across northern England and Scotland (Gibbons *et al* 1993).

A total of 3055 pairs were found in the SPA; eleven singles and aggregations of 2-10 pairs at twelve sites, 11-50 pairs at seventeen sites, 75-100 pairs at three sites, 220 pairs, 275 pairs, 300 pairs (at SE 164705 on East Nidderdale SSSI), 400 pairs (at Dodd Reservoir; NY 845460 on Allendale SSSI) and 1100 pairs (at Upper Barden Reservoir; SE 011575 on West Nidderdale SSSI). Many more would certainly breed were it not for persecution of the species in many parts of the SPA.

The British black-headed gull population is currently estimated at 127,907 pairs (Baker *et al* 2006) of which 2.4% breeds in the SPA.

4.28 Common gull

In Britain, the common gull breeds mainly in Scotland. Few breed in England and Wales. It is mainly an inland breeder where favoured sites are shingle bars, islets and islands in water bodies and along rivers, bogs and marshes, and open ground, grassy or heather moorland, sometimes some way from water. On the coast, breeding sites include small inshore rocky stacks, islets and islands, grassy and rocky slopes and cliff-ledges, shingle banks, sand-dunes and foreshores covered with tide-wrack or flood debris along inlets (Cramp & Simmons 1983, Gibbons *et al* 1993).

Just one pair was found breeding in the SPA; at Dirty Pool (NY 834199) on Lune Forest SSSI.

4.29 Lesser black-backed gull

Depending for security on strength of numbers, lesser black-backed gulls breed colonially, preferring to nest on generally flat or sloping areas under close, fairly short vegetation. Both coastal and inland sites are occupied in Britain, where more impressive colonies comprise several thousand pairs (Cramp & Simmons 1983, Lloyd *et al* 1991, Gibbons *et al* 1993).

A total of 50 pairs were found breeding in the SPA; on Whitfield SSSI (one pair), Bowes Moor SSSI (a total of four pairs at two localities) and East Nidderdale SSSI (a total of 45 pairs at three localities). A great many more would certainly breed were it not for heavy persecution of the species, particularly on grouse moors.

4.30 Cuckoo

Ubiquitous in both lowland and upland Britain, the cuckoo ranges indiscriminately over a wide variety of habitats including coniferous, broad-leaved or mixed woodland and scrub, parkland, open country with scattered trees or hedgerows (including farmland of various types), wetlands with reedbeds, heaths, and coastal dunes or marshes. Its restless mobility and far-carrying voice compensate for its thin distribution, largely determined by choices of principal host species parasitised for rearing young (Cramp 1985, Gibbons *et al* 1993).

Cuckoos require plenty of well-placed commanding song-posts and look-outs; in order to communicate with each other, and for monitoring the breeding stages of prospective hosts (Cramp 1985). Few of the total of 53 pairs found in the SPA were therefore located on open moorland, the majority recorded around the moorland fringe.

4.31 Little owl

The little owl is a lowland species in Britain, its breeding range extending only to lower lying, moorland fringe habitats where solitary pairs nest in trees, buildings and quarries and feed in fairly open, but generally unexposed country (Sharrock 1976, Gibbons *et al* 1993). The species was introduced to Britain during the 19th century and, following a population explosion during the early 20th century, has colonised much of England, Wales and southern Scotland (Witherby *et al* 1941, Cramp 1985).

Three pairs were found in the SPA; all around the periphery of West Nidderdale SSSI [REDACTED]

4.32 Short-eared owl

Apart from small numbers nesting in coastal rough grazing, marshes and dune slacks, the short-eared owl is an upland breeding species in Britain (Gibbons *et al* 1993). It favours substantial tracts of open country away from excessive human disturbance, a dominant factor in habitat selection being abundance or super-abundance of small mammal prey, in the absence of which many otherwise suitable areas may be unused for periods or even indefinitely (Cramp 1985). Short-eared owls feed mainly on voles *Microtinae*, a food supply ever-changing in abundance. Changes in owl numbers and distribution are therefore complex (Lockie 1955). Extensive upland afforestation in Britain in recent decades, creating excellent but temporary vole habitat in young plantations, has inevitably lead to increases and redistributions of birds (Mikkola 1983, Gibbons *et al* 1993). Persecution, particularly on grouse moors, has more localised effects, including in the SPA.

A total of 31 pairs were found breeding in the SPA; nesting in *Juncus* beds or deeper heather *Calluna* in generally more remote, less disturbed locations away from persecution. The majority were found on West Nidderdale SSSI (16 pairs), though small numbers were scattered throughout the SPA.

Listed on Annex I of EC Directive 79/409/EEC on the Conservation of Wild Birds 1979, the short-eared owl is a species of recognised international conservation importance. The British population is currently estimated at 1,000-3,500 pairs (Baker *et al* 2006) of which between 0.9 - 3.1% breeds in the SPA.

4.33 Skylark

One of the most widespread breeding bird species in Britain, skylarks occupy virtually all open upland and lowland habitats except for the highest montane zones (Gibbons *et al* 1993). The species frequents open surfaces of firm, level or unobstructed soils, preferably well clothed with grasses (including cereals) or low green herbage, though always including bare or short-vegetated patches or areas for foraging (Cramp 1988).

The distribution of the total of 4596 adults counted in the SPA was patchy with impressive concentrations in places as well as extensive areas supporting no or very few birds. Highest densities were found on the flatter, grassier hill-tops and plateaux, lowest densities on steep slopes or unbroken tracts of heather *Calluna*.

Following the rapid (>50%) decline in its UK breeding population over the last 25 years, skylark is currently included on the BoCC red list (Gregory *et al* 2002).

4.34 Sand martin

Breeding sand martins require sandy, loamy or other workable banks, excavations or cliffs suitable for tunnelling to form nest-chambers. Such sites occur naturally along rivers and streams, by lakes and on sea coasts, or artificially where sand or other materials are extracted in conditions leaving faces undisturbed. Consequently the species' distribution is somewhat constrained by geology and mainly restricted to lowland Britain (Cramp 1988, Gibbons *et al* 1993).

Nineteen pairs were found breeding in sandy exposed riverbanks in the SPA; one at NY 592576 on Geltsdale SSSI, ten at NY 698606 on Whitfield SSSI and eight at NY 835316 on Upper Teesdale SSSI.

4.35 Meadow pipit

Meadow pipits inhabit open areas of rather low, fairly complete vegetation cover, avoiding extensive bare areas (rock, stones, sand, soil, and close-cropped grass or herbage) as well as tall dense vegetation (including woods, forests, and reedbeds). Marked concentrations are found in a series of distinct habitats in Britain; coastal dunes, salt-marshes (except their lower fringes), damp low-lying grasslands, lowland heaths with grass and sparse bracken, mires, grazed fens, and the entire spectrum of rough heaths and moorland from those at sea-level in the far north, through blanket bog and gently or steeply sloping heather or grass moorland, to montane grasslands at high altitude (Cramp 1988, Gibbons *et al* 1993).

The meadow pipit is characteristically the commonest breeding bird on moorland throughout Britain, and a total of 27,939 adults were counted in the SPA. Though densities were broadly similar across the SPA, noticeably fewer birds were found in extensive tracts of unbroken heather (presumably supporting limited feeding habitat) as well as on more extensive exposed areas at higher altitudes (presumably supporting limited nesting habitat).

4.36 Yellow wagtail

Virtually absent from northern/central Scotland and west Wales, and with few in southern Scotland and east Wales, the British yellow wagtail population is largely confined to England where it is essentially a lowland species (Gibbons *et al* 1993).

Small numbers are found on drier agricultural land, but the species much more typically occupies fringes of wetlands; such as riversides, lakesides, upper levels of salt-marshes, floodlands, moist pastures, water-meadows, excavations, subsidences, grazed fens with scattered small trees, sedge marshes, slacks within sand-dunes and similar habitats both natural and artificially managed, especially where herbage is low, dense, luxuriant, moist, and preferably near shallow surface water. Low perches are also required for singing and territory proclamation; on bushes, wires, fences, banks or walls (Cramp 1988, Gibbons *et al* 1993).

Just one pair was found breeding in the SPA; in a damp enclosed pasture at NY 826329 in Upper Teesdale SSSI.

4.37 Grey wagtail

Typical grey wagtail breeding habitats include a combination of (a) fresh water, especially fast-running streams and rivers, but also canals, lowland streams, lake and reservoir margins, (b) rock slabs, boulders, vertical rock faces, shingle or gravel stream beds, or artefacts such as sluices, weirs, locks, culverts, walls, or roofs, (c) sheltering trees, shrubs, or dense herbage and (d) holes, ledges, or hollows for nesting. The grey wagtail is therefore mainly an upland breeding species in Britain, for upland and mountain streams often provide an ample choice of such requirements. Lowland streams, lakes, and reservoirs generally provide less, whilst lowland canals, woodland pools, habitations with artificial tanks or

drains, and other peripheral types of site are occupied only locally or infrequently (Cramp 1988).

A total of 104 pairs were found breeding in the SPA, their distribution highlighting the watercourses of rivers and wider, faster-flowing streams.

4.38 Pied wagtail

Locally scarce or absent only at higher altitudes and on intensive arable farmland, the pied wagtail is common and widespread across Britain, breeding in a wide variety of habitats; urban and rural, lowland and upland (Sharrock 1976, Gibbons *et al* 1993).

A total of 34 pairs were found breeding in the SPA; nesting mainly in walls, rocky outcrops or buildings and feeding on bare ground or very short vegetation nearby.

4.39 Dipper

The only truly aquatic passerine in Britain, the dipper lives exclusively beside, on and under fresh water, mainly swift-running rivers and streams, occasionally lakes. The vast majority of the British population are found in the uplands, though some breed on lowland rivers in association with weirs and bridges (Gibbons *et al* 1993). Typical habitat contains plenty of rock faces and boulders and tends to have little aquatic or bankside vegetation, but the mainstay of foraging habitat is shallow water, often with a gravel bottom (Cramp 1988). Despite its highly specialised habits and habitat, the species has become largely dependent for nest-sites on artefacts such as bridges, culverts, weirs, walls, and other structures related to exploitation of watercourses, which are often more frequent and accessible than natural crevices or waterfalls (Sharrock 1976).

Dippers breed very early in the spring, and the survey method does not allow time for all watercourses to be thoroughly searched. The total of only 30 pairs found breeding along rivers and streams in the SPA is therefore likely to have considerably underestimated true numbers breeding.

4.40 Wren

A very wide variety of low cover and foraging opportunities provide suitable breeding habitat for wrens; including herb and field layers of plant growth (both within and outside woodland), hedgerows, gardens, parks and shrubberies, crops, aquatic vegetation, fallen trees and branches and heaps of brash. The species is particularly attracted to crags, fissures, cliffs, earthen banks, outhouses and other free-standing structures, stone walls and other faces or slopes providing cavities, crevices and interstices which can be profitably explored or used for roosting or nesting. Indeed, apart from wide open tracts of bare rock, sand, gravel, mud, soil or water and also forests without undergrowth, extensive farmlands, and closely built-up urban areas, suitable habitat exists as a discontinuous layer of low natural cover or artefacts over much of the British landscape (Cramp 1988, Gibbons *et al* 1993). Remarkably ubiquitous and widespread, the wren is consequently the commonest breeding bird in Britain (Raven *et al* 2005, Baker *et al* 2006). Abundance can vary sharply from year to year however, since it is greatly influenced negatively by mortality rates that may be very high in severe winters and positively by the species' very high breeding potential (Peach *et al* 1995).

Most favoured habitats in Britain are damp deciduous or mixed woods with much small growth and thick cover, overgrown valleys with streams, untended garden/woodland areas, and sheltered, deep, tree-fringed lanes (Cramp 1988, Gibbons *et al* 1993). On open moorland, more sheltered slopes, crags, cliffs, ravines, river and stream sides are much favoured, such features highlighted by the distribution of the total of 3018 pairs found across the SPA.

4.41 Whinchat

Probably due to loss of marginal farmland habitats, the whinchat's range in lowland Britain has contracted considerably in recent decades where it is now a scarce breeding bird. Though frequenting lower levels, the species is therefore becoming confined to the British uplands (Sharrock 1976; Fuller 1982, Gibbons *et al* 1993).

Unlike stonechats, whinchats utilise the seasonal growth of green vegetation (such as bracken *Pteridium* and tall weeds and grasses) in preference to permanent woody shrubs (Cramp 1988). Accordingly, the 135 pairs found in the SPA were patchily distributed in more sheltered hillsides and valleys supporting lush, taller summer vegetation, avoiding the more open expanses of heather moorland. Notably high numbers (64 pairs) were found on ungrazed sections of Geltsdale SSSI, particularly on the RSPB land-holding there.

4.42 Stonechat

Breeding stonechats inhabit a wide variety of dry plains and hillsides, often submarginal for agriculture, characterised by scattered bushes, shrubs, stones, walls or fences (used as look-outs or song-posts) commanding lower moorland, heathland, grassland, or bare patches (Cramp 1988). With a distribution biased towards the more temperate west of the UK, the species prefers rough areas where gorse *Ulex* and/or heather *Calluna*, sometimes associated with bracken *Pteridium*, are interspersed with close-cropped grass (Sharrock 1976, Gibbons *et al* 1993). The total of 362 pairs located in the SPA frequented such areas, nesting mainly in localised stands of older/deeper heather *Calluna*.

The British stonechat population is currently estimated at 8,500-22,000 pairs (Baker *et al* 2006) of which between 1.6 - 4.3% breeds in the SPA.

4.43 Wheatear

The wheatear is mainly a bird of the open uplands in Britain, relatively few breeding in the lowlands (Gibbons *et al* 1993). It is largely unaffected by degree of slope (from flat to steep), or substrate (whether of soil, clay, sand, limestone, small stones or exposed bedrock), but its distribution is constrained by a requirement for a ready-made rock or burrow nest-site immediately adjacent to seasonally insect-rich bare patches or short swards for easy foraging (Cramp 1988). Though extensive areas of the SPA (particularly uniform tracts of heather moorland) are therefore avoided, marked aggregations were found in rockier, more heavily grazed or exposed locations.

A total of 623 pairs were located in the SPA, 1.1% of the British population, which is currently estimated at 55,000 pairs (Baker *et al* 2006).

4.44 Ring ouzel

The ring ouzel is characteristically a breeding bird of open moorlands and fells with rarely more than sparse and stunted trees. Most nesting territories in Britain include small crags, gullies, screes, boulders or broken ground, as well as sloping or flat areas, often of heather, sometimes with a few trees or bushes. Coastal cliffs and inshore islands are sometimes occupied, as are artefacts such as walls, quarries and mineshafts. Short-vegetated foraging habitat may not be plentiful close to nest sites, as birds will fly some distance to feed (Cramp 1988, Gibbons *et al* 1993, Wotton *et al* 2002).

The total of 256 territories found in the SPA were centred around nest-sites located in broken or rocky terrain; particularly crags, cliffs, gullies, disused quarries and walls. Highest densities were found where such habitat was plentiful, particularly where also located in the vicinity of prime short-grassland foraging habitat.

The British ring ouzel population is currently estimated at 6,157-7,549 pairs (Baker *et al* 2006) of which between 3.4 - 4.2% breeds in the SPA.

Following the rapid (>50%) decline in its UK breeding population over the last 25 years, ring ouzel is currently included on the BoCC red list (Gregory *et al* 2002).

4.45 Grasshopper warbler

Grasshopper warblers require three basic components within breeding territories; dense ground cover, several suitable song-posts and a rich source of invertebrate food (Glue 1990). Such conditions are found in a wide spectrum of habitats such as overgrown bottomlands beside small streams, dry meadows with nettle-beds or scattered shrubs, patches of young trees (coniferous or broad-leaved, either spontaneous or planted, in forest clearings or along margins), osiers or coppices recently cut low (especially among tussock sedge), heaths, commons, cliff-tops with plenty of brambles or gorse, moist or swampy ground with plenty of bushes or hedgerows, marshy or boggy rough grasslands with scattered or grouped willows *Salix*, birches *Betula*, or alders *Alnus*, thickets along river banks or fens and reedbeds with some bushes (Cramp 1992). The species therefore breeds mainly in the British lowlands (Gibbons *et al* 1993), though small numbers venture into moorland fringe habitats, such as the six pairs found breeding in the SPA; all in lush ground cover around the northern periphery of Geltsdale SSSI.

Following the rapid (>50%) decline in its UK breeding population over the last 25 years, grasshopper warbler is currently included on the BoCC red list (Gregory *et al* 2002).

4.46 Whitethroat

Breeding whitethroats require patchy, fairly low, fairly dense cover (natural or planted, woody or herbaceous) allowing room for song-flights and frequent excursions across open ground. A variety of different kinds of low vegetation are inhabited; ranging from herbs and grasses to shrubs, bushes, hedgerows and young trees (Cramp 1992).

Scarce in the uplands, the whitethroat is mainly a lowland breeding species in Britain (Gibbons *et al* 1993). A few pairs extend to the moorland fringe and one

such pair was found breeding in the SPA; on the edge of East Nidderdale SSSI at SE 171825.

4.47 Carrion crow

Having a wide-ranging foraging ability, an omnivorous appetite and great skill in exploiting most diverse opportunities, the carrion crow is one of the most adaptable bird species (Cramp & Perrins 1994a). It requires only a tree or bush (occasionally a cliff, crag, pylon, telephone pole or building) in which to nest, so it is common and widespread across its British range in England, Wales, southern and eastern Scotland (it is replaced by the hooded crow in northern/western Scotland), occupying a great variety of habitats from lowland open woodlands and farmlands to high moorland (Sharrock 1976, Gibbons *et al* 1993).

Following much reduced persecution, lowland populations in Britain have increased steadily since the 1960s (Gregory & Marchant 1996, Baillie *et al* 2005). Control activities continue to severely regulate numbers in many moorland areas however, including in the SPA where extensive areas held very few birds, the total of only 572 adults recorded exhibiting an irregular, patchy distribution.

4.48 Raven

The raven's overriding breeding requirements are a nest-site of difficult access (normally on a rock-face or in a tall tree) and a wide, open, largely undisturbed foraging area in which long-range food-gathering, often involving high flights, can be practised (Cramp & Perrins 1994a).

The species was formerly common and widespread throughout Britain, but severe persecution during the 19th and early 20th century drove populations back to wild, uninhabited regions in the far north and west (Holloway 1996). The general decline of gamekeepers has led to considerable population expansion in recent years (Cross 2002, Baillie *et al* 2005), though continued persecution continues to curtail increase in many upland areas, including in the SPA.

Ravens typically breed very early in the spring, and many breeding attempts were presumably persecuted at an early stage, so the single pair found breeding in the SPA (a cliff-nesting pair at NY 799001 on Mallerstang SSSI) probably underestimates the true SPA breeding population. Nevertheless it is obvious that the species remains extremely scarce throughout the SPA.

4.49 Linnet

The linnet is mainly a lowland bird in Britain (Gibbons *et al* 1993), frequenting scrub and heath vegetation with a dry sunny aspect, farmland with hedges or low trees, fields left uncultivated, young plantations and untended forest edges. These afford both nest-sites (in low vegetation) and ready access to seed-bearing food-plants and ground foraging areas. Woodlands and forests are generally avoided, except those of open type with clearings or glades (Newton 1972, Cramp & Perrins 1994a).

The 79 pairs located in the SPA were found mainly around the edges of moorland or in moorland fringe habitats, nesting mainly in deeper heather *Calluna*, dead bracken *Pteridium* or gorse *Ulex*.

Following the rapid (>50%) decline in its UK breeding population over the last 25 years, linnet is currently included on the BoCC red list (Gregory *et al* 2002).

4.50 Reed bunting

The reed bunting is ecologically restricted to particular types of dense and prolific fairly low vegetation, these mainly associated with intense soil moisture. The species' apparent attachment to wetlands therefore occurs indirectly (through dependence on their associated vegetation types) rather than being linked with any special need for water. Breeding pairs typically occupy tall herbage and small shrubs found in marshy and swampy areas, often bordering fresh or brackish water of all kinds, though mainly in valleys and lowlands. In Britain, the species has recently exploited drier situations such as young conifer plantations, hawthorn scrub on waterless chalk downlands and even tall crops such as cereals and oilseed rape (Sharrock 1976, Gibbons *et al* 1993, Cramp & Perrins 1994b). On open moorland, more extensive stands of tall sedge *Juncus* are particularly favoured and the vast majority of the total of 218-268 pairs located in the SPA were found in such habitat.

Reed bunting is currently included on the BoCC red list, based on a 62% decline on national CBC plots between 1974 and 1999 (Gregory *et al* 2002).

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Appendix 1:

Scientific names of species mentioned in the text

Little grebe	<i>Tachybaptus ruficollis</i>
Great crested grebe	<i>Podiceps cristatus</i>
Mute swan	<i>Cygnus olor</i>
Greylag goose	<i>Anser anser</i>
Canada goose	<i>Branta canadensis</i>
Shelduck	<i>Tadorna tadorna</i>
Wigeon	<i>Anas penelope</i>
Teal	<i>Anas crecca</i>
Mallard	<i>Anas platyrhynchos</i>
Shoveler	<i>Anas clypeata</i>
Tufted duck	<i>Aythya fuligula</i>
Red-breasted merganser	<i>Mergus serrator</i>
Goosander	<i>Mergus merganser</i>
Red kite	<i>Milvus milvus</i>
Hen harrier	<i>Circus cyaneus</i>
Goshawk	<i>Accipiter gentilis</i>
Buzzard	<i>Buteo buteo</i>
Osprey	<i>Pandion haliaetus</i>
Kestrel	<i>Falco tinnunculus</i>
Merlin	<i>Falco columbarius</i>
Peregrine	<i>Falco peregrinus</i>
Red grouse	<i>Lagopus lagopus scoticus</i>
Black grouse	<i>Tetrao tetrix</i>
Red-legged partridge	<i>Alectoris rufa</i>
Grey partridge	<i>Perdix perdix</i>
Moorhen	<i>Gallinula chloropus</i>
Coot	<i>Fulica atra</i>
Oystercatcher	<i>Haematopus ostralegus</i>
Ringed plover	<i>Charadrius hiaticula</i>
Golden plover	<i>Pluvialis apricaria</i>
Lapwing	<i>Vanellus vanellus</i>
Dunlin	<i>Calidris alpina</i>
Snipe	<i>Gallinago gallinago</i>
Curlew	<i>Numenius arquata</i>
Redshank	<i>Tringa totanus</i>
Common sandpiper	<i>Tringa hypoleucos</i>
Black-headed gull	<i>Larus ridibundus</i>
Common gull	<i>Larus canus</i>
Lesser black-backed gull	<i>Larus fuscus graellsii</i>
Herring gull	<i>Larus argentatus argenteus</i>
Cuckoo	<i>Cuculus canorus</i>
Little owl	<i>Athene noctua</i>
Short-eared owl	<i>Asio flammeus</i>
Skylark	<i>Alauda arvensis</i>
Sand martin	<i>Riparia riparia</i>
Meadow pipit	<i>Anthus pratensis</i>
Yellow wagtail	<i>Motacilla flava flavissimma</i>
Grey wagtail	<i>Motacilla cinerea</i>
Pied wagtail	<i>Motacilla yarrellii</i>
Dipper	<i>Cinclus cinclus</i>
Wren	<i>Troglodytes troglodytes</i>
Whinchat	<i>Saxicola rubetra</i>
Stonechat	<i>Saxicola torquata</i>
Wheatear	<i>Oenanthe oenanthe</i>
Ring ouzel	<i>Turdus torquatus</i>

Grasshopper warbler
Whitethroat
Carrion crow
Raven
Linnet
Twite
Reed bunting

Locustella naevia
Sylvia communis
Corvus corone
Corvus corax
Carduelis cannabina
Carduelis flavirostris
Emberiza schoeniclus